Nutrition Intervention in
Developing Countries

# udy II
# UTRITION EDUCATION

*Prepared by the Harvard Institute for International Development*

Prepared for
Office of Nutrition
Development Support Bureau
U.S. Agency for International
Development

Nutrition Intervention in
Developing Countries

tudy II
UTRITION EDUCATION

Marian F. Zeitlin
Candelaria S. Formacion

*Prepared by the Harvard Institute for International Development*

*Project Director, James E. Austin*
*Associate Project Director, Marian F. Zeitlin*

Prepared for
Office of Nutrition
Development Support Bureau
U.S. Agency for International
Development

Oelgeschlager, Gunn & Hain,
Publishers, Inc.
Cambridge, Massachusetts

International Standard Book Number: 0-89946-082-8

Library of Congress Catalog Card Number: 80-29235

Printed in the United States of America

Library of Congress Cataloging in Publication Data

Main entry under title:

Nutrition intervention in developing countries.

CONTENTS: v. 1 Study one, Supplementary feeding.--v. 2. Study two, Nutrition education.--v. 3 Study three, Fortification. Study four, Formulated foods.--(etc.)
1. Underdeveloped areas--Nutrition policy--Collected works. 2. Underdeveloped areas--Nutrition--Study and teaching--Collected works. 3. Underdeveloped areas--Food relief--Collected works. 4. Underdeveloped areas--Food supply--Collected works. I. Austin, James E. II. Zeitlin, Marian F.
TX359.N874 363.8'8 80-29235
ISBN 0-89946-082-8 (v.2)

This document has been prepared by a staff of professionals through the Harvard Institute for International Development under a contract with the Office of Nutrition, U.S. Agency for International Development. The purpose of this volume is to provide guidance to those interested in the development and implementation of programs directed at preventing malnutrition among preschool populations.

# CONTENTS

CONTENTS (continued)

CHAPTER TWO (continued)

CONTENTS (continued)

CHAPTER TWO (continued)

CONTENTS (continued)

CHAPTER TWO (continued)



CHAPTER THREE - INTERVENTION EVALUATION

CONTENTS (continued)

CHAPTER THREE (continued)



CHAPTER FOUR - CASE STUDY: USING RADIO TO TEACH ENRICHMENT OF RICE PORRIDGE IN THE PHILIPPINES

CONTENTS (continued)

CHAPTER FOUR (continued)

CONTENTS (continued)

CHAPTER FOUR (continued)

# FOREWORD

How do nutrition projects begin? How are specific interventions selected? Who makes the decisions and what is the rationale behind them?

Since such decisions relate to health or food policies of countries and have important implications for budgets, personnel and other resource allocations, it would be prudent that they be made only after careful study and analysis. Regrettably, this is not usually the case. More often than not, the choice is a subjective one.

Some interventions are undertaken because they seem "obvious." Since many others are doing it, it seems like the right thing to do, and there is unquestioned faith that it works. An approach may be fashionable at a given time period. A particular activity may be promoted by an external agency. There may be very attractive offers, such as free food or technical assistance, or a start-up grant.

To the degree that costs are considered, there is usually concern only with what funds are needed to cover immediate and direct costs. The indirect or hidden costs, which may be much greater, are overlooked. Project staff time may be charged to other budgets. The implications for an increased demand on energy or scarce materials may not be considered. There is a tendency to forget overhead costs such as those for the use of buildings or for heating, cooling, and lighting.

Social costs are even more often ignored. Some projects accelerate a change away from traditional practices such as breastfeeding or using natural foods or cultivating home gardens. A project may encourage a welfare mentality, reduce incentives to work, or create lasting demands for convenience foods where packaging and processing may forever raise the price of a food. Obsessed with political needs, decision makers may not be concerned with long-term consequences, such as the problem of terminating a popular service when it is no longer needed.

Too often these kinds of questions are not addressed, resulting in only marginal effectiveness for many projects. An apparently "good project" (that is, one which is scientifically sound, well organized, etc.), will bring disappointing results if it is aimed at a problem it is not designed to deal with. This in turn can lead to a dilemma of whether to continue a project while lacking confidence in it or to terminate it and admit failure. More often, projects go on and on without bringing results but without any objective evaluation or analysis.

Avoiding these problems requires accurate identification of problems, insightful analysis of causation, and a good understanding of interventions in terms of how they work, what they cost, what they achieve, what other consequences they bring, and what preconditions should be present before a particular intervention is selected.

To help deal with the question of intervention selection, the U.S. Agency for International Development commissioned Harvard University to prepare this set of monographs dealing with supplementary feeding, nutrition education, formulated foods, food fortification, consumer price subsidies, agricultural production and integrated programs. Together the separate pieces comprise a manual intended to provide guidance on selecting from alternative approaches to reach the preschool child. We hope this effort contributes to improving the process of intervention selection, and thereby, to more effective prevention of malnutrition.

Martin J. Forman
Director, Office of Nutrition
U.S. Agency for International
Development
Washington, D.C. 20523

## PREFACE

This study on nutrition education is part of a seven-study series examining the major types of nutrition programs operating in developing countries. The other studies cover supplementary feeding, formulated foods, fortification, consumer price subsidies, agricultural productivity, and integrated programs. Nutrition education is sometimes undertaken as an independent activity, but generally it accompanies one of the other interventions, particularly supplementary feeding, formulated foods, or integrated programs. The reader is urged to review those related monographs and an overview volume, entitled Nutrition Intervention in Developing Countries: an Overview.

The purpose of this series of studies is to provide guidance to planners in developing countries and international development agencies on the nature and design of these major types of nutrition interventions. The lack of knowledge about intervention design, costs, and effectiveness was cited by the National Academy of Sciences in its 1977 World Food and Nutrition Study as a major impediment to efforts to reduce the malnutrition problem. Our study, which was carried out for the Office of Nutrition of the U.S. Agency for International Development, is an attempt to help close that knowledge gap.

We have tried to assess the "state of the art" of nutrition interventions through a review of published and unpublished literature, a mail survey of 200 nutrition projects in 64 developing countries, interviews with professionals from many disciplines and institutions involved in nutrition programming, and direct field analyses of selected nutrition programs. From these multiple sources and voluminous data we have attempted to present a representative picture of each nutrition intervention. A commonly cited difficulty for planners, especially in developing countries, is ascertaining what is going on elsewhere and obtaining factual information on the many facets of designing a nutrition program. We have attempted to alleviate that problem by providing fairly complete, although not exhaustive, documentation and supporting references. Such attention to detail is needed when one is actually going through the intervention design process. However, not all readers will need to immerse themselves in this detail. To facilitate their use of the monographs we have preceded each subsection with a set of Key Questions that are addressed therein. At the end of each subsection we have presented a short Summary of the major points covered. Both the Question and Summary sections are blocked off to facilitate the reader's scanning the document and identifying those parts that are of greatest personal interest.

Despite our efforts for completeness and our intense desire to provide useful guidance, the relative paucity of reliable evaluation data on nutrition programs and the limitations of this study leave us far short of the ideal. It has not been possible to ascertain the quality of the data and research designs of most of the literature we have reviewed. Our analyses and suggestions should be viewed as tentative, subject to further verification. It is hoped that these documents will facilitate such future evaluative efforts and that this volume and the others in the series will at least provide a reasonable base upon which others can build.

The efforts of many individuals and institutions made this study ossible. Dr. Martin Forman and his staff in the Office of Nutrition pro-ided continuing support and encouragement. The following individuals indly reviewed the manuscript and provided valuable information and sug-estions: Dr. David Harman, Harvard School of Education; Dr. Jean cNaughton, FAO; Dr. Sean Tate, World Education; Dr. Anthony Meyer, AID/ ducation; Dr. Thomas Cooke, Manoff International; Drs. Gretchen and Warren erggren, Harvard School of Public Health; David Pyle and Peter Bowers. he case study on nutrition education via mass media in the Philippines ould not have been possible without the generous cooperation of Richard anoff, President of Manoff International, whose organization had assisted he National Nutrition Council of the Philippines mount and analyze the ass media campaign. The Executive Director of the Council, Dr. Florentino olon, and the Deputy Executive Director, Mrs. Delfina B. Aguillon, pro-ided invaluable institutional and individual support to our field work. ndelaria Formacion coauthored the case study with Dr. Marian Zeitlin. he field interviewers who collected the data and the cooperating milies also deserve special thanks. Elizabeth Duval and Marilyn Pirkle ssisted with their editorial services, and Melanie Mahin and Sarah, as ll as other HIID staff, skillfully provided critical administrative pport.

On behalf of the monograph's author, Marian Zeitlin, who also ved as my Associate Project Director, and myself, I extend our deep reciation to all these individuals and institutions for making this lication possible.

James E. Austin
Project Director
Cambridge, Massachusetts

# CHAPTER ONE

# OVERVIEW*

## I. PURPOSE AND ORGANIZATION

The purpose of this work is to provide guidelines for planning, implementing, and evaluating nutrition education programs designed to improve nutritional practices in developing countries. After an introduction to the role of nutrition education and its forms in Chapter One, Chapter Two discusses how to design programs within different contexts and how to meet different requirements. Most of the actio guidelines are far less explicit than, for example, the recipe for a weaning food or the instructions on a seed packet, because each nutrition education program is a unique organizational structure created by interaction with the environment. The exact forms nutrition education should take are determined by community participation, sources and amounts of funding, problem diagnosis, leadership styles, available facilities, cultural norms, and other considerations. For this reason, many examples of innovative techniques are included in order to help the reader to make an individualized "shopping list" of suitable approaches. Chapter Three considers evaluation from the point of view both of building ongoing formative evaluation into a program and of evaluating the cost effectiveness of alternative programs or strategies. Chapter Four illustrates considerations of the previous chapters with a case study of a mass-media nutrition education campaign in the Philippines.

## II. ROLE OF NUTRITION EDUCATION

### A. KEY QUESTIONS

- What is nutrition education?
- What is its history in developing countries?
- What are its interdisciplinary connections?
- How far do its goals extend?
- How much can it achieve?

### B. Definition of Nutrition Education

The term "nutrition education" applies to any communications system that teaches people to make better use of available food resources. Most types of nutrition interventions such as feeding programs or growth surveillance, require an educational component to teach participants to use

*This chapter was written by Marian F. Zeitlin.

foods, facilities, or opportunities. Nutrition education may also be the primary form of intervention, backed by other infrastructures such as health care, agricultural extension services, or adult education.

Strategies for nutrition education vary depending on the type of malnutrition being addressed. In this respect malnutrition can be compared to diabetes, in that there are two major types or syndromes: a juvenile-onset form and an adult-onset form. The juvenile-onset, or developmental form of undernutrition, is the concern of this volume. It primarily strikes children below the age of five years in low-income communities, is highly lethal, and can cause permanent mental and physical retardation. The adult-onset, or degenerative form of overnutrition, occurs in affluent societies and may begin in childhood with obesity or ingestion of toxins, but it generally does not threaten life or health until after the age of 50. The probability that death will occur in the near future as a result of nutritional disorders is many times lower in the affluent overnourished than in the poor and undernourished type.

In most developing countries these two forms of malnutrition are at the opposite ends of a single spectrum. The low-income majority suffer from the juvenile-onset variety, while the elite minority experience the nutritional diseases of affluence. In Tunisia, for example, preschool malnutrition is recognized to be numerically the greatest problem; however, problems of high cholesterol and obesity are found associated with higher occupational levels (Forbes et al. 1979). The difference in the type of problem creates a special need for nutrition education for policy makers, since their personal experience with malnutrition generally will be quite different from that of the target groups most in need of intervention.

C. History

The need for nutrition education in developing countries gained international recognition in 1950 with the first report of the Joint Food and Agriculture Organization/World Health Organization (FAO/WHO Expert Committee on Nutrition, which emphasized the importance of nutrition education in the health sector. By 1958 the same committee reported, "Education in nutrition is a necessary part of practical programs to improve human nutrition...," and recommended as channels for nutrition education schools, maternal child health (MCH) and public health centers, community development and related programs, and agricultural extension and home economics extension services. The 1960s saw an emphasis on audio-visual aids and the creation of programs such as the Applied Nutrition Programs, in which nutrition education was placed at a level of priority equal to that of other project activities, rather than being considered a casual adjunct to curative health (Bagchi 1977). The 1970s have seen further development in two complementary but very different directions: one toward use of mass media, and the other toward community self-care schemes, in which community members work part-time as lower-level field extension workers for centrally organized programs providing health, community development, agricultural, or other services, and provide nutrition education directly to their neighbors.

D. Interdisciplinary Connections

Food is so central to life that nutrition studies are inevitably interdisciplinary. Nutrition education is a subcategory of many disciplines, including pediatric health care, formal and nonformal education, psychological behavior modification, community development, sociological studies of attitude and behavior change, social marketing for nonprofit organizations, communications, and the diffusion of innovations. Most of these have focused on change and development generally, without applying their techniques and conclusions to nutrition in particular. A result has been that nutrition educators have remained out of touch with some useful information. Among the more recent books that educators might wish to consult are: Rogers and Shoemaker (1971), Drummond (1975), Bandura (1977), Gaedeke (1977), Herron (1977), and Srinivasan (1977).

E. Extent of Goals

The goals of nutrition educators vary from producing simple behavior modification, at one extreme, to educating individuals so that they can make intelligent food choices, to consciousness raising in the Freirian mode, where nutrition is considered as one of many areas in which communities are encouraged to take control of their living conditions. The view of this volume is that these goals are complementary and that the degree of choice exercised by the community or individual should depend on the type of nutritional decision being made. During a diarrheal epidemic, for example, rapid behavior modification of those who withhold liquids is required, in order to prevent their children from dying, although the reasons for giving oral rehydration should be explained. Whether to sell eggs for cash or give some of them to the children, however, is a choice only the family can make. And whether to organize cooperative community gardens must be a decision made by the community in light of other development goals.

The goals of nutrition educators may be subverted in situations where the government supports economic inequality, as pointed out by a report from a 1978 International Union of Nutrition Sciences (IUNS) workshop in Dar es Salaam on "Education of the Public" (IUNS 1978). Their work may be used to provide palliatives, rather than real attacks on nutritional problems, where real improvement can occur only by redistributing food-producing resources to malnourished groups. In such cases nutrition educators must question why segments of the population are denied access to the means of adequate nutrition and how such means can be secured for them. Educators should be alert to existing opportunities to cooperate with those organizations such as trade unions and community groups seeking broader social changes than those directly associated with nutrition. Part of their role as educators is to provide such groups with irrefutable statistics indicating the human costs in malnutrition and mortality of policies that promote inequality. The IUNS report points out the element of risk involved in this work in some societies and urges that international support be offered to nutrition educators by their professional colleagues.

F. Potential Achievements

How much improvement in nutritional status can be achieved through nutrition education? An answer to this question requires a closer look at the causes of the juvenile-onset type of malnutrition. Severe endemic malnutrition occurs in almost all developing countries at the weaning age. A major proportion of this malnutrition has been shown to be caused by ignorance, incorrect food and health beliefs, and resultant poor feeding and health practices, rather than by lack of basic food resources (Jelliffe 1968). The fact that this ignorance persists, however, reflects inequity in the distribution of the knowledge generated by modern technology.

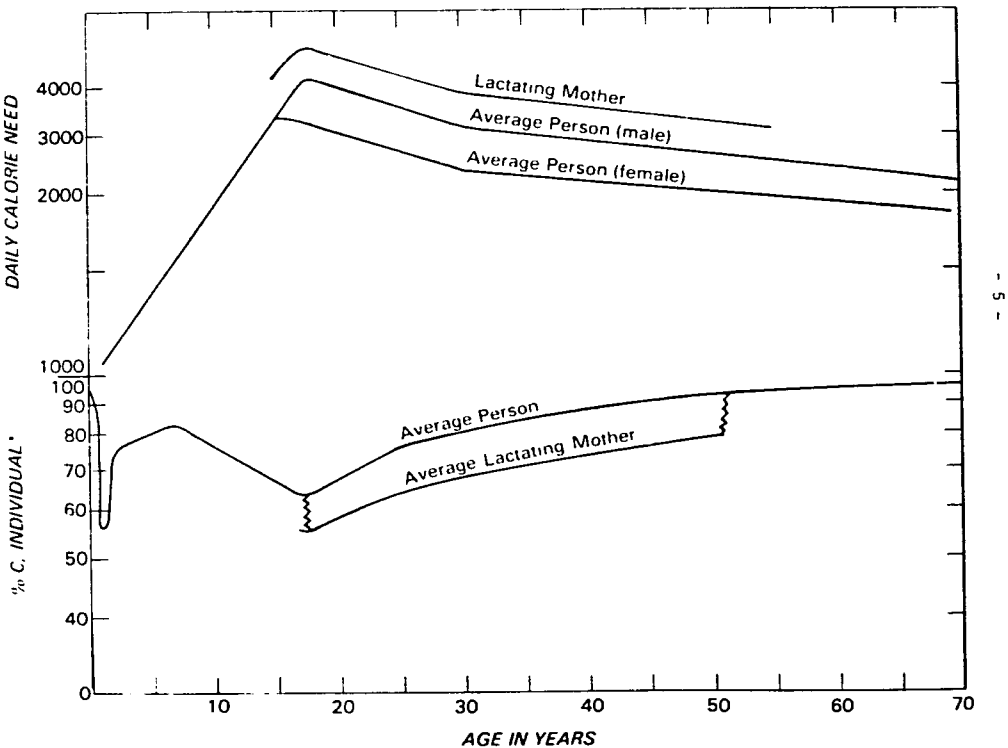
These facts are quantified most clearly by the 1973 Sidney M. Cantor Associates' study of nutrition as an integrated system in Tamil Nadu, South India. Figure 1 shows a comparison of daily calorie need with percentage fulfillment of calorie need from birth to 70 years old in Tamil Nadu. The deep dip in the curve between birth and three years indicates an average drop in intake to below 60% of caloric adequacy at about 12 months. Figure 2 presents the same percentage fulfillment figures by age for five levels of total family adequacy and shows that dietary intake of infants between about four months and two years of age was insufficient, even in families who were meeting 112% of calorie requirement. Figure 3, giving the same percentages by age for three levels of family expenditure, indicates that dietary insufficiency of infants aged 12 months, amounting to an intake of less than 70% of requirement, is almost equally severe in families with a total monthly expenditure of Rupees (Rs.) 97 as in lowest-income families with an expenditure averaging only Rs. 24. Though less completely documented, age-specific inequality in intrafamily food distribution and calorie deficiency during the weaning age regardless of family wealth have been reported by nutritionists the world over.

Educated elite groups such as families of university professors, for example, generally have adopted modern styles of infant feeding and no longer experience this weaning crisis. Children in more traditional affluent families recover nutritionally when the weaning period is over and become susceptible to the problems of overnutrition in the succeeding years.

A second dip, or period of dietary inadequacy, during the teens and early twenties, is shown in Figures 1 to 3. This dip has consistently been reported from many areas of the developing world (Leichtig et al. 1975), although it may not occur in regions such as the rain-forest belt of Africa, where calorie-dense crops are plentiful at all seasons. Low dietary intake at this age appears to have relatively few ill effects on the teenager or young adult, but does result in a high incidence of low-birth weight infants and in a reduced breastmilk supply from the underfed mother.

These figures imply that much if not most of the malnutrition that occurs during the weaning period is caused not by inadequate resources, but by faulty feeding practices which can be corrected by nutrition education. These practices and reasons for them will be discussed under the section on

**Comparison of Daily Calorie Need (upper graph) and Percentage Fulfillment of Calorie Need (lower graph).**

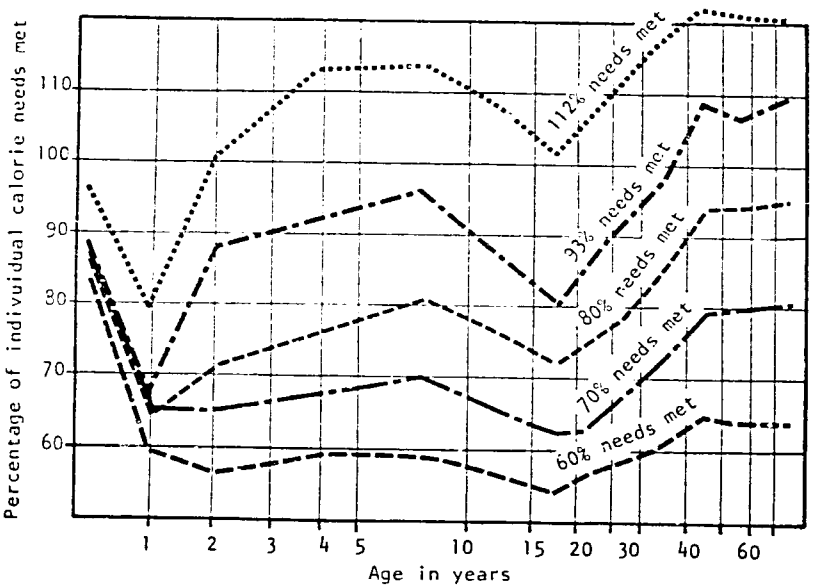



*Percentage fulfillment of individual calorie needs

Source: Sidney M. Cantor Associates, Inc., 1973.

FIGURE 2

PERCENTAGE OF INDIVIDUAL CALORIE NEEDS FULFILLED, BY AGE, FOR FIVE LEVELS OF FAMILY CALORIE ADEQUACY, TAMIL NADU, INDIA, 1972

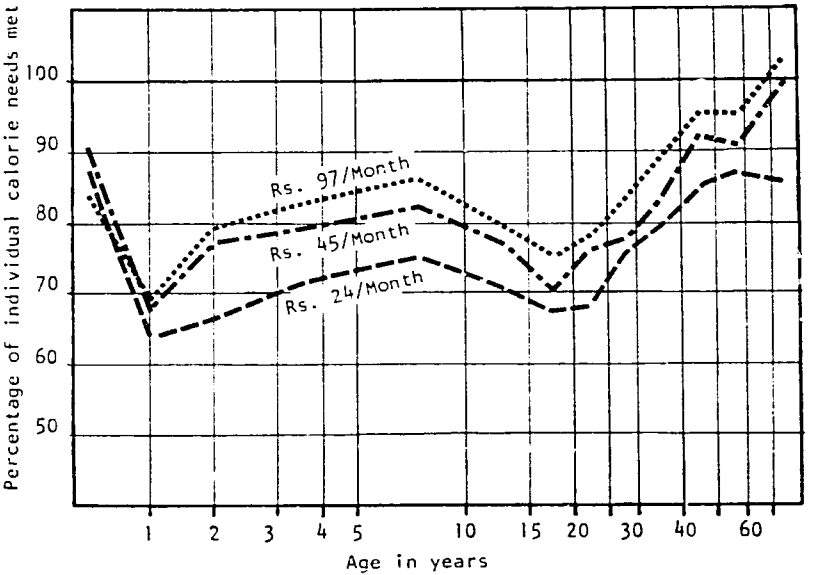



Redrawn by Joe D. Wray from

Sidney M. Cantor Associates, 1973, Vol. I, p. 101

FIGURE 3

PERCENTAGE OF CALORIE NEEDS FULFILLED, BY AGE, FOR THREE LEVELS OF FAMILY TOTAL EXPENDITURE, TAMIL NADU, INDIA, 1972




Redrawn by Joe D. Wray from

Sidney M. Cantor Associates, 1973, Vol. 1, p. 102

food beliefs in Chapter Three. Scrimshaw (1978) and others, however, have produced evidence of the possibility that infant deaths have served a necessary role in controlling family and population size in some traditional societies, and that negative feeding practices may have served a necessary if cruel function by insuring that only a certain percentage of infants survived. Caloric deficiency in the young-adult group appears to be more resource dependent and therefore less open to direct improvement through education. Thus, the primary beneficiary group for nutrition education is weanling children (or more generally the 0 to 5 year old, with focus on 0 to 3 years), and the secondary target groups are pregnant and lactating women.

A study by Levinson (1974) of 496 6- to 24-month-old children in Morinda in the Indian Punjab also illustrates dietary insufficiency at the weaning age, irrespective of income, and relates this insufficiency to nutritional status. Table 1 shows frequency distributions of percentage caloric intake allowance by per capita income and sex. Sixteen percent of infants in the highest income group were found to be ingesting only 45% of allowance or less. Table 2 compares the income elasticities of consumption of basic foods among sample children with total expenditure elasticities of demand for all age groups in rural India.

Levinson concludes (p. 53):

> The figures indicate clearly that the effects of income per se on the food consumption of the young children are far less pronounced than for the population as a whole. The income elasticities of consumption for calories, even among the 18-24-month age group with a lesser dependence on breast milk, is only .082, meaning that if a family somehow succeeded in doubling its income (assuming everything else, including prices, remained constant) the child's caloric intake would increase by only 8%. (The increase in adult's caloric intake might be 10 times that great.) The young child's protein, vitamin A, and iron intake would increase by even less. This would suggest that, for the sample population as a whole, a simple income supplementation program unaccompanied by other interventions is unlikely to have a major effect on their food intake.

Table 3 shows the nutritional status of the children according to the Gomez classification, grouped by per capita income and sex. Nearly 46% of all children in the highest income category were suffering from second- or third-degree malnutrition, with a very high preponderance of malnourished females.

Very poor communities for which nutrition education cannot be effective without simultaneous increase in real income exist in pockets in most countries and more generally in some of the low-income countries most in need of development. Nutrition education teaches better uses of resources which are already available to the family. When these resources fall below a certain level, redistributing them does not help.

TABLE 1

FREQUENCY DISTRIBUTION OF PERCENTAGE CALORIC INTAKE ALLOWANCE BY PER CAPITA INCOME AND SEX

| Per capita monthly income | Percentage ingesting 76–100% of allowance | Percentage ingesting 59–75% of allowance | Percentage ingesting 46–58% of allowance | Percentage ingesting 45% of allowance and below |
|---|---|---|---|---|
| All Children | | | | |
| Rs. 24 and below | 17.5 | 23.3 | 32.0 | 27.2 |
| Rs. 25–39 | 14.9 | 27.2 | 30.7 | 27.2 |
| Rs. 40–50 | 15.2 | 35.9 | 28.3 | 20.7 |
| Rs. 51–75 | 37.9 | 18.9 | 18.9 | 24.2 |
| Rs. 76 and above | 32.3 | 32.3 | 19.4 | 16.1 |
| Males | | | | |
| Rs. 24 and below | 25.0 | 25.0 | 29.2 | 20.8 |
| Rs. 25–39 | 13.6 | 20.3 | 32.2 | 33.9 |
| Rs. 40–50 | 19.2 | 44.2 | 21.2 | 15.4 |
| Rs. 51–75 | 41.7 | 22.9 | 14.6 | 20.8 |
| Rs. 76 and above | 30.2 | 35.8 | 22.6 | 11.3 |

TABLE 1 (continued)

| Per capita monthly income | Percentage ingesting 76–100% | Percentage ingesting 59–75% | Percentage ingesting 46–58% | Percentage ingesting ≤ 45% |
|---|---|---|---|---|
| Females | | | | |
| Rs. 24 and below | 10.9 | 21.8 | 34.6 | 32.7 |
| Rs. 25–39 | 16.4 | 34.5 | 29.1 | 20.0 |
| Rs. 40–50 | 10.0 | 25.0 | 37.5 | 27.5 |
| Rs. 51–75 | 34.0 | 14.9 | 21.3 | 29.8 |
| Rs. 76 and above | 35.0 | 27.5 | 15.0 | 22.5 |

Source: Levinson 1974.

TABLE 2

| Item | Income elasticities of consumption among sample children aged: 6-11 months | 12-17 months | 18-24 months | Total sample children | Total expenditure elasticities of demand for all age groups in rural India |
|---|---|---|---|---|---|
| Supplementary milk | .159 | .176 | .282 | .242 | 1.66 |
| Cereals | -.160 | -.099 | .011 | .010 | 0.50 |
| Pulses | -.107 | .178 | -.073 | .026 | 0.71 |
| Fruits | -.049 | -.077 | .009 | .036 | 1.43 |
| Vegetables | .470 | .232 | .115 | .218 | 0.69 |
| Calories | .070 | .041 | .082 | .071 | -- |
| Protein | .045 | .033 | .034 | .042 | -- |
| Vitamin A | .013 | .036 | .065 | .035 | -- |
| Iron | -.055 | -.057 | .020 | .012 | -- |

Source: Levinson 1974.

TABLE 3

FREQUENCY DISTRIBUTION OF GOMEZ CLASSIFICATION GROUPINGS BY PER CAPITA INCOME AND SEX

| Per capita monthly income | Percent normal (over 90% of Harvard reference weight for age) | Percent with 1st degree malnutrition (76-90%) | Percentage with 2nd degree malnutrition (60-75%) | Percent with 3rd degree malnutrition (below 60%) |
|---|---|---|---|---|
| All Children | | | | |
| Rs. 24 and below | 9.7 | 29.1 | 51.5 | 9.7 |
| Rs. 25-39 | 11.6 | 33.0 | 41.1 | 14.3 |
| Rs. 40-50 | 18.1 | 38.3 | 35.1 | 8.5 |
| Rs. 51-75 | 16.1 | 44.1 | 35.5 | 4.3 |
| Rs. 76 and above | 19.1 | 35.1 | 43.6 | 2.1 |
| Males | | | | |
| Rs. 24 and below | 14.0 | 40.0 | 42.0 | 4.0 |
| Rs. 25-39 | 14.0 | 47.4 | 36.8 | 1.8 |
| Rs. 40-50 | 30.2 | 41.5 | 24.5 | 3.8 |
| Rs. 51-75 | 25.0 | 50.0 | 25.0 | 0 |
| Rs. 76 and above | 30.2 | 43.4 | 26.4 | 0 |

TABLE 3 (continued)

| Per capita | Percent normal (over 90%) | Percent with 1st (76-90%) | Percent with 2nd (60-75%) | Percent with 3rd (below 60%) |
|---|---|---|---|---|
| **Females** | | | | |
| Rs. 24 and below | 5.7 | 18.9 | 60.4 | 15.1 |
| Rs. 25-39 | 9.1 | 18.2 | 45.5 | 27.3 |
| Rs. 40-50 | 2.4 | 34.1 | 48.8 | 14.6 |
| Rs. 51-75 | 6.7 | 37.8 | 46.7 | 8.9 |
| Rs. 76 and above | 4.9 | 24.4 | 65.9 | 4.9 |

Source: Levinson 1974.

Wittman and co-workers (1967) found a marked difference in the slums of Cape Town in South Africa, between the health and nutritional status of children in families receiving 21 cents per person per day versus families with 60 cents per person per day. In Maduri, South India, per capita income of the lowest 23% of families with children attending the Nutrition Rehabilitation Unit at Erskine Hospital was less than Rs. 5 per month (Venkataswami and Kabir 1975).

The low-cost diet offered in the center, making use of groundnut cake as a source of protein, cost 60 paisa per child per day. Since these families could allot no more than 10 paisa a day to each preschool child, it is very doubtful whether they had the means to feed the children.

Adeline Andre, nutrition educator with the Department of Agriculture in Haiti, herself tried to live from the market for the U.S. $0.09 a day which low-income families average daily (per capita) for food and concluded that it is simply not possible to eat adequately for this amount unless one can collect firewood and grow green leafy vegetables at home (Andre 1977). Tables 4A, 4B, and 4C showing nutritional status and food production over time, along with distribution by size of farms in Haiti, support her conclusion that a large proportion of farmers with farms less than 0.5 hectares (1.25 acres) in size probably are unable to redistribute food resources in a manner that would make it possible to prevent malnutrition among preschoolers (Pellerin 1977).

Rawson and Valverde (1976) found in Costa Rica that the 45% of all households with less than 1.4 hectares of land had a significantly higher proportion of malnourished children than families with larger landholdings. Similarly Valverde and co-workers (1977) in Guatemala discovered that only 17% of children in families owning more than 3.5 hectares were malnourished, versus 31% among families with 1.5 to 3.5 hectares, and 38% in families with 1.5 hectares or less. Although the critical factor in such cases may be low wages for off-farm employment, rather than lack of land for food crops, the effects of the size of the resource base on nutritional status is apparent.

Dr. P.M. Shah (Reddy 1975) estimated from a domiciliary rehabilitation program in Kasa, India, that "only one third of the severely malnourished, who are extremely poor, need nutrition from outside sources." Of three nutritionists teaching in mothercraft centers in Manila, Philippines, interviewed by the writer, one estimated that 5% and the other two that 50% of the mothers in their classes were too poor to implement the nutrition education that they were receiving.

In many cultures, the lack of child care is an additional resource constraint which makes it difficult to use available foods to supplement infant diets. In rural India (Gopaldas 1975) and in villages of highland Guatemala (Emrich 1977), for example, low-income mothers leave their babies for most of the day in the care of siblings who may not yet have reached school age themselves. Although some food may be available in the home, these scarcely older brothers and sisters cannot be expected to feed the infants adequately.

TABLE 4A

NUTRITIONAL STATUS OF HAITIAN CHILDREN

(GOMEZ CLASSIFICATION; WEIGHT FOR AGE)

| Year | 1965 | 1975 |
|---|---|---|
| Normal (weight for age) | 15.6% | 17.8% |
| First degree of malnutrition | 48.1% | 28.9% |
| Second degree of malnutrition | 21.8% | 35.6% |
| Third degree of malnutrition (including marasmus and kwashiorkor) | 11.3% | 17.4% |
| Number of children | 600 | 1542 |
| Age of children | 1 to 4 years | 0 to 5 years |
| Number of surveyed places | 3 | 25 |

Sources: Beghin et al. 1970, p. 153; Bureau of Nutrition of Haiti and American Foundation for Overseas Blindness 1975; and Pellerin 1977, p. 57.

TABLE 4B

PRODUCTION OF SOME FOOD PRODUCTS AND

HAITIAN POPULATION FOR THREE DIFFERENT YEARS

| | | Production | |
|---|---|---|---|
| Product | 1959-1960 | 1965-1966 | 1972-1973 |
| Corn (metric tons) | 226,890 | 234,000 | 257,000 |
| Rice " " | 31,264 | 24,500 | 24,000 |
| Peanuts " " | 2,286 | 2,175 | 2,200 |
| Beans " " | 37,042 | 41,000 | 20,000 |
| Fresh water fish | 1968-1969 | 1970-1971 | 1972-1973 |
| (Kg) | 253,000 | 140,000 | 74,000 |
| Total population | 1955 | 1965 | 1975 |
| | 3,054,000 | 3,911,568 | 4,583,785 |

Sources: Institut Haitien de Statistiques 1975; and Pellerin 1977, p. 58.

TABLE 4C

NUMBER OF FARMLANDS PER SIZE IN HAITI IN CARREAU[2]
(1.3 Hectares)

| ze of Farmland | Number of Farmlands | Percent of Total |
|---|---|---|
| ss than 0.5 | 293,725 | 47.6 |
| om 0.51 to 1.0 | 144,270 | 23.4 |
| om 1.01 to 2.0 | 110,260 | 17.9 |
| om 2.01 to 3.0 | 36,630 | 5.9 |
| om 3.01 to 4.0 | 12,740 | 2.1 |
| om 4.01 to 5.0 | 7,810 | 1.3 |
| om 5.01 to 10.0 | 9,100 | 1.5 |
| re than 10.0 | 2,175 | 0.3 |
| TOTAL | 676,710 | 100.00 |

rce: Institut Haitien de Statistiques 1975.

What is the poverty threshold below which the family cannot afford to eliminate severe dietary inadequacy at the weaning age by redistributing existing foods? Although no firm figure would apply, it is possible to observe that the calories required to increase the intake of a 12-month-old child from 60% to 100% of adequacy would amount to less tha: 5% of the total intake of a family of six, with two adults and four children who were consuming 70% to 80% of total family requirement.[1] If the family cannot afford to deflect 3% to 5% of total intake to the youngest, nutrition education probably will have little effect, unless it substantially improves food availability by teaching animal husbandry or some agricultural activity.

### G. SUMMARY:

### THE ROLE OF NUTRITION EDUCATION

Nutrition education as addressed in this presentation refers to all types of communication that teach better use of available food resources to avert undernutrition among preschool-aged children in low-income communities. The need for such education has been internationally recognized since about 1950. Food-related behavior and attempts to modify this behavior are studied within a number of disciplines. Studies of the reasons for malnutrition in preschoolers in low-income communities indicate that most malnutrition at the weaning age results from poor feeding and health practices. These practices may have served to control population size in areas with ecologically limited food resources by ensuring that not all children born lived to adulthood. Nutritional status and child survival rates can be improved by nutrition education that teaches improved practices. If family food resources are sufficient to deflect about 5% of total family calories to the preschooler, then nutrition education can play a significant role. Below this poverty threashold, however, nutrition education is ineffective without accompanying increases in real income.

## III. FORMS AND USAGE

### A. KEY QUESTIONS

- What are the major forms of nutrition education?
- How and to what extent are these forms currently used?

## Target Groups and Channels

Forms of nutrition education vary by target group and by channel. The five main target groups are: (a) mothers of weanling children, pregnant and lactating women, and other community members influential in the feeding practices of vulnerable groups; (b) schoolchildren; (c) nutrition-related service personnel, including medical doctors, other health workers, agricultural agents, medical students, paramedical trainees, and others (such as rural primary school teachers) who are now or who will in the future be responsible for delivering nutrition education and for diagnosing and treating malnutrition; (d) food processors, distributors, and commercial advertisers; and (e) politicians, planners, and heads of ministries with responsibility for nutrition programs and nutrition education, including ministries of health, social welfare, agriculture, finance, and information.

The common channels used to reach each of these groups are presented here for overview purposes. Programs using these channels focus on educating decision makers and change agents within each target group category and within each organizational structure.

### Mothers and Other Community Members Influencing Eating Patterns of Vulnerable Groups and Family Food Production

a. Nonformal Education

- Combined with:
  - health services
  - family planning
  - agricultural extension
  - social welfare
  - women's programs
  - day-care/preschool education programs
  - community development
  - youth programs
  - political party activities
  - religious organizations
- Structure of face-to-face education in all of the above contexts can be:
  - group activities

    discussions
    demonstrations
    participatory learning
  - one-to-one

    in center
    in home

b. Support Media or Small Media

(These are materials used and distributed by the educator - ideally some of the same materials also should be distributed through mass channels, including commercial sales.)

- Printed or mimeographed materials

  - posters
  - hand-out sheets, leaflets
  - calendars
  - booklets
  - comics, photonovels

- Audio-visual materials

  - tapes
  - slides
  - filmstrips
  - videotapes

- Community involvement materials

  - photographs for stimulating discussion
  - simple instruments for community self-assessment
  - learning games

c. Mass Media

- Radio and television (TV)

  - Open broadcasting

    advertising spots
    entertainment with nutrition themes
    public information (e.g., radio doctor programs)

  - radiophonic or TV schools
  - radio or TV forums

- Cinema houses

  - short films, documentaries
  - nutrition themes in feature films

- Printed media

  - newspapers, journal articles, and advertisements
  - signboards, posters, calendars, etc.
  - booklets
  - comics and photonovels
  - product labeling

d. Direct Mail

e. Adult Education/Literacy

2. Schoolchildren

a. Formal - In School

b. Radio - TV

c. Nonformal Groups

- R-H, Extension, Scouts

3. Medical and Agricultural Professionals and Paraprofessionals

a. Institutional instruction, requiring textbooks containing accurate information concerning malnutrition of the vulnerable groups

b. Field experience, e.g., in Tanzania, medical students are responsible for conducting malnutrition prevalence surveys, field manuals are required

c. Association meetings, seminars, symposia, workshops

d. Direct mail, newsletters, professional journals, radio

4. Food Processors, Distributors, and Commercial Advertisers

a. Association meetings, trade journals, newspapers

b. Radio and TV programs

c. Incorporation of nutrition education into training programs

5. Politicians, Planners, and Ministerial Heads

a. Public relations and lobbying

b. High-level meetings, seminars, and workshops

c. Malnutrion ward or nutrition rehabilitation center placed visibly in nutrition institute or in prestigious hospital in capital city

d. Exposure to newspapers, radio and TV programs

e. Dissemination of project activities and results of malnutrition prevalence surveys in fact sheets, brochures, annual reports, news releases.

## C. Global Usage Estimates

According to Harvard Institute for International Development's (HIID) recent survey (Austin et al. 1978) of 201 nutrition programs in developing countries, 91% (or 183) conducted some form of nutrition education, and approximately 47% of these employed nutrition workers with less than six years of education (7% had workers with no schooling). See Table 5 for a breakdown of the percentage of these programs utilizing various aspects of nutrition education.

Ninety-five percent of the programs responsing to the survey questionnaire combined nutrition with health services. This reflects in part the fact that the term "nutrition program" is commonly interpreted to mean a health-related field program, rather than a nutrition course in school for home economics students, for example, or the nutrition component of a nationwide agricultural extension scheme. It also reflects the fact that public funds for nutrition activities, including education, are not yet routinely channeled through structures other than health services. This allocation pattern in turn exists because awareness of the need for nutrition education originated relatively recently in the clinical treatment of pediatric health problems.

A survey by the American Public Health Association of 180 low-cost health delivery systems in developing countries showed that 88% provided some form of nutrition education (Karlin 1976). However, for programs not immediately connected to health delivery nutrition education still is uncommon. For example, as of 1978, the World Food Programme was assisting 31 feeding projects reaching 1,193,629 mothers and 4,267,667 preschoolers. Of these projects, 22 contemplated having a nutrition education component, but had not yet started educational activities.

Since the 1960s, development economists and other social scientists have become increasingly concerned with the need to include nutritional goals in national development plans. Numerous international seminars and workshops have been held to provide a sophisticated level of nutrition education to developing country planners and policy makers. Nutrition planning involves not only health but agriculture, education, population, finance, foreign trade, information and other sectors. Education is required for most forms of nutrition programming. Development education in other areas, such as family planning, is incomplete without a nutrition component. For these reasons, sectors other than health can be expected to sponsor an increasing number of nutrition education activities in the years to come.

TABLE 5

PROFILE OF NUTRITION-EDUCATION ACTIVITIES IN

201 NUTRITION PROGRAMS IN DEVELOPING COUNTRIES

| Program Aspects | Percent Using or Including |
|---|---|
| 1. Target group: | |
| Mothers | 90 |
| Fathers | 20 |
| Other relatives | 24 |
| Schoolchildren | 35 |
| Influentials | 15 |
| Entire Community | 28 |
| 2. Medium: | |
| Demonstrations | 79 |
| Group classes | 75 |
| Individual counseling | 62 |
| Radio | 23 |
| Television | 14 |
| 3. Frequency: | |
| Daily | 31 |
| Weekly | 33 |
| Monthly | 33 |
| During health visits | 36 |

TABLE 5 (continued)

| Program aspects | Percent Using or Including |
|---|---|
| 4. Site: | |
| Home | 43 |
| Village* | 55 |
| Health center | 64 |
| 5. Topics covered:** | |
| Weaning foods | 77 |
| Balanced diet | 73 |
| Pregnancy diet | 71 |
| Lactation diet | 70 |
| Diets during illness | 48 |
| Food preparation | 67 |
| Food storage | 48 |
| Kitchen gardens | 54 |
| Hygiene and sanitation | 75 |
| Weight-chart interpretation | 52 |

*Locations within villages were generally not specified, although village cooperatives and other local organizations were named by a few respondents.
**Not all 182 programs providing nutrition education reported topics covered.

Source: Austin et al. 1978.

## D. SUMMARY:

### FORMS AND USAGE

Forms of nutrition education depend both on target group and on service deliver structure. About 90% of nutrition education activities currently appear to be part of health services. Similarly, nearly 90% of health delivery systems in developing countries appear to offer some form of nutrition education, mainly to mothers of young children. The close link between nutrition and health service reflects the fact that weaning-age malnutrition was discovered through clinical treatment of pediatric problems. As the approach to nutrition becomes increasingly multisectoral, the proportion of nonhealth-centered agencies conducting nutrition education can be expected to increase.

# CHAPTER TWO

# INTERVENTION DESIGN*

## I. INTRODUCTION

Many informal observations by nutrition workers note examples of poorly designed nutrition education. Dairy products are one of the five food groups taught by nutritionists in Indonesia. However, milk is not a usual part of the Indonesian diet, and families most in need could not afford to buy it. A drawing produced in Abidjan, Ivory Coast, illustrating the use of baby powder and diapers and used as part of a health and nutrition education picture series in Upper Volta was perceived by mothers to demonstrate the need for giving the infant regular enemas (Lemasson 1978). Inadequate design, not only of message content but of materials and other program elements, is associated with a generalized impression that nutrition education is ineffectual, or is at best a long-term solution that cannot be expected to have measurable rapid impact.

A broad review of the literature and of field experience suggests that it has not been the concept of need for nutrition education that has been at fault for the lack of rapid effectiveness, but the fact that nutrition education has been a token activity in terms of absolute resources allocated. Consequently, sufficient effort has not been given to the design and implementation of programs. Programs that have been carefully designed and that have succeeded in enlisting more than a token investment from the target community itself provide strong evidence of effective change; although in the majority of cases, change has not been quantified by evaluation.

Certain design considerations apply to all the basic forms of nutrition education, i.e., face-to-face nonformal, mass media, formal and adult literacy. These general aspects are problem diagnosis, definition of target group and goals, community involvement, strategies favoring attitude and behavior change, message design, and materials preparation. After discussing these, this chapter will examine design aspects specific to each of the individual forms of nutrition education. Discussion of most aspects of evaluation is reserved for Chapter Three.

## II. INTERVENTION DESIGN ELEMENTS

### A. Diagnosing the Problem and Determining Program Goals

#### 1. KEY QUESTIONS

- Who should participate in problem diagnosis and planning?

*This chapter was written by Marian F. Zeitlin.

- What information should be collected?
- What target groups should be reached by the program?
- What goals should be set, and how specific should they be?

A first step in planning a nutrition education program is diagnosis of the problem. As mentioned earlier, this book addresses the common form of malnutrition in developing countries, which is undernutrition complicated by infection among children at the weaning age. Poor nutrition of pregnant and lactating women aggravates the problem by causing low birth weight of newborns who receive a marginal supply of breast milk and are therefore already undernourished when they reach the weaning crisis.

How widespread is the problem? How severe? What ages does it affect? What additional forms of malnutrition or health factors complicate the situation? What are the causes? How can education help? None of these questions will have a single correct answer because nutrition research studies can never ask every question or study every corner of the population. However, it is possible to choose from a number of reasonable estimates as to what the answers might be. In each case it is more important to get widespread agreement and commitment to a reasonable problem diagnosis and to a general course of action than to become fixated on a single point of view, no matter how technically correct that point of view may be.

2. The Task Force

The initiative for a nutrition education program or for modifications in an existing program may come from the top at the planning commission or ministerial level, from community development activities at the grass-roots level, or from any point in between. At whichever level the program idea starts, it is important to involve all vertical levels in problem diagnosis and planning. An exception to this might be a self-contained pilot program which wished to test certain approaches and develop local initiative before attempting to coordinate its activities with those in other regions. If the idea originates at the central government level, it will be important to involve grass-roots representatives from the early stages (see section on Involving the Community).

The decision about whom to invite to participate in the diagnosis of the problem and in subsequent planning should be made carefully. The nature of the problem and the themes for nutrition education should be identified by collective decision if a number of different organizations and leadership structures are going to participate in the education program. Since nutrition education is most effective if it is delivered through an integrated campaign that makes use of as many information channels as are available, it may be desirable to invite representatives of all participating organizations to take part in the problem diagnosis. However, if authority for making nutrition decisions is vested in a single national

organization, as in the case of the Nutrition Center of the Philippines, it may not be appropriate to include all implementing agencies in every stage of discussions. The more each group is included in the decision-making process, however, the greater will be the degree of acceptance of and satisfaction with the decisions (Rogers and Shoemaker 1971).

Mass media should play an important role in amplifying the effectiveness of face-to-face nutrition education activities. For this reason, representatives of public service broadcasting agencies, and possible also advertising firms with an interest in public service marketing, may be invited to sit in on problem diagnosis and early planning sessions, in order to provide an orientation in nutrition for these agency personnel and to establish them as members of the working group in which their skills should prove crucial in the later stages.

Regarding the face-to-face network, if a new form of nutrition education is to be carried out by health extension workers, for example, its success will depend on how well this approach is accepted and taught by the health workers' own training programs. Learning of the method and themes will have to be a regular unit in the extension workers' required training courses if it is to be a regular part of their presentation to the communities with which they work. For this reason, heads of public health schools, other extension-worker training organizations, and possibly also schools of marketing and business management should join in problem diagnosis and planning for educational programs that involve their future graduates. Their curriculum designers and textbook writers must also be involved.

3. Information Gathering

Reliable information is the basis for problem diagnosis. All available research reports concerning the nutrition problem should be collected and analyzed. Studies of infant and young child mortality and morbidity should be included. All available experts on the nutrition of young children should either be part of the diagnosis task force or be consulted by members of the decision-making group.

This expert category should include members of the target group, e.g., mothers of malnourished children, grandmothers and other family members. No one knows as well as they do what problems they have in acquiring food and in looking after their infants. It should also include shopkeepers and food vendors in target neighborhoods. Another group of experts are the nutrition field workers who already are providing nutrition education. They have inside knowledge about themes and teaching methods that have succeeded or failed in practice. Anthropologists, sociologists, marketing experts, and others with an interest in food-related behavior also should be consulted.

Further methods for analyzing and attacking the problems which are discovered will be discussed under the section on themes and messages. The problem diagnosis and planning stages of a nutrition education program are times for generating enthusiasm as new points of view and possibilities become apparent and for enlisting the commitment of implementing agencies.

## 4. Setting Goals for the Program

An important part of program planning is defining objectives and setting goals concerning groups to be reached and changes to be achieved.

### a. Target Groups

As noted earlier, the main target groups for dietary changes are weaning-aged children and pregnant and lactating mothers belonging to population groups known to have a high prevalence of malnutrition. The target groups for nutrition education are all those persons who affect the eating habits of these groups, and most immediately the mothers themselves.

During the goal-setting process, project designers will both define groups and estimate the numbers of each who will be reached during successive phases. While low-income mothers of malnourished children should make up the primary group, opinion leaders influencing child-feeding practices (who may differ from culture to culture) and other influential persons in the community must be included, because effectiveness of the program will depend on their support. The program should discover who these other groups are and then list the different segments to be reached. These might be mothers, fathers, traditional midwives, and village council members, for example. As noted by Geghin and Viteri (1973), malnutrition is a family disease and also a community problem. Fathers often play an essential role in the feeding and food habits of the family, as in urban areas of Pakistan where the father normally purchases the family's daily food supply from the bazaar (Zeitlin 1972).

Different segments of the population may be reached with different frequencies and with different messages. Most of the time, only mothers of preschoolers will participate, but educational programs that involve mainly mothers may hold occasional meetings that include larger segments of the community. In Yako district in Upper Volta, for example, annual festivals including the entire village community are held to honor the community-level nutrition workers. These festivals are an occasion for songs, demonstrations, dances, and plays on nutrition themes, and they also function as a form of compensation to the nutrition workers for their services (Gourier 1978). Fathers can be invited to the first or second class in a series of mothers' meetings, or can be approached separately. Community leaders may be reached individually or through small gatherings. Different media, such as radio or direct mailing of letters with leaflets, for example, may be used to reach different groups with different messages.

Most traditional roles, including sex roles, are called into question by modernization. Development education should work within existing roles (unless it has the ideological strength to change them for the better), but it should appeal to values of family and group welfare to motivate communities to change roles where changes will benefit the development process. Role changes leading to greater equality for women usually benefit young child nutrition and improve family planning acceptance.

b. What About the Middle Class?

Elite groups may serve as role models for the lower class. Rogers and Shoemaker (1971) cite 11 studies showing that when people adopt behavior or technology used by individuals outside their own group, they imitate persons of higher social status. The term "trickle down" (Barber 1957) has been used to describe a process by which lower classes imitate upper-class fashions or behavior. While it is questionable whether such imitation occurs in many aspects of life, the writer has heard many nutritionists and anthropologists express the opinion that it does occur in infant-feeding practices, with reference particularly to bottle- or breast-feeding.

Deodhar (1967) noted that middle- and upper-class families in India also had faulty feeding practices. Although they were reluctant to give sufficient milk or supplementary foods to infants, 42% of the families studied were giving tea. Tarwotjo (1971) reported that a rise in income in rural families in Java did not result in better diets.

For these reasons it is important to improve nutritional practices of the affluent. This should be accomplished by educating the private pediatricians who serve them, through the medical schools and professional journals and associations, not through nutrition education projects. Nutrition education programs generally are part of a package of health or other services. Directing such a service package to the middle class, who can afford to obtain similar services through private channels, emphatically discriminates against the poor and should be avoided.

c. Problems of Reaching Low-Income Groups

Usually it has been easier to reach the lower middle class than it has been to reach the poorest families. One reason for this is the design of programs. In Pakistan, for example, only middle-class girls are selected for training as lady health visitors to serve in the 1,000 or more MCH centers serving the country, because a high school education is a prerequisite for the training course. It has often proven unrealistic to expect these girls to establish personal rapport with the lower-class families in the communities to which they are assigned. This outcome is in keeping with the findings of Rogers and Shoemaker (1971) that the success of change agents is greater if they come from the same social and cultural group as their clients.

The solution to this problem that appears to be most successful is to train members of the target neighborhoods or villages (although they may have no literacy skills) to deliver nutrition education and other services to their own communities, as discussed in the section on community involvement. Pakistan also has such a Community Health Worker program, using both male and female workers.

d. Goals for Changes to be Achieved by the Program

The objective of every nutrition education program is to achieve positive behavior change that results in improvement in nutritional status. Goals for behavior change, change in nutritional status, and reduction in mortality and morbidity should be defined. Whether or not they should be

stated in terms of time limits and numbers, such as "50% reduction in third-degree malnutrition in project villages within two years" will depend on whether or not there is numerical baseline information against which to measure such changes, and whether or not such goal-setting serves a useful function in motivating project workers.

Baseline surveys such as the 24-hour dietary recall are highly useful. It is possible, as in Yako, Upper Volta, to develop a program which has reduced the rates of severe malnutrition as detected by arm circumference by vaccination teams in 1977 to only 3 in 1,360 without ever conducting a dietary survey (Gourier 1978). However, it is also possible to make expensive mistakes if no baselines are gathered.

Examples of types of goals that might be considered are: to teach each mother how to understand her baby's weight chart within three months of her initial enrollment; for each field worker to persuade five influential mothers in her neighborhood to cook weaning foods daily within the first few weeks or months of the project; and to reduce the number of infant deaths in the community to less than half the number in the previous year. Evaluation of program achievements against baseline figures and goals provides important information for funding agencies and also provides the best basis for making accurate judgments about ways in which the program could be improved. (For further discussion of evaluation, see Chapter Three.) Defined goals also help field workers to plan and monitor their activities.

5. SUMMARY:

PROBLEM DIAGNOSIS AND PROGRAM GOALS

The task force for problem diagnosis and planning should be carefully selected to include representatives of the groups who will implement the program. Representatives of the target community should be invited to participate because they know and have more control over certain vital aspects of the problems than outside specialists. Existing studies concerning nutrition, mortality, morbidity, and food production should be collected and analyzed. If the project can afford a baseline survey, it should be conducted at this stage. Available nutritionists/child health specialists, market researchers and other social scientists with an interest in nutrition should be consulted. Heads of institutions training health and other extension workers should participate in planning to ensure that program methods and themes are taught in their institutions.

A statement of project goals should specify target groups and the numbers of each segment to be reached during successive phases. While the major target group should be mothers of preschoolers in the lowest income

groups, secondary groups of nutrition educators and community influentials will vary by community and by culture. Project goals for knowledge, attitude, behavior, and nutritional status change should be specified against simple baseline survey information, such as 24-hour dietary recall data and infant weights.

## B. Involving the Community

### 1. KEY QUESTIONS

- Why should the community take primary responsibility for the program?
- How can nutrition educators involve the community?
- What social conditions favor successful community involvement?

One desirable goal of all development efforts, including nutrition programs, is to encourage the growth of self-reliance, which occurs when communities contribute to and increasingly assume responsibility for the operation of their own programs. Moreover, projects and activities having children as immediate beneficiaries, such as nutrition programs, have been shown to be a successful starting point for further community efforts [United Nations Childrens Fund (UNICEF)/WHO 1977].

For the central government planner, involvement of rural communities in their own nutrition and health programs can provide an essential multiplier effect which may make it possible to extend basic services to the rural majority at costs affordable within low annual government per capita health and nutrition budgets. As stated by Morley (1973b) with respect to under-five clinics, the cost of running basic health and nutrition services in developing countries is acceptable only if the clinics incorporate the training and use of community-level auxiliaries.

In community health and nutrition projects, such as the Aroles' in Jamkhed, Ahmadnagar, India (Austin et al. 1978), up to 80% or 90% of costs have been borne locally at the family, village, municipal, or district level. This obviously implies that community involvement may make it possible for the same outlay of central government (or other external) funds to extend services to five times as many people as could be reached by the usual government health program.

The effectiveness of community-operated services has been reported to equal or to excel that of standard paramedical services, although little comparative evaluation has been conducted. One preliminary study comparing physician versus nonphysician delivery of primary care found that infant mortality was halved and preschool mortality quartered by using nonphysicians [Pan American Health Organization (PAHO) 1973]. In Yako District, Upper Volta, nutrition and health programs run by villagers have extended nutrition education, simple curative care, and health referral services to a population of 100,000 in about 100 villages that are served by a single medical doctor, who is the district medical officer, and about 20 public health nurses (Gourier 1978). Because all foods, payment of village-level workers, and costs of some medicines are provided by the community, the incremental fiscal costs of ongoing training, supervising, and medicines and supplies for the 800 nonliterate village health and nutrition workers who serve this population are about $0.25 per person per year. The case study in Study III, Formulated Foods, shows this intervention is up to 19 times more cost effective than standard government health services.

Nutrition education is particularly suited to community involvement and to a community development approach because the application of the principles of good nutrition depends on cultural acceptance. A community involved in improving its own nutritional practices will automatically develop and teach culturally acceptable behavior patterns that would have been difficult for an outsider to invent or discover. Community workers who are members of the educational target group will also have the opportunities to teach their neighbors in natural interactive settings, as recommended by Harman (1974), such as when they are doing the laundry by the river or spinning cotton together in the compound courtyard.

Nutrition education generally belongs as one component in a larger nutrition program. Similarly, nutrition programs may best be integrated with other development activities (see Study VII, Integrated Nutrition and Primary Health Care Programs). The principles of community involvement briefly outlined here apply to the total development package, but should be used on a smaller scale for the nutrition education component of the package.

**2.** How to Organize the Community

A UNICEF/WHO study of community involvement in primary health care (1977) notes that most successful programs were started or supported from the beginning by strong local leaders who could mobilize resources in the form of money, people, and materials. How can one find or develop such leadership? Dr. Florentino Solon, director of the National Nutrition Council of the Philippines, has recommended starting at the lowest level of political organizations, which is usually the village (called "barangay" or "barrio" in the Philippines), in an attempt to discover leaders with the capacity for mobilizing funds, labor and other community resources. If authority at this level is not sufficiently organized, move step by step up the political infrastructure until the lowest level with sufficient political organization is discovered. Leadership at this level should then be motivated and made responsible for organizing and mobilizing resources for nutrition programs. In the Philippines case, the barangay

captain did not have the authority to mobilize resources. The next higher level of leadership which did have this power was the mayors of municipalities. Therefore, mayors throughout the country were motivated to take responsibility for nutrition activities in their areas (Solon 1977).

After the mayors had become active in the program, it became easier to motivate and involve the provincial governors (one level up) and the barangay captains (one level down). Success of the Philippines program at each level has been directly proportional to the quality of local leadership (Florentino 1978).

Other strategies, such as the Freirian (Drummond 1974; Freire 1970) or other methods of attempting to develop community cooperation and leadership at the village level, whether or not it already exists, are valuable, but require effort from trained outside motivators who in effect provide program leadership themselves until local leadership and motivation have developed. Save the Children Federation has developed a community awareness strategy for motivating community action and leadership initiative with respect to nutrition. This strategy, explained in a manual by Sanghvi, has successfully mobilized a variety of innovative community-based nutrition programs in Banda Aceh, Indonesia, Bangladesh, and the Dominican Republic.

In the Yako program in Upper Volta, in which the local chieftaincy system assumes responsibility for village-level project management, external village-level leadership was provided during the first year of the project by two volunteer nurses, one French and one American, who lived in two of the villages. The ideal role of such outside motivators is to train or assist in organizing local leadership and then to withdraw, either entirely or to a more supervisory position. If local leadership is weak or nonexistent and/or if the outsider assumes a strong personal leadership role and is unsuccessful in delegating responsibility, the community remains dependent on the external change agent, and the program tends to collapse with the departure of the outsider.

In the Yako case, one of the nurses disliked spending time in her village and therefore handed over project function to the local chief as rapidly as possible and was generally perfunctory in her duties. The other became deeply committed to personally providing curative services to the villagers, was a constant presence in the village, and placed her personal servant (who was from another tribe) in charge of medical treatment. The paradoxical outcome was that the village of the first nurse became a model village, whereas the second, seven years later, still is not well integrated into the health program, in part because the chief became an alcoholic (Gourier 1978).

A point to be made here is that leadership has to come from somewhere. The government does not pay for the services of a local leader, but must continue to support external change agents unless these agents are committed to staying with the community without receiving exaggerated incentives and the community is committed to supporting them locally. Such

devoted leadership for community development is difficult to find outside of socialist political systems and certain religious and social movements. Needless to say, leadership with management capability has to exist not only in the community but at each administrative level at which program decisions are made and program resources are allocated.

In some areas community involvement may be very difficult to achieve because of lack of community structure, as in Central Tunisia, for example, where 75% of the population live in isolated clusters of houses or very small villages.

Community cooperation is more likely to be successful if the first project undertaken is simple and provides obvious visible benefits. Some groups, such as the Church World Service, recommend starting with a demonstration project that villagers want, whether or not it appears relevant to the development process. One example was organizing women to sew uniforms for the village marching band, because the villagers initially perceived band uniforms as their most important need (Swartzendruber 1976). The project went on to interest this community in improving its water supply.

The benefits of health and to a lesser degree of preschool nutrition programs are immediately perceived - a reason why dropping mortality rates and rapid population increase precede other aspects of development. These benefits do not need to be demonstrated in roundabout ways. Many communities are already eager for additional health facilities, which should have nutrition education as one of their primary concerns.

A successful way of motivating the community to mobilize local resources has been to offer external services and resources if the community will fulfill certain conditions, following a "matching funds" principle. For example, the Aroles in Jamkhed, India (Arole and Arole 1975) agree to organize village-level health and nutrition services if the village will meet the following conditions (Morehead 1977):

- build a Landrover road to connect to the main road
- construct a simple building for ehalth work (important during the raining season)
- select village health workers for training
- provide protection for village health workers
- agree to cooperate in goal of 95% immunizations and feeding one cooked meal a day at the health building to children under age 5. One acre of communal lands must be cultivated for every 75 children, to provide wheat and pulses for the daily meal, to which the project adds donated milk if this is available. The meal provides 50% of the children's daily caloric allowance. Each child must bring a stick of firewood daily for cooking.

It is better to wait for such conditions to be fulfilled than to rush around with a poorly motivated program.

Community leaders may be successful in mobilizing resources if they appeal to local self-help traditions, ancient virtues, and religious values, so that change comes in the form of a revival, that integrates the old with the new (UNICEF/WHO 1977).

The UNICEF/WHO examination of nine case studies of successful community involvement also showed that the following governmental and environmental conditions favored success: (1) the existence of government policies encouraging community participation, (2) the availability of external and particularly government resources to match and supplement local resources, (3) the existence of nongovernmental organizations which provided channels for community participation, such as the Savodaya Shramadana in Sri Lanka, and (4) the accessibility of regional and national communications and other infrastructures.

The types of persons selected to be village-level nutrition educators will depend on local social structure. As in Yako, Upper Volta, several categories of village-level workers may be recruited so that the nutrition educator need not be a multipurpose health worker. Traditional midwives can and should be trained to provide more nutrition education (Jelliffe 1973); however, the chief focus of their attention continues to be childbirth. Mature married women with young children of their own have proven a valuable additional category in Upper Volta, in the Dominican Republic, and in Indonesia (Rohde et al. 1975). Indonesian Kaders (village-level volunteers) are selected on the basis of personal characteristics and interest rather than age or sex, but frequently are mature women. The same Kader may be either a single or a multipurpose worker. A nutrition Kader may extend her activities to family planning or agriculture, for example, by attending additional training courses of about two weeks each. Ninety percent of local health collaborators in Petit Goave, Haiti, are men, because literacy is a requirement and few women are literate (Berggren, 1977).

Important characteristics to consider in selection of the individuals are the motivation and credibility of the worker (to be discussed later), commitment to staying in the village, mobility, and willingness to take initiative in contacting mothers of preschoolers by visiting them in their homes.

### 3. SUMMARY:

### INVOLVING THE COMMUNITY

Low income rural communities in India and Africa have proven capable of mobilizing local resources to cover up to 80% or 90% of the costs of village-level health and nutrition programs, thus making it possible to extend services over wide areas without increased government expenditure. The effectiveness of these village-level services appears to equal or exceed that of standard paramedical care. Nutrition education, in particular, is most effectively delivered by community members because dietary change depends on cultural acceptance.

Nutritionists should motivate the lowest level of political leaders who have the power to allocate local community resources for program use. An outside organizer may have to assume the leadership role initially. However, the long-term success of the program will depend on how well the local leadership takes over responsibility for most aspects of program management and for recurrent funding and incorporates new program roles into the local social structure.

Community cooperation can be gained by concentrating on felt needs, starting with a project with obvious visible benefits, and following a matching funds principles in order to qualify for assistance. Community leaders should appeal to local self-help traditions so that change is seen as a revival of ancient virtues. Success is promoted by government and private support for community-level development and by the existence of government services to which activities can be linked.

c. Strategies for Changing Attitudes and Behavior

1. KEY QUESTIONS

- How do food habits change?
- How do attitudes and behavior change?
- What strategies can nutrition educators use to promote change?

Changing food habits, such as child-feeding practices, may appear simple. All the learner has to do is give different foods to her child. True enough: but change doesn't occur rapidly in the desired direction unless a number of other conditions are favorable. Many gifted nutrition educators understand and satisfy these conditions without ever putting this understanding into words, because they consider it to be a matter of common sense. Much of social science theory is common sense in that it refers to interactions that we engage in on an everyday basis and that are not learned in school. Becoming conscious of these processes is valuable, however, because it gives a greater degree of control over them and makes it possible to use them systematically.

How do food habits change? The evidence is that they change radically, but not overnight and not trhough a simple process of information transfer. Barnes (1968) points to the irrational opposition to water fluoridation in industrialized countries to illustrate the fact that change

in practices is not automatic or guaranteed, no matter how well-established are the scientific principles on which the proposed changes are based, and no matter how clearly the information is presented. The knowledge-attitudes-practices (KAP) model for changing behavior is familiar in nutrition education and has served as a basic format for many social intervention programs outside of the commercial sector. The model rather naively assumes that increased knowledge will result in modified attitudes, which in turn will bring about new and improved practices or behavior (Harman 1977). Thinking in terms of KAP is necessary for evaluating the effectiveness of education programs (see Chapter Three) but is insufficient for program planning purposes.

In this section we will look first at how food practices have changed, then at ways in which this change or cultural transformation occurs, and third, methods which the nutrition educator can use to bring about change. The educator should not feel intimidated by the models and theories proposed. All have some intrinsic value; however, no elaborate methodology for social transformation should distract from attention to the basic ingredients for effectiveness, such as program continuity over time, committed leadership, good management, and flexible problem solving, or from recognition of the fact that good educators are capable of developing their own specific methods for producing change.

## 2. Historical Changes in Food Habits

As noted by Berg (1973), biological, geographical, psychological, sociological, religious, economic, technical, and other factors govern food practices, with the result that eating patterns are a relatively inflexible aspect of personal life. Yet in spite of conservative forces, diet patterns and food habits are constantly changing through cultural borrowing, innovation and price shifts, and with the effects of commercial advertising and of health and nutrition education. Although traditional biases can inhibit the use of new foods, intense biases are not the norm. Most peoples in all parts of the world, even those who are somewhat isolated from the main channels of 20th-century communication, derive the majority of their foods from crops that were originally developed in other regions (Niehoff 1966). Maize, peanuts, tomatoes, potatoes, sweet potatoes, cassava, lima beans, and cocoa are examples of the foods that were taken from the Americas to Europe, Asia, and Africa after the 1600s.

Changes that frequently occur with urbanization are decreased consumption of cereals, increased demand for animal products, and increased consumption of sugar, soft drinks, alcohol, and expensive snack foods of lower nutritional value than traditional cereals and beverages. Low-income urban dwellers attempt to approximate the diets of the more affluent (Miller 1978). Thus, poverty affects food consumption differently in urban and rural settings and may lead to different sets of nutritional disorders. According to Fernandez (1975), low-income urban dwellers are likely to be deficient in protein and calories, vitamin A, and thiamine, and rural dwellers in calories, iron, and vitamin C.

Within the last 30 years, clever and insistent marketing and the example of the middle class have spread the new practice of bottle-feeding to the same low-income populations that nutrition educators most need to reach, with disastrous results in many cases (War on Want 1974). Bottle feeding has spread so rapidly that it has given nutritionists a whole new educational task. During this same period, the number of new processed foods has proliferated through competitive commercial marketing. Some products considered by Americans to be foreign and disgusting 25 years ago, such as yogurt, for example, are now staple foods in the United States. Enterprising British tea salesmen some 50 years ago succeeded in changing the habit of drinking buttermilk throughout much of India and what is now Pakistan to drinking tea. By contrast, in many cases in which the introduction of formulated, nutritious foods to low-income groups in developing countries has been unsuccessful, very little money or expert skill has been applied to marketing.

3. The Importance of Consumer Advertising

A recent analysis of Kotler and Zaltman (1977) of the effectiveness of mass media for propaganda or teaching purposes shows that one condition for success is the absence of counterpropaganda. In nonsocialist countries most new information provided to the public regarding foods and dietary habits comes from consumer advertising aimed at commercially processed foods without explicit concern for the nutritional needs of target groups. In the foreseeable future the advertisers will continue to have many times as much money as the nutrition educators. Thus, counterpropaganda is a continuing problem.

For nutrition educators to "mind their own business" and continue as if this problem does not exist is self-defeating, not only in leaving the door wide open for abuses, but in failing to channel the energies and profits of the food industry productively. Most food advertising in the United States is currently judged to be nutritionally unuseful (U.S. Senate Select Committee on Nutrition and Human Needs 1977). A study of the health information presented on television in the United States, mainly through product advertising, estimated that 70% was inaccurate or misleading or both (Smith et al 1972).

Greiner (1975) documented the ways in which the multinational corporations, together with the health profession, have promoted the sale of milk formula and the practice of bottle-feeding, which leads to severe malnutrition of infants in low-income communities (War on Want 1974). Bottle-feeding promotion enters health centers by what Jelliffe (1970) referred to as the "Trojan Horse" techniques of sales promotion - free calendars, posters, booklets, or labeled samples of baby formula and other impossibly expensive processed foods. Two particularly damaging forms of promotion are the use of company representatives dressed as nurses to promote formula feeding by new mothers (War on Want 1974), and the giving out of free samples to mothers (Margulies 1977).

In February 1979, in Indonesia the writer found widespread distribution of free samples of formula to new mothers by private midwives, who conducted a large proportion of deliveries. Individual midwives were motivated to distribute the samples because the free formula served to promote their services and to give them a competitive advantage in attracting clients over midwives who did not distribute formula. The introduction of formula to the newborn infant dovetailed with the traditional belief that colostrum was bad and should be expressed and thrown away. The formula replaced the coconut water or coconut jelly traditionally given in the first day or two. One low-income woman interviewed by the writer in rural Java had been persuaded by friends to give commercial formula for more than a week before initiating breast-feeding of her sixth child, who was eight months old and malnourished at the time of the interview. The mother still was purchasing token amounts of the expensive formula.

At the time of this writing, the outcomes of the international controversies over formula advertising are unclear. Milk companies have responded to pressure from consumer groups by stopping overt mass media advertising of formula. They continue to advertise expensive processed cereals, opening the way for a new abuse now found in Liberia, for example - widespread use of cerelac instead of formula in the bottles given to young infants. A number of countries have taken legislative steps to stop the spread of bottle-feeding. In Papua, New Guinea, the sale of bottles, nipples, and pacifiers without a doctor's prescription has been banned and carries a fine of $250 (Anonymous, Bottle Baby 1978). In order to obtain a prescription a mother must demonstrate that she has the knowledge and facilities to prepare an adequate hygienic feed and that she has sufficient income to purchase the necessary amount of formula on a regular basis (Lambert 1978). In Niger and Sudan similar laws prevent the sale of baby bottles on the open market. Laws requiring milk advertisers to state in each advertisement that mother's milk is best, as in the United States and Pakistan, are better than no laws at all, but are an invitation to advertisers to prey on mothers' fears that their milk may not be sufficient in quantity or quality.

Promotion of soft drinks may also endanger the nutritional status of infants. Stephens (1975) found in Zambia that children with kwashiorkor were significantly more likely to receive soft drinks daily than were control children, following an advertising campaign extolling the virtues of these beverages.

Since the food industry has the resources to educate the public (collected from consumers in the form of profits), both legislation and education of industry representatives are required to guarantee that these resources are used in a manner that benefits the public. According to Miller (1978), the critical point for intervention in nutrition education is "the market, the radio or television, and generally in the schools, not as an educational program but as a traditional advertising campaign based on a basic desire to attain status and the satisfaction of other emotional needs. The food industry should be encouraged to continue traditional marketing strategies and, in fact, to expand them. However, they must also be made to assure high nutritional quality of the foods they huckster."

While consumer advocacy activities cannot be classified as a traditional form of nutrition education, they are essential for safeguarding the potential of nutrition education to affect the dietary habits of those most in need.

4. Cultural Versus Psychological Factors

When income and food supply are not constraints, poor dietary habits have one of two main causes: (1) cultural lack of knowledge or in appropriate beliefs, and (2) psychological or physiological disorders. The second type of problem is much more difficult to correct than the first, as has been found in the treatment of obesity. A study of infant malnutrition in Cambridge, Massachusetts (Pollitt 1974), found that the few existing cases in this affluent community were caused mainly by psychological disorders in the mother-child relationship. Dr. Francois Gourier of Yako, Upper Volta (a low-income rural African setting, where severe malnutrition has been almost eliminated through a community-level health and nutrition program) commented to the writer in April 1978 that the only malnourished infants still coming into the rehabilitation center of the district hospital were those of mentally retarded mothers.

The type of malnutrition addressed in this book results overwhelmingly from the first cause, although psychological and physiological factors inevitably contribute to the problem. Frequently, the only child to become malnourished in a large low-income family is of low birth weight and of the sex not desired by the family, for example. After cultural factors are modified, a small number of recalcitrant cases of the second type of malnutrition invariably remain. Some of the same basic techniques are useful in treating both types. However, cases primarily of psychological origin tend to require closer supervision, and may place the nutrition educator in the role of social worker or therapist. In extreme cases, the malnourished child is physically abused and should be removed to another home. The nutrition educator should investigate this possibility whenever a child has bruises or other signs of abuse.

5. The Diffusion of Innovation

Cultural changes in child-feeding practices follow the laws of social learning and the diffusion of innovation. These are the same principles by which all kinds of cultural practices are transferred from one group to another. The following illustration of the process summarizes points from Bandura and Walters (1977) and Rogers and Shoemaker (1971).

The spread of new ideas and practices that occurs spontaneously, without any deliberate educational effort, cannot be counted on to reach those people who are most in need. Therefore, we will start the illustration with a change agent, who brings the new idea or practice to a community. This person is the nutrition educator. Let us say that the new practice is the feeding of substantial quantities of family foods, mashed soft, to the baby from the age of 6 months, in a culture where babies are not normally given foods other than breast milk until 9 or 10 months because of the fear of resultant stomach disorders and the belief that the

baby does not yet require food. Let us say that radio broadcasts are also used to recommend the new practice. The idea is learned from listening to the radio, from explanations and demonstrations given by the educator to the village mothers, and from word-of-mouth communication between community members. In the beginning a few mothers come to a community center to meet with the educator because they are motivated to anticipate some benefit, such as social approval, having a healthier child, or having the feeling of being a good mother. They pay attention to each step of the explanation and of the demonstration and think about how they could repeat the same process in their own homes.

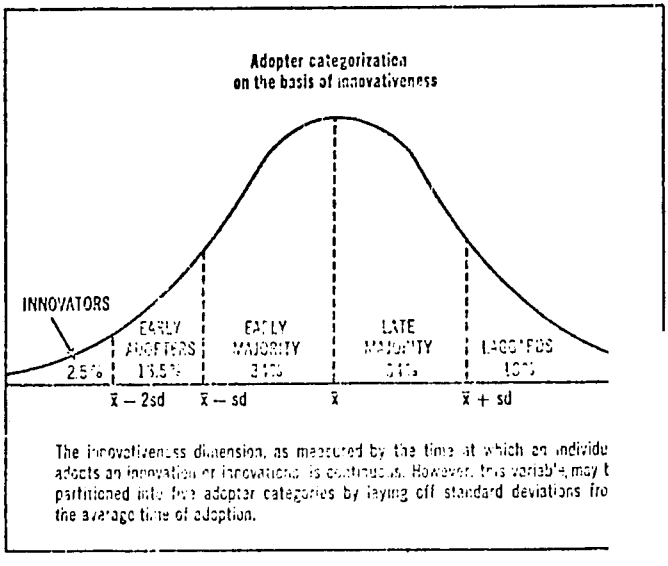
An unfamiliar step in the process is the mashing of the food and feeding the baby with a spoon. Knowing that this step is needed, the educator distributes spoons and yam and stew in cups and asks each mother to mash the food and feed it to her baby. Most of the mothers mash the food with the educator's supervision and encouragement, but only a few decide to actually give it to the child. The educator models the behavior for these mothers by showing them how to introduce a small amount into the baby's mouth from the tip of the spoon and how to aim it back into the mouth if the baby accidentally starts to spit it out. The educator also shows how to praise the baby for eating, and praises the mothers who try the experiment by telling them they will have strong and intelligent children.

At home and during the weeks to come an increasing number of mothers will decide to try the new behavior. Their proficiency at mixing the right proportions and amounts of food and at feeding their babies will increase with more guided practice and positive reinforcement given by the educator during demonstrations in the center. After the first trial at home, some will decide to repeat it and will then continue with the practice regularly. They will become adopters. But their continuing practice will depend on the relative advantage they perceive that they have gained by the new behavior. In the case of adequate feeding of weaning foods, this advantage can in fact be perceived, as suggested by an evaluation of such a program in Upper Volta in which 80% of mothers stated that they noticed their children had become fatter, bigger, or healthier since the introduction of the food (see Upper Volta case study in Study III).

The rate at which different mothers adopt the innovation will generally follow the bell-shaped curve shown in Figure 4 from Rogers and Shoemaker (1971). The characteristics of the innovators, who will be the first to adopt the new ways, include venturesomeness and eagerness to try new ideas. They may not be closely integrated in the social system and may be trying to get from the educator social approval that they normally lack. To the extent that the decision to adopt the new behavior is a group decision, these innovators, together with the change agent, will stimulate the group to consider the idea and will initiate its practice.

By contrast, the early adopters are a respected group in the community who have been found in many diffusion studies to have higher than average education, literacy, social status, and wealth levels than later adopters. They will be less dogmatic, more intelligent, will have a more favorable attitude towards change, and will have higher aspirations than later adopters. Early adopters also have more contact with change agents

FIGURE 4




Source: Rogers and Shoemaker 1971.

and more exposure to mass media and interpersonal communications. With good management, opinion leaders in the community will become early adopters and will influence others to adopt more rapidly. In particular, mothers who are afraid to risk adoption for fear that their infants will get diarrheal infections will be helped to overcome this fear when they are reassured by the educator and see for themselves that the children of the opinion leaders do not become ill. Early adopters will function as legitimizers for a group decision.

The early majority are deliberate and require a relatively long time to make up their minds, while the late majority are skeptical and wait until peer pressure motivates them to adopt. Laggards are relatively out of touch with the social system and tend to be generally lacking in competence.

Acceptance of new practices introduced by nutrition educators may differ from the above profile if the practices involve the use of foods that are considered to be low in social status, made from inexpensive or low status staples, and if the education is targeted mainly to disadvantaged groups, who would necessarily be laggards with respect to attractive commercial innovations, such as the use of radios or mosquito nets, for example. In this case early adopters may not be of higher social status or educational level than nonadopters. Adopters were not found to differ from nonadopters in socioeconomic status in the case study evaluation presented in Chapter Four, although they conformed to Rogers and Shoemaker's findings in all other regards.

b. Attitude Change

Attitude change should occur as a part of the decision to adopt an innovation. Attitudes are emotions or value judgments attached to actions, facts, objects, or states. "It is good or correct to give the best foods to the head of the household" is an example of an attitude shared by many mothers of young children in traditional societies.

A mechanism that describes the process of attitude change is the theory of cognitive dissonance. This theory explains that attitude change is most likely to take place if a person is sharply confronted with a discrepancy between his or her attitude and some new item of information which he or she takes seriously (Kelman 1974). The discrepancy can be of three kinds: (1) between the attitude and information about reality - the mother's attitude could change, for example, if she learned that the growth of the youngest child might be retarded if he did not get enough protein because the best food was going to the father; (2) between the attitude and the attitudes of significant others - the mother's attitude could change if she learned that her cousin who lived in the city believed in giving meat and eggs to her young children and (3) between the attitude and one's own actions - the mother's attitude could change if she realized that all the time and attention she was investing in caring for the child was discrepant with not feeding it well.

a. Interactions Between Attitudes and Behavior

Attitudes and behavior continuously interact with each other (Kelman 1974). A mother's attitudes influence her behavior in ways that affect her experience of reality. Experiences in turn help to shape attitudes. If a mother has the attitude that it is bad to give fish to her baby, she may not do so even when the baby in her arms reaches for the piece of fish that she is eating. So long as the baby shows no immediate change in health, its relative well-being will confirm her attitude that she was correct in not feeding it fish.

If, however, the mother tries feeding her baby fish at a nutrition demonstration, or at home when a health and nutrition worker advises her to do so, or if she sees another mother whom she respects try the experiment with her baby and the child shows no ill effects, this new experience is likely to influence her to change her attitude. This is an example of point (3) above, in that her new action - feeding the baby fish - is discrepant with her previous attitude that it is bad to feed fish, and the discrepancy between the new actions and the old attitude influences her to move in the direction of changing the old attitude completely. Her new attitude will make her more likely to give fish to the baby the next time she eats fish. The greater her sense of risk - her fear that the baby will fall sick - the more difficult it will be for her to change the old attitudes and behavior patterns.

The nutrition educator tries to influence both attitudes and behavior. She or he gives both attitudinal messages, such as "It is good to feed children green leafy vegetables every day because they protect the eyes and improve resistance of the body to illness," and behavioral messages, such as "Boil some spinach leaves wth potato, mash them soft, add some vegetable ghee, and feed them to Ibrahim." The messages teach how to apply the general information to each specific case.

7. Twenty-Five Strategy for Promoting Attitude and Behavior Change

Cognitive dissonance alone is not sufficient to produce attitude and behavior change. It is probable that no single condition is sufficient in and of itself to produce cultural dietary change, but that cumulatively the factors presented below are more than additive. Nutrition educators can apply these factors to program planning and implementation. They are summarized in Worksheet 1 at the end of Section 1.

- Change agent effort. Rogers and Shoemaker (1971) find, not surprisingly, that the most important predictor of success in village-level change programs is the amount of effort the change agent puts into his or her work. Many nutrition educators could do better if they tried harder.

- Positive change is more likely if the educator is more client-oriented than agency-oriented and if the clients or learners are consulted about their needs and these needs are taken into account.

• Credibility of the institution sponsoring nutrition education, either through individual change agents or through the mass media, is an important factor in determining the program's effectiveness in producing attitude and behavior change (Hoveland et al. 1953). Where the commitment of government institutions to providing services to low-income groups is highly credible, as in mainland China and Cuba, health and nutrition education and behavioral change are claimed to progress rapidly. According t· de Haas (1973), "Health education in China is not based on complicated psychologic and sociologic theories as in Western countries, but is part of socialist education in general, stressing everyone's responsibilities with respect to society, family, and individual. There are no rigid regulations from above, but instead information and explanation from below." In Cuba, health care was extended to all the people in spite of the exodus of almost half of the 6,300 physicians of the country. Attendance was high at prenatal and well-baby (puericulture) clinics where nutrition education was delivered.

As suggested by Mellander (1973), the creation of credible and effective service delivery on the socialist model may depend on a complete transformation of the social characteristics of society. Where this is the case, individual nutrition education programs cannot expect to bring about such transformation alone, although they can reinforce socially responsible values and can form alliances with other organizations promoting change. Mellander's prerequisite characteristics for social transformation are:

- a completely different set of priorities:

  . collective target definition vs. individual
  . loyalty to state vs. personal freedom of choice
  . self-reliance vs. self-realization
  . moral work motivation vs. economic
  . ideologically modulated education vs. objective

- administrative forces of religious character

- young people disciplined and self-denying

- intense farming and labor-intensive production

- political independence and stability - strong feeling of a dignified, happy, and quite population

- innovation mentality and do-it-yourself happiness

• An effective medical referral system is important to the credibility of institutions providing nutrition education. Malnutrition which has progressed into the third degree or into kwashiorkor should not be treated by educational methods alone because of the high risk of the death of the child. The infections accompanying milder forms of malnutrition also require treatment. If there is not accessible and responsive health service to which to direct the mothers of children needing treatment, the program will lose popularity. Mothers may reason, "How can I trust your advice, when you were unable to prevent my neighbor's baby from dying?"

A problem arises when the nutrition education is given in locations that are distant from curative health facilities. The principal of the Public Health School in Sind, Pakistan, noted that the mothers of infants whose nutrition and preventive health care were being monitored by the MCH services would bring the children to the MCH center when they became severely ill because of their personal acquaintance with the staff. The nearest hospital which could prescribe antibiotics or admit the sick child was too distant, and many mothers could not afford to make the extra trip. Moreover, without personal contact at the hospital they had no assurance that their infants would receive care. For these reasons, children sometimes died in their mother's arms while the nutrition educator looked on helplessly.

In view of limited curative facilities in many places, institutional rearrangements must be made to assure that sick and severely malnourished children referred from nutrition and lower-level MCH programs receive priority care. Effective referral can also insure that curative hospital facilities are not overcrowded with children who require only the preventive services which they should be receiving in MCH or community-level nutrition programs. Tanzania has solved this problem by refusing hospital treatment to children who have not been referred by their nearest MCH center. Such a strict approach works only where all children have access to lower-level facilties.

The importance of a medical referral system can also be understood from another point of view. Where innovation is perceived to involve risk, it has been found that people require reassurance that they can safely take that risk (Rogers and Shoemaker 1971). A mother who fears introducing weaning foods will be more willing to take the risk if she is reassured that digestive problems can be promptly treated.

The desirability of a referral system does not meant that no attempt should be made to provide nutrition education in the many places in the world that are unreached by modern health services. It does mean that the organizers of nutrition education activities should simultaneously attempt to organize a referral procedure if it is within their ability to do so.

- Credible mass media campaigns impart an institutional impact (Manoff 1973b) to the nutrition education message and create an atmosphere of unity and common purpose between the individual educator, the listener, and the national campaign.

- Credibility of the individual educator favors change. While personal characteristics strongly influence credibility, two other factors also are important. These are an authoritative professional image or social role, and cultural similarity of the educator and the learner group. As an example of the first factor, medical doctors and nurses are widely respected as nutritional authorities. However, if they are from an ethnic group or institution that does not have a trustworthy image among the learner group, or if they lack knowledge of the local beliefs and practices, their credibility may still be low. In many cultures untrained midwives have an

an authoritative social role because of their age and experience. This role may give them more credibility than young, trained midwives, as nutrition educators for pregnant women.

Credibility problems arising from differences in culture or social class can be successfully avoided by training a local person, who has been selected by the community in which she or he will work or who is otherwise of a category proven acceptable to the community and effective in working there. The type of person found to be most acceptable may differ from place to place. In Oaxaca, Mexico, for example, local Zapotec Indian girls who had received nutrition and health training were found to have less credibility in their own villages than in neighboring villages. They are now assigned to work in villages similar to their own but where they are not known personally (Messer 1977). In Yako, Upper Volta, on the other hand, mature mothers of preschool children are trained to work as nutrition educators among their neighbors in their own villages. These mothers are selected in part for their ability to act as good role models for other mothers (Gourier 1978).

- Change is more likely if the nutrition educator is a good role model. The phenomenon known as modeling (Bandura and Walters 1963) refers to the fact that people are likely to imitate the behavior of prestige figures, familiar figures, or favored figures, particularly if this behavior is seen to be followed by satisfactory consequences. As an unfortunate example of modeling, nurses - nutrition educators - in Papua New Guinea (Barnes 1975), who bottle-fed their own babies, often communicated to poor mothers the message that bottle-feeding is best, although these educators were trying verbally to encourage breast-feeding. The large size and good health of the educators' own bottle-fed children were interpreted by the mothers as the consequence of bottle-feeding.

- Change becomes more likely if community opinion leaders are included in the learner group. Rogers and Shoemaker (1971) cite a case in Peru where a campaign to teach village women to boil drinking water failed in part, because the educator did not work with housewives whose opinions were valued in the community and who would have been capable of acting as role models and of diffusing information.

- Motivation of the learner group is important and must take into account both incentives to attend and participate in educational activities and motivation to change personal food behavior. Direct food distribution or registration for rations or other services is often used to motivate attendance at nutrition education activities. When nutrition supplementation is national policy - as in Cuba, where preschool children, pregnant women, and people over 65 years of age all receive a liter of milk daily (Stein 1972), nutrition education should function as an integral part of the distribution system. Formerly, the Catholic Relief Services in Vietnam required mothers to attend daily nutrition education sessions for a month before starting to receive donated commodities (Ramage 1977).

The majority of nutrition education projects surveyed by HIID also conducted feeding programs. Proponents of food distribution contend that food is a necessary incentive to motivate rural, traditional village women in less-developed countries to attend nutrition talks and to change infant feeding practices. Opponents counter that food distribution creates dependency on external resources, is a disincentive to local responsibility, and teaches people to modify weaning practices in ways that are only temporary solutions to the long-term problems.

In projects with a high level of credibility and community participation, as in Yako, Upper Volta, however, it has been possible to change villagers from being food recipients to nonrecipients who provide their own ingredients for weaning food. The program also distributes available foods on an occasional and irregular basis without losing program participants or experiencing any of the dire consequences foretold by proponents of either the food or nonfood strategies. Thus it becomes apparent that food distribution is not a critical incentive for nutrition education, although it may sometimes be an important one, particularly in the early phases of creating interest in establishing a program.

The advisability or inadvisability of distributing foods to motivate attendance should be decided on a case-to-case basis. Certainly less skill is required to get people to come together to receive a free or subsidized commodity than to gather them together for the sole purpose of discussing a subject of which they may have little previous awareness, such as preschool malnutrition. If on balance it appears that a new program could not be established without the provision of food, then a maximalist strategy should favor the use of donated foods where these are available. It should be kept in mind, however, that good nutrition education programs can and have originated without the distribution of foods, and that successful programs that do not distribute foods immediately achieve goals of self-reliance, community commitment, and use of locally available foods to eradicate malnutrition.

In each of the service structures in which nutrition education can and should be included, from adult literacy, to health, to agricultural extension, to income-generating crafts taught by social welfare projects, the service package is the incentive for attendance. Where the service structure successfully involves the community, an additional incentive such as food distribution probably is not required.

- Positive reinforcement in the form of social approval motivates both attendance and behavioral change. The effectiveness of social approval as a motivating force can be enhanced by awards, ceremonies, special days, and other promotional techniques. In the mothercraft on-site feeding and nutrition education programs in the Philippines, for example, certificates are presented to all program "graduates" by a prominent social figure (such as the mayor's wife) in a celebration held at the end of the course. Stickers, such as gold stars, and medals given for weight loss, prove effective in adult weight-control programs (Templeton et al. 1978). Stickers or badges might similarly be given to mothers whose children have gained more

than an average amount of weight between monthly weighing sessions. Praise from the nutrition educator is a powerful form of approval. When, as is claimed for China, the population as a whole is enlisted in the education process, as one cohesive community, the power of social approval becomes pervasive. In smaller-scale efforts social approval is strengthened when the mothers who are learning together know and care enough about each other to function as a peer community.

Motivation for behavior change in choice of foods and eating habits is complicated and probably differs depending on whether the individual is choosing foods for herself or for her infant. According to Miller (1978), "it has become powerfully evident to nutritionists in recent years that people eat for reasons satisfying to themselves, not to the nutritionist, planner or technologist." In spite of 40 years of nutrition education, adults in affluent countries continued to show a rising incidence of obesity (more than 20% of the population), cardiovascular disease, stroke and hypertension until about 1970. From 1970 on, precipitous drops have been shown in all these categories particularly among the upper classes, leading Miller to speculate, "It may be that long-term consideration of future health becomes of importance only when income (and time at income level) reaches a stage at which most desires have been or can be satisfied and new 'cosmic consciousness' can now play a role." The implication is that nutrition education targeted to low-income groups will be most effective if it appeals to the more fundamental ego component of food choices, such as status, maintenance of interpersonal relationships, coping with stress, rewards and good "cuisine."

However, weaning-age malnutrition threatens the immediate survival of the child. Immediate health and survival are more effective motivators than long-term, future health. Death rates of children under five are so high in developing countries that most families have personally lost a child. Beyond the sense of personal tragedy, producing children who will look after their parents in old age is a basic survival concern of adults and therefore an effective motivator to take steps to insure the survival of infants. For these reasons, the goal of having <u>healthier children</u> is a strong motivator for changing feeding behavior.

The appeal that better nutrition will produce stronger and <u>more intelligent children</u> capable of studying for modern sector careers is also a powerful motivator, insofar as traditional rural societies often have high educational and career aspirations for their children. Among the Nilotic Dinka of the Sudan a survey conducted by the writer in 1977 showed that although only 5% of the rural population had attended any form of school, parents of 52% of children under the age of 14 wanted them to complete a university education. Moreover, 94% desired their children to have modern sector occupations. In rural Upper Volta, where less than 3% of the population are literate, 60% of families interviewed (see Formulated Foods Case Study) wanted their children to attend school and 70% desired them to have modern sector occupations. Schooling is seen as a way of rising from the traditional to the modern sector and of improving family status.

The appeal to people's desire to achieve middle-class or modern status has been effectively used by the milk companies to promote bottle-feeding (Wennen-Van Der Mey 1969). The babies pictured in the formula ads are fat and the appeal in the text is to good health, but the clothing worn by the babies and their mothers shows their middle-class status and makes the indirect statement, "If you use this product, you can identify yourself with the middle class." Because of the importance of status, it is desirable to promote the same infant-feeding practices for both upper- and lower-income groups and to pick women of higher status (either modern or traditional) to illustrate these practices in posters, on television, and in some face-to-face weaning food demonstrations. The status of village women's groups in Kasangati, Uganda, was felt to be improved by calling them women's clubs (Bennett 1968).

- Both positive and negative appeals may motivate change, but positive appeals are generally more effective. Strong negative appeals based on fear are unlikely to induce significant change unless they contain specific practical alternatives to the threatening behavior (Rachman 1970). The message, "Your children will not develop mentally and physically if they do not drink milk in the early period after they are weaned from the breast" is unlikely to produce attitude or behavior change in an area where cow's milk is unavailable and where people have lived for centuries without it. Similarly, a message that it is unsafe to drink unboiled water will not change attitudes or behavior where fuel and time are not available for boiling water.

- Certain teaching techniques favor change. Successful behavior change consists of an initial trial followed by repeated trials which lead to adoption, after which the behavior becomes habitual. In order to learn new behavior adequately in the trial phase, repeated opportunities to practice the behavior with the personal guidance of a nutrition educator or informed opinion leader who reinforces correct efforts with praise and encourages further improvement are important. Thus the opportunity for guided practice with reinforcement is a basic principle favoring change.

- Active discussion favors change by encouraging individuals to resolve their own personal misunderstandings, doubts, and fears. An effective way of guaranteeing active discussion is by teaching nutrition educators to present ideas by asking open-ended questions. These are questions which can't be answered by yes or no. The Philippines Nutripak Project in Leyte found that a single day spent in teaching volunteer workers how to ask open-ended questions instead of lecturing increased the sales of the Nutripak weaning food by close to 100% in a group who were receiving face-to-face education plus a videotape (Anderson 1978). The volunteer educators required a full day of practice, taking turns role-playing teacher and mother in order to learn to ask the questions correctly and respond to the answers.

- When traditional food and medical beliefs are strong and where people have a lively interest in nutrition and health, as in Pakistan, it may be helpful to present both sides of the argument, and to discuss and explain the reasons for changing from the old practices. Explanations become critical when it is discovered that people are not practicing what

they have been taught, as when it is found, for example, that mothers are not giving their babies the weaning foods or hygenic care advised by the health workers because the new ways conflict with the old beliefs.

Explanations should start from the premise that the old ways are partially correct and were useful in their time, but that we now have more complete knowledge which enables us to change to better practices. Many of the old beliefs contain a partial truth. The wisdom in them deserves respect. The belief in Pakistan, for instance, that banana will cause constipation if it is fed to babies is partially correct in that it recognizes that banana has a soothing effect on the gut during diarrhea. A person holding the belief will change more readily if told, "Yes, there is some truth in that belief, but the complete truth is that while banana has a constipating action in the case of diarrhea because it is an easy food to digest, it does not constipate a baby who is well," than if simply told, "Feed the baby bananas." Beliefs that "hot" foods such as eggs, meat, and fish are not safe to eat during the summer, especially for young children and pregnant women used to have the valuable effect of protecting vulnerable groups from foods that spoil rapidly in hot weather.

Explanations that acknowledge the wisdom of the old beliefs have several advantages: (1) they affirm the credibility of the persons offering the explanation and teaching the new practices; (2) they enhance the self-respect of the persons holding the old beliefs; and (3) they help the learners to integrate the process of change. A series of nutrition and health education booklets were prepared for use in Pakistan, with the goal of modifying rather than completely changing or destroying the popular Unani (Greco-Arabic) food and medical belief system (Zeitlin 1973). These are used by the lady health visitors in the MCH clinics. They also serve as fourth- to sixth-grade-level adult literacy readers and are sold in commercial bookshops around the country. A second edition of the Urdu booklets was printed in 1978.

Although it may prove useful to explain reasons for change, the nutrition educator has no obligation to do so. Change that is not understood or explained on a conscious level occurs in all aspects of life. Individuals and groups psychologically integrate the changes that occur in their lifestyles over time. In some cultural transitions, this integration process is difficult and may take a generation or two. Second-generation Americans, for example, face psychological stress that first and third generations do not. Newly urbanized groups in developing countries also experience sudden stressful change.

In bridging the gap between the old and new, it often is useful to introduce practices that calm people's fears by making the new rules safe according to the old point of view. In Pakistan, for example, pregnant women fear that "hot" foods, including fish, meat, poultry, and eggs, may induce abortion. The "heat" of these foods can be neutralized by squeezing lemon or lime juice, which is "cold," over them, thus allowing the expectant mother to eat as much high-quality animal protein as she can afford. Not every compromise is constructive. The practice devised by some Pakistani mothers to protect their babies from the "cold" effects of orange juice by warming it over the fire may defeat the purpose of giving the juice by destroying its vitamin C.

An exception to the rule favoring discussion applies to the presentation of new foods, such as young cowpeas in Bangladesh (previously used only in mature form for animal fodder). Excluding foods that violate strong cultural taboos, such as beef among Hindus, unfamiliar dietary items are best presented simply in prepared form for people to try, with some indication that the dish is very tasty and has been well received by others, but without any further explanation or discussion until all those present have had the chance to taste it (Taylor 1976). If the group were asked about the food first and committed themselves to a negative answer, it is likely they would never try it. Once they had tried it and found it good, the discrepancy between their experience and their previous attitude is likely to bring about an attitude change.

• Behavior change is favored if the learner makes a public commitment before the group. The mother who is encouraged to tell the group which green vegetables she plans to give her baby and how often she plans to prepare this food will be more likely to follow through than the mother who listens quietly. The perception that others in the group are changing in the same direction also favors change through modeling and social approval. Some groups have used the strategy of having each member publicly select an assignment to carry out between group meetings, and then reporting back at the next meeting on their success (Templeton et al. 1978). Such assignments might be to accustom the infant to eating some food he has refused up until now, or to plant certain green vegetables around the house, or to give a baby suffering from chronic diarrhea only boiled water to drink. Discussion at the next meeting allows group members to reevaluate and to share in problem solving.

• Role playing is also known to increase attitude change on the part of those taking on the new roles (Adult Education Association 1960). Nutritional problems can be dramatized within the group in ways that deal with conflicts, such as the difficulty that arises in some cultures during harvest season when women arrive home late in the evening from the fields and the younger children already are sleeping by the time the meal is prepared (Moumouni 1978). Taboos exist against waking sleeping children; moreover, the groggy wakened child may not feel hungry.

Church (1971) noted that in a nutrition rehabilitation unit in Kampala, Uganda, the level of involvement of other mothers was higher when one of the mothers took on the role of educator and presented the nutrition demonstration than when demonstrations were given by the staff. Outside of classes, when mothers or other community members are enlisted as volunteers to teach others in their neighborhoods, this experience places them in the new role of teacher or advice-giver, and their own acceptance of the nutritional practices they are teaching others increases.

• Neighbors generally do pass on information to each other by a natural process of diffusion. This process has powerful multiplier effects. Dr. de Chavez and co-workers (1972) in Mexico instructed an experimental group of 30 families in a small village to prepare and feed beans, carrots, and eggs to their children, and then evaluated the results of the educational message not only on the experimental group but on a control group

of 90 neighboring families. After 14 months had elapsed, 85% of the controls had begun to implement the new feeding practices. When this diffusion process is enhanced by enrolling some members of the community to spread the new information actively, as has been done in Indonesia (Rohde et al. 1975), in the Philippines (Bartolome 1977), and in Upper Volta, change within the community is consolidated by the process of both role playing and diffusion.

A health education program in the United States found that each person enlisted in the program who received mass-media messages and face-to-face instruction spontaneously transmitted high-quality information concerning prevention of cardiovascular disease to an average of eight other individuals (Meyer et al. 1978). Such diffusion effects may also be enhanced by providing learners with pictures, diagrams, or photo-novels which they can show to others.

- Mass-media, support-media, face-to-face activities and diffusion work together by ensuring repetition of the message content. Repetition is required for learning. Those people with high exposure to channels of communication will have to hear the messages many times in order to ensure that target families with lower exposure hear the subject matter often enough for learning to occur. Conscious learning of a new message is not always a prerequisite for behavior and attitude change. However, awareness that new methods or opportunities exist, and knowledge of the nature of these methods and the advantages to be gained by change generally are early phases in the change process.

The factors proven to be important in producing attitude and behavior change are summarized in a list of key questions in Worksheet 1. This list can be used to assess existing nutrition education programs. It can also be used by program directors and nutrition educators in internal formative evaluation, as a basis for discussion and design of changes to improve ongoing programs.

## 8. SUMMARY:

## CHANGING ATTITUDES AND BEHAVIOR

Change in food habits follows a bell-shaped curve, which is to say that a minority of people change soon after the new idea has been introduced, the majority change after some time, and another minority change very late or not at all. Cultural borrowing, innovation, urbanization, price shifts, commercial advertising, and nutrition and health education are factors that influence dietary change. Opinion leadership and peer pressure from those who have already changed motivate dietary change. Public education campaigns have

little or no success when they must compete with counter-propaganda, such as misleading commercial advertising. Thus advertising of infant formula, for example, must be controlled by legislation before breast-feeding education can be expected to be successful.

Attitudes and behavior continuously interact. Nutrition education works to change both simultaneously, and should make use of a number of principles. Attitude and behavior change depend on the effort and client orientation of the educator, and on the credibility of the institutions and individuals offering the education. A medical referral system increases institutional credibility, while an authoritative image and cultural similarity to the learner group increases credibility of the individual teacher. Motivation is important both for program participation and for change. Motivating factors should include social approval, and appeals to the desire for big, healthy, and intelligent children, for middle-class or modern status, and for community solidarity, and may also include the delivery of services or the distribution of food. Teaching practices favoring change include enlisting community opinion leaders in the learner group, demonstration, guided practice, with reinforcement, presentation of themes by open-ended questions, discussion, eliciting public commitment before the group, role playing, and actively promoting diffusion. An action-oriented summary of principles and methods for promoting change is presented in Worksheet 1.

WORKSHEET 1

## QUESTIONNAIRE FOR ASSESSING FACTORS THAT PROMOTE ATTITUDE AND BEHAVIOR CHANGE IN FACE-TO-FACE NUTRITION EDUCATION PROGRAMS

Each question below presents a factor that has been proven to promote effective behavior change in nutrition or other development education programs. In using the questionnaire to assess nutrition education efforts, answer the a. series by filling in the matching boxes with the numbers 0 to 4, where 4 = yes, definitely or most of the time; 3 = yes, moderately or more than half of the time; 2 = yes, somewhat or less than half of the time; 1 = no, not much or rarely; and 0 = no, not at all or never. Answers to the b. questions should provide guidance in upgrading the project.

1.a. Are the nutrition educators motivated to give the project their best efforts? ☐

b. How could the field workers be better motivated? _____

_____

2.a. Are the educators more client-oriented than institution-oriented? ☐

b. What could be done to encourage field workers to take clients' expressed needs into greater consideration?

_____

_____

3.a. Does the institution sponsoring the education have credibility with the learner group? ☐

b. What could be done to increase institutional credibility?

_____

_____

4.a. Does the program have an effective medical referral system? ☐

b. What could be done to make medical referral more effective? _____

_____

5.a. Do the nutrition educators have an authoritative image which makes them credible? ☐

WORKSHEET 1 (continued)

5.b. What could be done to make this group more authoritative?

_____

6.a. Are the nutritional educators similar in culture and social class to the learner group in ways that increase credibility? ☐

b. What can be done to recruit more field workes from the same communities as the target groups? _____

_____

7.a. Is radio used to provide institutional impact to the program and to increase awareness and knowledge of the messages? ☐

b. How could radio and other media be used more effectively?

_____

8.a. Is social approval used to motivate program attendance and behavior change? ☐

b. What festivities, visits of important persons, certificates, or other expressions of social approval could be used to increase motivation? _____

_____

.a. Are all existing food distribution programs used to motivate attendance at nutrition education activities? ☐

b. How can food distribution or feeding programs be used more effectively to motivate participation in nutrition education? _____

_____

.a. Are health services used to motivate attendance at nutrition education activities? ☐

b. How could participation in nutrition education be tied in more closely with the delivery of health care? _____

_____

WORKSHEET 1 (continued)

11.a. Are other development activities such as income-generating women's handicrafts, or agricultural extension services used to motivate participation in nutrition education? ☐

b. What development activities outside of health already bring groups of women together in settings in which nutrition education could be conducted? _____

_____

12.a. Is desire to be modern used to motivate behavior change? ☐

b. How can the growth and health benefits of the program be illustrated more clearly to mothers and community opinion leaders? _____

_____

13.a. Is the appeal to the desire for rapid child growth and good health used to motivate change? ☐

b. How can the growth and health benefits of the program be illustrated more clearly to mothers and community opinion leaders? _____

_____

14.a. Is the appeal to the desire for more intelligent children used to motivate change? ☐

b. Are there ways in which benefits of good nutrition on mental development can be stated more clearly without promising that every well-nourished child will be brilliant? _____

_____

15.a. When positive or negative appeals are used to motivate change, are the action instructions specific and practical? ☐

b. How can instructions for action be made clearer and more practical? _____

16.a. Are community opinion leaders included in the learner group? ☐

WORKSHEET 1 (continued)

16.b. How can opinion leaders be better reached by the program? _____

_____

17.a. Are learners given regular opportunities to practice the cooking or other techniques which are taught with the personal supervision of the nutrition educator? 

b. How can more guided practice be built into the program?

_____

18.a. Do the nutrition educators check on performance of the mothers in their groups? 

b. How can more home visiting or other individual counseling or reporting of individual performance be included in the program? _____

_____

19.a. Do the nutrition educators praise or reward the learners for their performance and encourage them to keep improving? 

b. In what ways could nutrition educators provide more positive reinforcement and encouragement for further change? _____

_____

20.a. Is the nutrition educator herself a good role model for the learners to imitate? Does she breast-feed her own children, for example? 

b. How could field workers be encouraged to set better examples for those they teach? _____

_____

21.a. Do nutrition educators present new materials in a context of open-ended questions, in order to encourage group discussion? 

b. How can more training in presentation through open-ended questions and other discussion methods be included in the educators' own training programs? _____

_____

WORKSHEET 1 (continued)

22.a. When the new methods being taught conflict with old beliefs, do the educators attempt to calm people's fears by further explanation and reassurance? ☐

b. Are there ways of making new practices safe according to old definitions (by neutralizing "cold" and "hot" foods by mixing them together, for example)? _____

_____

23.a. Is each learner encouraged to make a public commitment to trying or performing the new practices in her home? ☐

b. How could a statement of plans or intentions to carry out change be included in the teaching pattern? _____

_____

24.a. Are members of the learner group encouraged to role play by being teacher in the class or in dramatic skits? ☐

b. How can group sessions be structured to give the members more opportunity to take on the teaching role? _____

_____

25.a. Are learners encouraged to take on a teaching role in the community in order to spread the nutrition education messages by diffusion? ☐

b. How can group members be encouraged or enlisted to teach their neighbors? What instructional materials can they be given to assist them in communicating the messages they have learned? _____

_____

26.a. Do all of the educational channels together provide sufficient repetition for the priority themes to be memorable? ☐

b. How could the channels present the themes in a more repetitive and mutually reinforcing manner? _____

_____

Score: _____

75-100 = excellent; 50-75 = good and can be improved; 25-50 = weak but program structures provide the foundations for improvement; 0-25 = basic changes required in program design.

## D. Theme and Message Design

### 1. KEY QUESTIONS

- What do people in traditional cultures already know or believe about diet and health?
- What techniques should be used for assessing beliefs and practices?
- What are the priority themes for nutrition education affecting the weaning age?
- How should these themes be adapted to local conditions?
- What testing procedures are required for translating themes into messages?
- What further procedures are required for standardizing and adapting messages?

The word "themes" is used in this discussion to refer to the information that is to be conveyed. The word "messages" applies to the units into which the themes are broken down and to the specific words used to express these units. This distinction is most important in the case of the mass media, such as radio, where every word in a 30-second spot, for example, must be carefully specified in advance of the broadcast. The face-to-face educator, on the other hand, can take a theme such as supplementary feeding by the age of 6 months and spontaneously translate it into specific messages to suit the circumstances of the group or the individual mother. Better yet, individual messages can evolve out of group discussion.

### 2. Identification of Themes

Identification of priority themses is a second phase of problem diagnosis and planning. When objectives have been specified and goals have been set, these themes define the general behavior changes required to achieve the objectives. Existing nutritional beliefs and practices must be assessed before nutrition education themes can be specified within any culture area.

#### a. Traditional Belief Systems

Historically, most civilizations have recognized the existence of a relationship between food and health. Many traditional cultures throughout South America, North Africa, the Middle East, and Asia ascribe hot and cold values to foods, which refer not to temperature of the food but to the heating or cooling effects of the food on the body. Although

many foods differ in hot or cold values from region to region, and even in the opinion of different households in the same neighborhood, portions of the belief system are virtually universal. Lemons and most other citrus fruits are invariably "cold." Skin rashes are widely believed to be one effect produced by too many "hot" foods. Theories claiming that hot-cold beliefs spread from the Greeks to the Arabs and on to the Subcontinent, and through the Arabs to the Spanish and the Indian populations of South America, or that they originated in China and spread similarly, tend to raise as many questions as they answer (Foster 1953; Currier 1966; Hart 1969).

One thing which is certain is that proponents of these belief systems succeeded in doing a fine job of nutrition education. Illiterate traditional peoples, as found in Pakistan, may be able to name more nutritional qualities per food item than could be expected from the average American or Western European high-school graduate (Ahmed and Zeitlin 1972). Some beliefs appear to be surprisingly universal. The writer found, for example, the folk belief that if a baby had not nursed for more than 24 hours, the milk in the breast would be spoiled and would make the baby sick, coming from Oshogbo in Nigeria, Yaounde in Cameroon, and from Kiev in Southern Russia. In two cases personally known to the writer, the mother had acted on the belief by discontinuing breast-feeding and had interpreted the painful breast engorgement she experienced as proof that the milk was spoiled.

Jelliffe (1968) and Ashkenaz (1973) provide basic information concerning traditional infant feeding practices and their nutritional consequences. Before proceeding with the discussion of such beliefs, it is important to note that they must not be viewed as somehow sacred or unchanging. Our grandmothers held them. But which of us would go back to the child-feeding and health practices of our grandmothers? The fact that damaging beliefs persist is in itself proof of inequity of education in society. How is it that the opportunity to acquire accurate scientific information concerning health and nutrition has been made available to some segments of society, but has been denied to other groups? The existence of food taboos cannot be used as an excuse for malnutrition, because both the taboos and the malnutrition together are evidence of social inequality. In some social groups, lack of food resources is the main reason for continuing culturally inadequate feeding practices. Most people are eager to give up incorrect knowledge if they can adopt new practices under circumstances that favor the process of change (see previous section).

A common reaction of persons learning for the first time about the more destructive nutritional beliefs and practices common throughout the world, which are listed in Worksheet 2, is incredulity - how could the human race remain collectively so ill-informed for so long? What happened to the healthy, noble savage? Where is man in his natural state? The only answer we have to this last question is that if by healthy natural primitives we mean groups of indigenous peoples who do not have damaging food beliefs and weaning practices that result in high childhood-mortality rates, no one has documented the existence of such groups. However, like the Sasquach, they may be out there. The writer found that the Nilotic Dinka in the Sudan, who give large quantities of cow's milk to the weaning infant, do appear to avoid protein-calorie malnutrition (but not anemia) in the second year of life, when milk is available.

**WORKSHEET 2**

COMMON HARMFUL FOOD AND HEALTH BELIEFS

| Harmful Beliefs and Practices | Harmful Conditions Produced | Areas of World in Which Beliefs Occur | Relative Strength of Beliefs and Practices | Potentially Beneficial Functions of these Beliefs (Comments) |
|---|---|---|---|---|
| Breast-feeding | | | | |
| Yellow colostrum is bad for baby (sometimes thought to be pus). Mother's milk is not given until it turns white. (Ashkenaz 1973, 2, B) (Mathur 1975) | Infection caused by feeding unsanitary substitutes. Caked breasts. Poor maternal infant bonding. | Very common but not universal in Subcontinent, Africa, South America, Indonesia | Strong | Spiritual bond formed, e.g., with grandmother who gives alternate hand or spoon feeding, or neighborwoman who breast-feeds and her child who becomes milk brother, may be culturally important. |
| Lactating mother's diet may be restricted to only bread and tea or some other unsatisfactory combination for period following delivery. (Wilson 1971) (Ashkenaz 1973, 2, B) | Weakens mother and may affect quality and quantity of her milk | South India, Pakistan, Malaya, Latin America | ? | Good food practices of giving chicken soup or other nourishing foods to the new mother are more common. |
| Milk spoils and must not be given again if child has not sucked at breast for 24 hours or more. | Enforces sudden, sometimes accidental weaning (if mother called away for some reason). Traumatic, can lead to marasmus. | Widespread Nigeria, Russia | ? | (Painfulness of the overfull breast is interpreted as a sign the milk has spoiled.) |
| Mother's milk will disagree with baby if mother is angry or upset. Mother should wait until she is calm to breast-feed. | Contributes to cycle leading to reduced milk supply and underfeeding of child. | Philippines, West Indies, Mexico | Weak to moderate | This belief may give lactating mother permission to create a calm environment for herself in which the let-down reflex functions well. |
| Sexual relations spoil the milk and make the baby sick. | Urban couples may bottlefeed to permit sexual intercourse. | West Africa, Indonesia | Varies | Postpartum abstinence has been an effective birth spacing method in rural polygamous cultures. |

| Harmful Beliefs and Practices | Harmful Conditions Produced | Areas of World in Which Beliefs Occur | Relative Strength of Beliefs and Practices | Potentially Beneficial Functions of these Beliefs (Comments) |
|---|---|---|---|---|
| Evil eye commonly given by a jealous woman may cause mother's milk to spoil and be unfit for baby. | Abrupt weaning when gastroenteritis is taken as a sign of spoiled milk caused by evil eye, malnutrition. | Subcontinent, West Africa | ? | Sometimes influences mothers to prevent infants' exposure to strangers and crowds where child might catch infection. |
| Foods such as chick-peas, cabbage, etc. may be avoided by lactating mother for fear of causing gas pains in nursing baby. | Loss of nutrients in mother's diet if food avoided is dietary staple such as chick-peas in Pakistan. | Almost universal. Foods avoided vary with region. | Weak | Individual infants apparently respond badly to foods eaten by some mothers, but such responses are uncommon. |
| Supplemental Feeding | | | | |
| Breast or milk feeding is basically enough for baby until teeth come in or until it shows a desire to eat, or until end of first year of life or later. Other foods are given in insufficient quantities. (Rao and Balasubramanian 1966) (Jelliffe 1968) | Commonest cause of malnutrition. | Underfeeding is universal, and also occurred in Europe and U.S.A. until turn of century or later. | Strong | Introduction of solids under unsanitary conditions often causes diarrhea, though infants receiving more solids still have been shown to have better survival. |
| Cereal or other starchy gruels are given in place of breast milk when mother works, or as primary supplement. | Child is limited to bulky staples which are poor in protein and calories. | Common among some groups in all regions. | Strong | For older infants, such a gruel is better than no food at all, and may form the staple base, to which enrichment ingredients are added. |

| Harmful Beliefs and Practices | Harmful Conditions Produced | Areas of World in Which Beliefs Occur | Relative Strength of Beliefs and Practices | Potentially Beneficial Functions of these Beliefs (Comments) |
|---|---|---|---|---|
| Egg or egg yolk shouldn't be given before age 2 because it is a "hot" ("cold") food. (Ahmad and Zeitlin 1972) (Ashkenaz 1973) | Loss of protein source for infant when egg is avail- | Areas where hot-cold beliefs are strong. | Very Strong in some regions. | --- |
| Eggs shouldn't be given to babies or children for fear they will become thieves, or will steal eggs or won't learn to speak, or teeth will become yellow. (Jelliffe 1968) | | Sub-Saharan Africa<br>North Africa | Strong | African chickens lay so few eggs that if children got the habit of foraging for them, the chickens might die out. |
| Meat and/or fish should not be given before age 2 because they are either too "hot" or because they will cause worms or stomach upset. Similar beliefs apply to beans, pulses, and oily foods in some areas. | Loss of protein and calorie sources for infant when meat and fish or other foods are available. | Nearly universal in one form or another. | Vary from very strong to weak. | Inadequate preservation of leftover meat and fish stews may make these dangerous for young children, particularly in hot weather. Beans do cause flatulence. |
| Fruits, particularly lemon, orange and other citrus, should not be given to infants because they are "cold" and may cause sore throat and cold. (Ahmed and Zeitlin 1972) | Loss of vitamins C and A. | Areas where hot-cold beliefs are strong. | Vary from strong to weak. | --- |

WORKSHEET 2 (continued)

| Harmful Beliefs and Practices | Harmful Conditions Produced | Areas of World in Which Beliefs Occur | Relative Strength of Beliefs and Practices | Potentially Beneficial Functions of these Beliefs (Comments) |
|---|---|---|---|---|
| Infant shouldn't have highly peppered foods. | Child is limited to bulky staples which are poor in protein and calories. | Some areas using lots of red pepper in cooking. | Variable | Infants themselves often do not like the heavily peppered dishes and so may refuse them even when offered. This calls for a change in cooking habits. |
| **Care of Sick Child** | | | | |
| Foods and liquids are commonly withheld from sick infants, and particularly from children with diarrhea. Mothers' milk may be withheld. Cow's milk is almost invariably withheld. (Sanjur et al. 1970) (Mathur 1975) | Dehydration during diarrhea is frequently commonwest single cause of death. Withholding of foods leads to downhill spiral of malnutrition and lowered immune response. | Universal, with exceptions. | Strong enough to be a serious cause of concern. | In the case of diarrhea, when nothing goes in, less comes out. However, this does not mean the child's condition is improving. |
| Diarrhea or stomach pains should be treated by purging or enemas to clear the gut. (Mathur 1975) | Worsens the condition. | Latin America, Subcontinent | Varying | --- |
| Illness or malnutrition are caused by evil eye or witchcraft or other spiritual causes. (Kakar et al. 1972) | Magical treatments may be considered sufficient until child is so ill or malnourished that death or brain damage can't be avoided. | Universal | Strong in some areas. | Illness also may have psychological causes, so treatment of spiritual healer may be valuable addition to modern medical and nutritional therapy. |

WORKSHEET 2 (continued)

| Harmful Beliefs and Practices | Harmful Conditions Produced | Areas of World in Which Beliefs Occur | Relative Strength of Beliefs and Practices | Potentially Beneficial Functions of these Beliefs (Comments) |
|---|---|---|---|---|
| Pregnancy | | | | |
| Foods should be restricted so that infant doesn't grow too big. | Increased incidence of low- birth weight infants. | Common but not universal in variety of locations. | Varying | When hospital delivery is not possible, it may be better to have a low-birth weight infant than to lose the mother and infant in childbirth. |
| Foods such as meat, fish, egg, pulses, and some fruits and vegetables may cause bleeding or spontaneous, abortion or other ills, such as anemia, or ill effects on baby. (Zeitlin and Anin 1972) | Loss of intake of available protein, low-birth weight, loss of vitamins. | Where hot-cold system is strong, other areas. | Varying | --- |
| Family Food Distribution | | | | |
| The man or men in the family should get the best foods, and particularly the high-protein foods, while the children should be fed last. (Jelliffe 1968) | Malnutrition of the preschoolers and pregnant and lactating women. | Widespread, although a few cultures favor children in food distribution. | Strong | If the male household head falls ill, the entire family may be seriously jeopardized. If some individual must die, society loses the least by losing the youngest. |

A second response is to demand an explanation which makes sense in evolutionary terms. Smaller total body size, which results from malnutrition, has been claimed to be an advantage in an unfavorable environment. The need for population control within an ecosystem may have resulted in infant care practices that permitted the survival of no more children than the environment could support (Scrimshaw 1978). Perhaps it was favorable for human development in evolutionary terms for children who did not pass a weaning-age survival test to be eliminated from the gene pool. Maybe hunting and gathering nomadic tribes needed to have infants who did not become too heavy before they learned to walk well, so that they could be carried on long treks. Probably some of the beliefs and practices were protective in cultures with no understanding of the germ theory of disease. These and other explanations for individual practices may be true, but could be difficult to prove.

Restriction of the diet of pregnant women in order to avoid obstetric difficulties caused by too large an infant is common practice, which is probably well-advised in situations where cesarean birth is not an alternative (Sambhi 1973; Mtimavalye 1974; Bagchi and Bose 1962). Among the Dinka of the Sudan, such rules forbid the expectant mother to drink fresh cow's milk, to eat sweets, and to nap during the day.

Beliefs in Worksheet 2 which have not been referenced are taken from the personal experience of the writer and her colleagues. Most of the beliefs probably are held in more areas of the world than are noted on the list (if a belief shows up in widely separated locations, it may be held at some points in between). The extent to which most of the beliefs listed are actually practiced has received little research. A literature review of food beliefs and practices by the Cooperative for American Relief Everywhere (CARE) (Vemury and Levine 1978) provides many additional examples. Taboos may be honored to degrees varying from virtually 0% to 100%. Fifty-one percent of six- to 15-month-old infants in the Philippines case study had received some fish, meat, or eggs in the day prior to the survey, although traditional taboos against feeding these foods to babies exist. In a study in Sind, Pakistan, by contrast, 100% of respondent families practiced at least one of the dietary restrictions prescribed by the Unani medical system (Ahmed and Zeitlin 1972).

A major reason why unsatisfactory belief systems have continued for so long is that the malnutrition they cause is hard to spot, except in severe cases. The average moderately malnourished child in the 6-to 24-month age range cannot be identified without a weighing scale. Most of these children look entirely normal but are too small for their ages, have lowered resistance to infection, and therefore easily succumb to and die of illnesses, such as measles in Africa, which rarely kill the well-nourished child. The appetites of infants of this age seem to adapt to reduced food intake, so that the malnourished child receiving only 60% of requirement may give no outward signs of being hungry.

In older infants the regulatory system that should alert the mother to the child's need for food is thrown off by feeding patterns that partially satisfy the child and therefore keep it from crying, without providing sufficient nutrient intake. The malnourished infant that

reast-feeds on demand may be on and off the breast several times an hour. requent sucking, an insufficient trickle of milk, and rocking and juggling y the mother or other caretaker may keep the child quiet so the mother is ot alerted to the fact that the child needs more food. This phenomenon has een referred to as "breast starvation" and has sometimes mistakenly been iven as an argument in favor of weaning infants from the breast by the age f 12 months or so (Udani and Parikh 1973). The child's frequent desire to eed cannot serve as a reliable cue to the mother that the child needs more ood because well-nourished infants often desire frequent comfort feedings, ust as some nonbreast-feeders suck their thumbs or pacifiers.

Bulky cereal porridges, root vegetables, soups, and diluted milk requently have a similar effect by filling the child's stomach and satisying its appetite without providing sufficient calories. A real problem rises here: the baby must have a soft food because it cannot chew; cereals re softened by adding more water during cooking, but this extra water ilutes the nutrients in foods that already are bulky. Mother's milk olves the bulk problem by providing 40% to 50% of calories in nutrient-ense fats, so that the infant receives 160 calories in 8 ounces of milk. or the same number of calories, the child would have to eat approximately 6 ounces of cereal porridge. The need for calorie-rich foods is not bvious to the mother, and the infant cannot consume the 12.5 cups of orridge a day that would be required to provide 1,000 calories.

It is small wonder, then, that traditional people who are used to eeing undersized children generally do not realize that their babies are alnourished. Mothers in the Philippines case study in Chapter Four, for xample, were asked whether they thought their children were growing and eveloping well or poorly. Of the infants in the sample, 33% suffered from econd- or third-degree malnutrition according to the Gomez classification ased on the Harvard standards. Of the mothers of these malnourished hildren, 58% said they thought their babies were growing and developing ell. Body perceptions may not be well developed. Gray (1977) compared elf-perceptions of weight appearance of 179 male and female undergraduates t Fordham University in New York with their weight status as defined into roups of underweight, normal, and overweight by Metropolitan Life Insurnce standards, and discovered that nearly half of the sample inaccurately erceived their own weight appearance. Or, when body perceptions are dequate, standards may be too low.

Breast-feeding mothers also may have an unclear perception of the nfant's stomach volume, since they cannot observe the amount of milk taken rom the breast. The possibility that they underestimate the size of the hild's stomach is suggested by the finding in the Philippine study survey hat the 32 mothers who bottle-fed their babies had also fed 54% of the hild's caloric requirement in solid foods during the day previous to the urvey, whereas the 40 mothers who breast-fed had provided only 13% of heir baby's requirements in supplementary solids. The average ages of the hildren were 10 months for the bottle-fed and 9.6 months for the breast-fed

(no significant difference). The solid foods given both groups were similar, consisting mainly of rice and other items from the parents' daily diet. Although the reported income of the breast-fed children's families averaged below 200 pesos per month, versus between 200 and 300 pesos for the bottle-fed group, this difference would not have affected the families' ability to provide the average additional 387 calories a day required to bring the intake of the breast-fed group up to that of the bottle-fed. It appears more likely that the bottle-feeding mothers knew from the amount of milk the child normally drank the amount of food its stomach could be expected to hold. Alternately, they may have learned to feed solids from the same source that influenced them to bottle feed.

The previously mentioned Sidney M. Cantor Associates study (1973) offers the silhouette hypothesis to explain the failure to allocate enough of the family food to infants and pregnant and lactating women,

> It appears as if food were allocated according to the relative two-dimensional size of the different family members: i.e., height or length by width, or the face-on-body silhouette. Lack of perception of additional food needs for growth, for reproductive functions in the female, and variable needs according to body weight and activity provides an explanation consistent with the degree of malnourishment of different sex and age groups studied. Under this hypothesis, one would expect the elderly to be better fed than younger adults who are more active and have greater food requirements; the mere passage of time and progression through the life cycle would be expected to bring the older adults into a better state of nutrition.

b. How to Investigate Food Beliefs and Practices Relevant to Preschool Child Nutrition

i. General Beliefs and Practices Inventory

A formal survey of food beliefs is not required, but it is useful for those developing the themes of a nutrition education campaign and preparing to introduce new foods to hold at least one and preferably several discussions on this subject with field workers, who will be giving the education and with members of the learner group. The list of questions in Worksheet 2 can be used to investigate food beliefs and practices. The questions are listed in the impersonal (do mothers generally?) form. An effective procedure for determining food beliefs in discussions with health workers, traditional practitioners, or mothers is described below. Although such discussions can be held with individuals, more productive conversations evolve in meetings with groups of 4 to 12 health workers or mothers.

- Ask Question 1 on Worksheet 3 and write down the answers. If these answers indicate good practices and beliefs, go on to Question 2. But if the answers indicate poor practices and beliefs, stay with Question 1 and ask the individual or group: "What is your personal experience with this question?" Continue in this manner through the list, recording all responses.

- o Check each belief or practice listed in Worksheet 2 to see which have not been covered in answers to Worksheet 3. If the belief has not been discussed, ask the group about it. For example, if colostrum has not been mentioned, ask: "Is colostrum given to new babies?" If the answer indicates a faulty practice, ask why and ask again in personal form: "Have you had any personal experience with this? Why didn't you give it?"

Answers to the general questions reveal beliefs and practices hich are a part of the culture, while answers to the personal questions ndicate whether the items mentioned are a matter of everyday experience, f occasional occurrence, or of remote hearsay.

The beliefs and practices uncovered can be classified as positive, eutral, or negative, according to their effects on nutritional status Jelliffe 1962). The practice of breast-feeding children until the age of would be positive, for example. The belief in Pakistan that pregnant omen must not eat eggplant would be neutral, since eggplant is not a rich ource of nutrients. The positive beliefs should be reinforced. This einforcement offers an opportunity to appeal to old virtues and to encourge learners to feel proud of their cultural heritage. Neutral beliefs re ignored. The negative beliefs and practices then become a basis for hange through nutrition education.

i. The 24-Hour Recall

In addition to discussions concerning beliefs and practices, a mall 24-hour recall survey of the diets of weaning-age infants is required n order to avoid expensive errors. The fact that mothers say that they ive certain foods frequently or regularly does not mean that they give hem every day or in adequate quantities. The mass media project presented n the case study in Chapter Four provides an example of a costly and difficult to predict error which occurred because a 24-hour recall was not conducted during the information-gathering process prior to message design. revious survey information from the Iloilo Province in the Philippines, here the campaign was conducted, indicated that nearly 100% of families ave a rice porridge called lugaw to their infants, and that most families ded oil for cooking. The campaign staff therefore assumed that the message to add oil to your baby's lugaw would be capable of leading to action hich would increase the calories in the infants' diets.

A 24-hour dietary recall study conducted at the end of the campaign, however, revealed that only 30% of the infants had actually received lugaw the previous day, because most were receiving rice from the family at (81%) which did not call for the extra preparation time required to ook lugaw. Probably all babies did receive lugaw, but not daily. If a ich simplified 24-hour recall had been conducted at the time of the copy esting, the message could have been changed to: Add oil to your baby's lugaw, rice, and soup (received by 62% in the 24-hour recall).

WORKSHEET 3

## OPENING INQUIRY IN SERIES OF QUESTIONS TO DETERMINE INFANT FEEDING PRACTICES AND FOOD BELIEFS

(When the answer to a question indicates a faulty practice, ask the individual or the group: "What is your personal experience with this question? Write down all answers.)

1. What is the first feeding given to a newborn baby? Why?
2. When does a mother first put the baby to the breast? Why?
3. What are new mothers usually given to eat and drink after childbirth? Why? For how long?
4. How long do people say a woman should breast-feed her baby? Why?
5. Do women usually given the baby cow's milk? What kind? How much?
6. (If cow's milk is given) How do mothers prepare and feed cow's or other animal milk to the baby? With a bottle? How is it sterilized? At what dilution?
7. How long do women usually breast-feed the baby? Why?
8. For what reasons do women generally wean the baby?
9. How do mothers go about weaning a baby? Gradually? Abruptly?
10. Are there some foods that a lactating mother should avoid? Why?
11. Are there some foods that are particularly good for lactating mothers? Why?
12. Describe how women generally introduce different foods and drinks to the baby in the first two or three years. What foods? At what age started? In what quantities?
13. What foods are bad for babies? Why?
14. What foods are good for babies? Why?
15. Do women change the baby's diet when he or she gets sick? How? With diarrhea? How? With cold and cough? How? With fever? How?
16. Do mothers use purges or enemas for children? When and why?
17. Are there any foods women should avoid during pregnancy? Why?
18. (Show a picture of a marasmic child.) Is this child healthy? (If answer is no, ask:) What is wrong with the child? What causes the condition? Can it be cured? How?
19. *(Show a picture of a kwashiorkor child.) Is this child healthy? (If answer is no, ask:) What is wrong with this child? What causes the condition? Can it be cured? How?

*This procedure should be repeated for rickets if they are common in the area.

The technical effort put into the 24-hour recall and the size of the sample will depend on program resources. The important points to make are that (1) lack of funds is no real impediment to conducting a simplified dietary recall which provides the information essential for message design; (2) If a comprehensive planning and baseline survey can be scheduled, a more careful and sophisticated 24-hour recall combined with weighing of the infants and questions concerning attitudes and income and other socio-economic conditions of the family can be very helpful estimating: dietary deficits; actual prevalence of malnutrition; actual relationship between diet and nutritional status; which socioeconomic groups are most malnourished; and which attitudes in these groups most need changing. Whether it is a small exercise or part of a larger survey, the 24-hour recall survey conducted during message design will be the baseline for measuring changes later in evaluating the campaign. For discussion of additional methods of conducting and analyzing the dietary recall along with other survey information, see Chapter Three. Alternative methods of conducting dietary recall as a group learning activity have also been developed by Save the Children Federation (Srinivasan 1977).

If the recall must be conducted on a very low budget, five field workers or students in a training program should be sent to interview 10 mothers each as a part of their regular duties. As equipment, they should take with them a spoon of the same size normally used by mothers for feeding their infants, and a clear baby bottle with ounce or gram markings on it if some mothers bottle-feed. The mothers they interview should have babies between about six months and about 2-2½ years. Reasons for this age limit are not only that this group are most vulnerable to malnutrition, but also that older children run around so much that the accuracy of the information is reduced because the mothers may not keep track of what the child eats. The interviewers may also ask the mother about her own diet, in which case a similar procedure is followed.

The interviewer asks the mother what she fed her baby starting from the time of waking yesterday morning through a 24-hour period until the morning of the interview. Worksheet 4 is a sample form for conducting the simplest form of 24-hour recall, and Worksheet 5 is a sample form to be filled out in the simplest type of analysis of the recall information. In the most basic type of analysis, the amount of the food which was eaten does not need to be calculated unless the nutritionist looking through the filled-in forms notices an obvious problem, such as too little rice being given, for example. Any advice given in the messages should be checked against the results of Worksheet 5 to see if it is realistic. Correspondingly, any deficiencies noticed from Worksheet 5 should be addressed in the themes. If illness appears to have a strong effect on the diet, the nutritionist should decide whether a further investigation is required, or whether the messages should address this point specifically.

WORKSHEET 4

## 24-HOUR DIETARY RECALL FORM FOR DIETS OF INFANTS FROM 6 TO 24 MONTHS

Interviewer _____ Date _____

Mother's Name _____ Location _____

Child's Name _____ Age in Months _____ Sex _____

Is the child sick today? _____ Child's weight in 0.1 Kg. _____

If sick, with what illness? _____

What did the baby eat and drink? How much? (List kinds of foods and amounts as accurately as possible.)

---

First thing in the morning?

For breakfast?

At midmorning?

At noon?

In the afternoon?

At supper time?

In the evening?

During the night?

---

WORKSHEET 4 (continued)

)id the baby also have any: candy? biscuits? soft drinks? tea? fruits?
hen? How much? (write on recall sheet)

s there anything else we forgot to mention?
write answers on recall sheet)

ow many times did the baby breast-feed during the day? _____

*very frequently
on demand ☐

ow many times did the baby breast-feed during the night? _____

*very frequently
on demand ☐

id the baby drink from a bottle? _____

f yes, what kind of bottle? Please show us.

hat was given in the bottle?

ind of milk _____ amount _____

mount of water _____

ther things fed in bottle _____

_____

s the bottle sterilized? _____

OMMENTS: _____

_____

_____

WORKSHEET 5

FORM FOR ANALYZING SIMPLIFIED 24-HOUR DIETARY RECALL FOR INFANTS 6-24 MONTHS

Total number of children in recall survey: _____

| Main Types of Food Eaten by Infants in Survey | Number of Children Who Ate the Food | % Who Ate the Food | Average Amount* (by those who ate the food) | Average Number of Meals |
|---|---|---|---|---|
| 1. | | | | |
| 2. | | | | |
| 3. | | | | |
| 4. | | | | |
| 5. | | | | |
| 6. | | | | |
| 7. | | | | |
| 8. | | | | |
| 9. | | | | |
| 10. | | | | |
| 11. | | | | |
| 12. | | | | |
| 13. | | | | |
| 14. | | | | |
| 15. Milk diet only | | | | |
| 16. Breast - only kind of milk | | | | |
| 17. Breast + cow's milk | | | | |
| 18. Cow's - only kind of milk | | | | |
| 19. Use feeding bottle | | | | |
| 20. No breast or cow's milk | | | | |

*These figures are necessary only for those foods which appear to the nutritionist or others scoring the recall to have been eaten in incorrect amounts.

c. Priority Themes

i. The General List

The biological requirements of infants at the weaning age are sufficiently similar the world over that it is possible to draw up a generalized list of priority themes for nutrition education affecting this age group. Results of the problem diagnosis exercise and the local beliefs and practices uncovered by the investigation described in the previous section provide the basis for making this list culture-specific. The following list of priority themes presented in Worksheet 6 has been adapted from a trainer's manual produced by the Nutrition Center of the Philippines (1975). A similar list was formulated in India by Greaves (1973). The extent to which traditional mothers perceive that the behavior change recommended may produce negative results is estimated in brackets by the words high or low risk.

ii. Food Functions or Food Groups

The concept in point 13, that different foods play different roles in contributing to body structure and functioning, is too complicated to teach in detail to learners below a sixth-grade literacy level, but can be adequately simplified by explaining foods according to functions or by putting them into groups.

The names and functions of proteins, carbohydrates, and all the vitamins and minerals, as well as of the foods that contain these nutrients and the number of grams or milligrams of each substance required by each individual by age and sex, make up a complex body of information. Since the early 1900s, various pictorial schemes for grouping foods according to their functions, ranging in number from two to seven, have been devised (Abrahamsson and Velarde 1977).

[illegible] main functions, energy (calories), growth and repair of body tissue (protein) and protection and regulation (vitamins and minerals) form the most theoretical structure for organizing foods either by function or into groups. A problem with the group system in general is that it is untrue to say that any food (with the exception of sugars and fats, which are almost pure carbohydrate) has only one function and therefore belongs only in one group. This degree of oversimpliciation may not be necessary even with people who have little or no literacy skills (McNaughton 1978). More work is needed to pretest the following type of presentation, in which functions and foods could be represented in pictures instead of in words. Amount could be expressed in squares or circles instead of in Xs.

| | Energy | Growth | Protection |
|---|---|---|---|
| Sweet potato | XXXXXX | X | XX |
| Bread | XXXXXX | XX | |
| Meat | XX | XXXXXX | X |
| Milk | XX | XXXXXX | XXXXX |

## WORKSHEET 6

## PRIMARY THEMES FOR NUTRITION EDUCATION

A. Milk Feeding (Low Risk)

1. Mother's milk is best for the baby. Breast-feed on demand, day and night, as long as is possible without great inconvenience.

2. If breast-feeding is not possible, consult a trained health worker for the right feeding formula and for the hygienic methods of preparing the milk and feeding the baby.

B. Supplementary Feeding (High Risk)

3. Mother's milk or cow's milk alone is not sufficient after six months. Start feeding the baby at 4 to 6 months with other foods. (In weight chart surveillance programs, supplementary feeding should be started when monthly weight gain falls below normal for age, and at 6 months for infants who have continued to gain normally with breast-milk only.)

4. What foods should be given?

   a. By six months babies can eat almost any food that has been recently cooked all the way through and is mashed soft. They can also eat most uncooked fruits, recently peeled and mashed soft.

   b. The baby's regular food can usually be the same as the parents' meal. Put the baby's portion in a separate cup or dish, mash the food soft, and feed it with a spoon. Oil or sugar may be mixed in for extra calories.

   c. A multi-mix weaning food may also be specially prepared for the child.

   d. Green leafy vegetables and high protein foods such as beans, fish, or meat should be fed to the baby daily by 6 months, if possible. These can be mixed into the baby's regular food or fed separately.

   e. When babies and young children refuse to eat peppered foods, the cooking method can be changed so that the pepper is added near the end of cooking after the baby's meal has been removed.

5. How much food should be given? By nine months the baby should have breast or cow's milk and at least one-half cup of other food in the morning, at noon, and at night. This amount should increase from one-half cup to about one cup at every meal plus snacks between meals by the age of 1 year. The 1 to 2 year old should eat almost half as much as his mother.

WORKSHEET 6 (continued)

C. Preschool Feeding (High Risk)

6. Satisfy the food needs of the infant and preschool child before the other members of the family.

7. Preschool children have small stomachs. Try to feed them five or six times a day. Make sure they have at least three meals a day. If possible, mix one teaspoon cooking oil, butter or fat with each meal to provide more energy.

8. If cow's milk is available, given the preschool child at least one cup a day.

D. Care of the Sick Child (High Risk-Low Risk Depending on Culture)

9. Don't stop feeding a sick baby or baby with diarrhea. A sick child needs complete nourishment to make him strong in fighting the infection. Continue to feed him with soft, nutritious foods like eggs, milk, fish, beans, or vegetables and fruit. Never stop breast-feeding a sick baby or a baby with diarrhea because mother's milk is the easiest food to digest.

10. Diarrhea causes the body to lose too much water. Give fluids, such as oralyte solution, to infants with diarrhea to prevent dehydration.

11. Take a sick child for treatment early, before the condition becomes serious.

12. If you are visiting a spiritual healer, let this person treat the spiritual side of the illness, but let the modern health worker treat the body.

E. Balanced Diet from All of the Food Groups (Low Risk)

13. Foods can be divided into groups or according to the functions they perform for the body. The three functions are the energy, body building, and protective or regulatory. These functions can be taught directly or foods can be divided into three or four groups according to function. The new four-group system starts with the staple food as the first group, and teaches that the previous three groups are supplements to the staple, making a total of four.

14. Everyone in the family needs foods for all of the functions or from all of the groups.

F. Pregnant and Nursing Mothers (High Risk-Low Risk Depending on Culture)

15. If you are pregnant or a nursing mother, remember that you are eating for two people. If you are not too fat, try to eat more foods having all of the functions or from all of the food groups.

WORKSHEET 6 (continued)

G. Family Planning (High Risk)

16. Give adequate time and care to each child and restore your health by spacing children. Use contraception, starting 6 weeks after the birth of a new baby.

H. Food Production (Low Risk)

17. Grow foods in the backyard and raise poultry, rabbits, or pigs, if possible. Expand the variety of foods you already produce.

I. Food Sanitation (High-Low Risk)

18. Wash your hands before cooking, eating and after using the toilet.

19. Wash raw foods thoroughly before serving or peel them.

20. If you reheat a cooked dish to keep it from spoiling, make sure it boils again for at least 15 minutes in order to kill all the germs. Don't feed leftover foods to babies.

21. Protect your foods from rats, flies, cockroaches, and other insects. If they come in contact with food, they transmit germs and disease.

J. Water (High-Low Risk)

22. Do not give water from streams or shallow wells to babies unless you boil it first.

K. Detection of Nutritional Status (Low Risk but not always credible)

23. Big babies are usually healthier than small or thin babies.

24. Big babies have a better chance of growing to be intelligent than small or thin babies.

25. Take any child with the following signs to a nutritionist or health worker:

    a. very thin
    b. with loose skin fold in arms, thighs, and buttocks
    c. prominent ribs, wing bones
    d. swollen feet, face, or arms
    e. paleness at lower eyelids, face, lips, and nailbeds
    f. night blindness
    g. sore at the corner of the mouth

26. To know if your child is undernourished, weight him.

27. To check on your child's progress, weigh him every month, if possible, and record his weight on a growth chart.

Switching back and forth from one system to another may cause more confusion than education and may discredit the idea of grouping systems. Any system is probably better than no system. Therefore, if a grouping system which appears to be well accepted and widely taught by field workers exists, it should be changed cautiously and gradually, if at all. It is more important that the nutrition educators accept the system and teach it well and that the target group understand and accept it than that it be theoretically best."

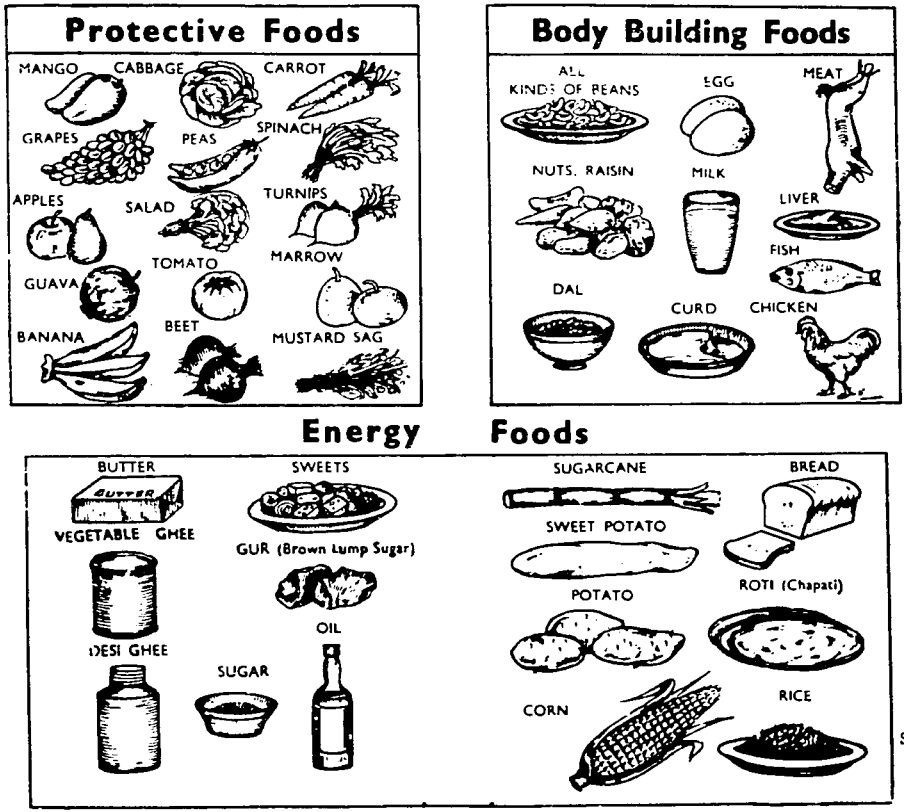
Of all the food group schemes, the three food-group system or a new four-group system probably are most useful. More than four groups tend to become redundant and overly complicated. The simple three-group division, which is shown in Figure 5 as drawn by a Pakistani artist (Zeitlin 1973), has the advantage of corresponding to the major functions of foods as these are envisioned by intellectuals, academic nutritionists, and by the popular press, so that simplification into these groups for teaching purposes is probably as honest and undistorted as can be achieved according to current concepts.

The alternative four-group system illustrated in Figure 6 takes into account three weaknesses of the three-group system: (1) little importance is given to the staple and to other starchy foods, which are wrongly considered to be just pure starch but in fact provide more than 50% of protein in most diets, as shown in Figure 7; (2) too much importance may be given to animal products; and (3) the use of complementary proteins with the staple is given more importance than the use of energy-dense complements such as sugar and oil (Abrahamsson and Velarde 1977). The new four groups consist of staples or starchy foods as one category, and supplements of energy, protein, and vitamins and minerals as the other three. Weaknesses of this new system may be that it could encourage reliance on a cultural "superfood" staple that is already overemphasized in the popular diet, and that reference to "the staple" loses meaning in cultures with a large variety of different energy foods, none of which can be termed staples unless all starches are termed such. This situation holds not only in industrialized countries, but in West Africa and other locations with an abundant variety of starchy root and vegetable crops or of baked goods. Figure 7 shows nutritional values of staples and other foods.

ii. Multimixes

The concept of multimixes (Jelliffe 1967) applies the food-group idea to the development of new weaning mixtures that contain items from all of the food groups. One example of such a mix, which is a complete meal for the baby, is porridge of corn meal to which ground peanuts and green vegetables have been added. The possible combinations are endless. The idea of teaching women to make a multimix weaning food is excellent, particularly if the mix contains oil or fat to raise its caloric density. However, in cultures in which separate items of family food contain all of the different food elements the baby needs, such as fish, greens, and rice, for example, it may be irrelevant and distasteful to ask the mother to mash them all together to make a mix. Decisions concerning the best specific foods for weaning should be made after pretesting and should be flexible enough to allow for variation.

FIGURE 5




**Protective Foods**

At least ONE of the Foods for Protection should be eaten by every person every day.

**Body Building Foods**

At least ONE of the Foods for Growth should be eaten by every person every day, especially by young children and pregnant and lactating mothers.

**Energy Foods**

PLENTY of the Foods for Work or Energy should be eaten by every person every day.

Enough should be eaten so that the person satisfies the feeling of hunger, does not feel tired easily when working, and is not too thin.

Source: Zeitlin 1973, pp. 28-29.

FIGURE 6

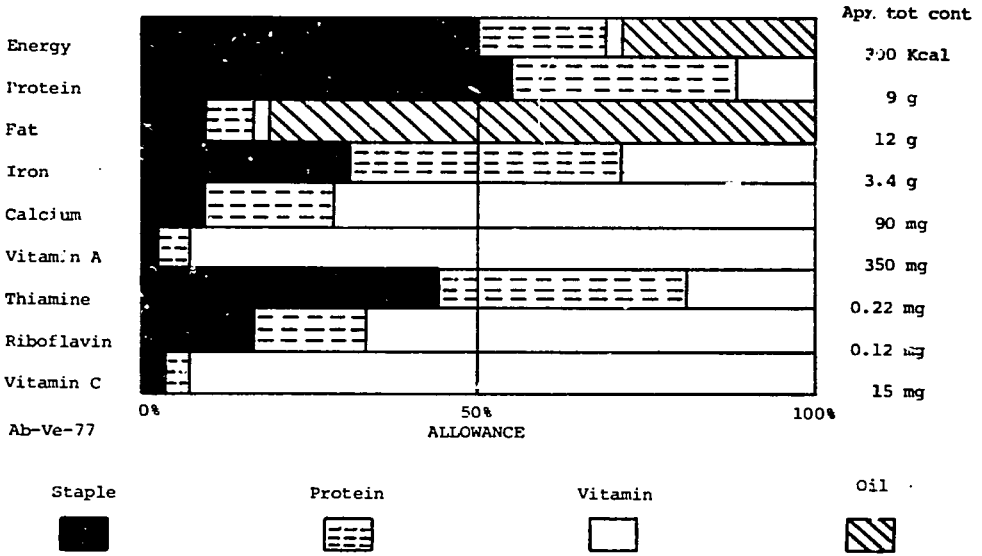
WEANING FOOD FOR A 9-MONTH-OLD CHILD

| | |
|---|---|
| GROUP I<br>STAPLE<br>40 g wheat flour | GROUP II<br>PROTEIN SUPPLEMENT<br>15 g chickpeas |
| GROUP III<br>VITAMIN-MINERAL SUPPLEMENT<br>25 g dark green beans | GROUP IV<br>ENERGY SUPPLEMENT<br>10 g oil |

Adapted from Abrahamsson and Velarde, 1977.

FIGURE 7

NUTRITIONAL IMPORTANCE OF THE STAPLE (40 GMS WHEAT), PROTEIN SUPPLEMENT (150 GMS CHICK PEAS), VITAMIN-MINERAL SUPPLEMENT (25 GMS DARK GREEN BEANS), AND THE ENERGY SUPPLEMENT (10 GMS OIL) IN THE WEANING FOOD




Source: Abrahamsson and Velarde 1977.

d. The Culture Specific Working List

i. Modifying the General List

After investigation of local beliefs and practices, the next step in designing themes is to modify the general list so that it specifically addresses the problems discovered. Some items on the general list may not be applicable and should be dropped. Cow's milk, for example, may not be available. Other health and nutrition themes must be added. In South India it is important to teach mothers not to brand the sick child (Chandra 1975). The corn pap given to infants in much of Africa is not bad, but if given alone it is not sufficiently dense in calories or protein, so that mothers must be taught to enrich it with oil and beans, oilseeds, milk, nuts, or other protein- and calorie-rich foods as these are available. The general list cannot specify foods that should be given to infants because they vary by region and by season. Possible ingredients for the preparation of acceptable local weaning foods must be added to the culture-specific list. This working list of themes should be drawn up by the nutrition education task force.

Domestic research determining the relative costs of calories and protein from different local foods may be conducted so that it will be possible to specify the cheapest culturally acceptable sources of nutrients. Based on 1965 prices in Ghana, for example, the cost of 10 g protein from yam was five pesewas, versus 1.5 pesewas from pulses or legumes. The cost of fully utilizable proteins was 30 pesewas for 10 g for cassava, versus three pesewas for pulses and legumes (Archampong 1971).

3. Design of Message Content through Formative Evaluation

After exploring food beliefs, general food availability, and dietary practices, identifying the practices that lead to malnutrition, and identifying a list of region-specific priority themes, the task force is ready to return to the community to develop specific messages. Action messages for field workers and for mass media diffusion should not be finalized at headquarters because no matter how theoretically good they are, they will have no important effect unless (1) the people they are intended for are willing to take the recommended action and (2) the action has the desired consequences.

Every nutritional theme involves a long chain of specific actions. Take, for example, the theme, "To feed fish to infants." Action starts with catching or purchasing the fish proceeds to preserving the fish until it is needed, to cooking in a culturally acceptable way (without overtaxing fuel or time resources), to overcoming counter-arguments or fear of feeding the fish to infants, to distribution among family members, to combining the fish with nutritionally complementary foods, to feeding in a culturally acceptable manner, to hygienic feeding practices. Action also involves a first trial, repeated trial, and continuing adoption. Steps in the sequence that can be taken for granted don't require advice. Rather, it is the new or problematic links in the action chain that need specific messages. It is not possible to identify these weak links at project headquarters.

Viewed scientifically, a piece of advice is a stimulus that will evoke a range of responses. Developing the stimuli that will evoke the most favorable responses within a target community also requies the cooperation of the community in experimental procedures.

For these reasons, members of the learner group must be asked to perform the actions which are being considered, such as preparing and feeding a given recipe, and must be observed while they are following the instructions to see that the advice is practical. They must also be asked their opinion concerning this advice and whether they would be willing to do it daily. The actions should then be modified to make them more practical and acceptable, and the new procedure should be tested in different households. Such formative evaluation should continue during the project in order to generate new messages as conditions change.

Those conducting the formative evaluation must talk to household members on equal terms in order to get their honest opinions. In most societies there is unconscious class bias against attaching value to the opinions of poor and uneducated people. Graduate students in anthropology at the major university in a North African country recently stated that it was below their personal dignity to conduct pretesting and that this was a job for secretaries only. Fortunately, an understanding of modern scientific methods is making such attitudes less common. At the other extreme, the professional social scientist may be reluctant to recommend action if messages cannot be substantiated by extensive evidence which would require expensive field surveys to collect.

A realistic approach requires pretesting in a sample of at least 15 to 20 homes of the socioeconomic groups being considered. This testing should be conducted together with nutrition workers who are educating these groups, and should be continued periodically during the ongoing program activities. The nutrition educators who will be teaching the methods must be included in the same exercise that pretests the advice because this also pretests the ability of the educators to act as a channel for this advice. They will not be effective in teaching behavior that they themselves do not accept or find to be impractical or for which they cannot provide guided practice.

Even where messages have already proven some effectiveness and there is general agreement that they are adequate, it will be worthwhile to introduce a system of formative evaluation, because a major amount of effort and expenditure goes into the teaching process.

A comparison of household-level weaning food development efforts in the districts of Yako and Koupele, in Upper Volta, for example, by Zeitlin (1978), found that 20 out of 39 mothers in Koupele and 56 out of 62 in Yako had responded to nutrition education by feeding their infants a weaning porridge as their first supplementary food. Thus both programs showed successful behavior change.

However, most mothers in Koupele had been taught to prepare a nutritionally incomplete millet or sorghum porridge flavored with tamarind and sugar, whereas the message taught in Yako had been to enrich sorghum porridge with fried peanut cake, fermented nere seed, and other protein- or oil-rich additives. Thus, the majority of the mothers in Koupele started their infants on an unenriched porridge which was not adequate to promote growth, while most in Yako introduced a protein-enriched food. The group of infants between 6 and 24 months weighed in Yako were significantly better nourished in weight for age than those weighed in Koupele. It is questionable whether it was worthwhile to expend the energy to teach mothers in Koupele a faulty message.

In this case, the Yako recipes had been pretested for nutritional quality, and the Koupele recipes had not. Formative evaluation of the Yako recipes was conducted in the nutritional rehabilitation centers when these new foods were developed. Mothers of malnourished children were required to bring their own ingredients from home to the centers to prepare the recipes themselves, using local cooking equipment, and to feed the porridge to their infants. Recipies that proved their acceptability in this pretest, and that produced acceptable weight gains, were used in nutrition education.

Pretesting may also, as in the case of weaning food development, involvement laboratory testing. Twenty-two mothers in the Upper Volta study stated their belief that a weaning porridge could be kept 10 hours or more without spoiling. Although nutrition educators can be quite sure that this is not a safe practice at tropical temperatures, the same time limits for keeping a sorghum and groundnut porridge after preparation are not known. An adequate message cannot be defined in this case until after bacteriological tests have been performed.

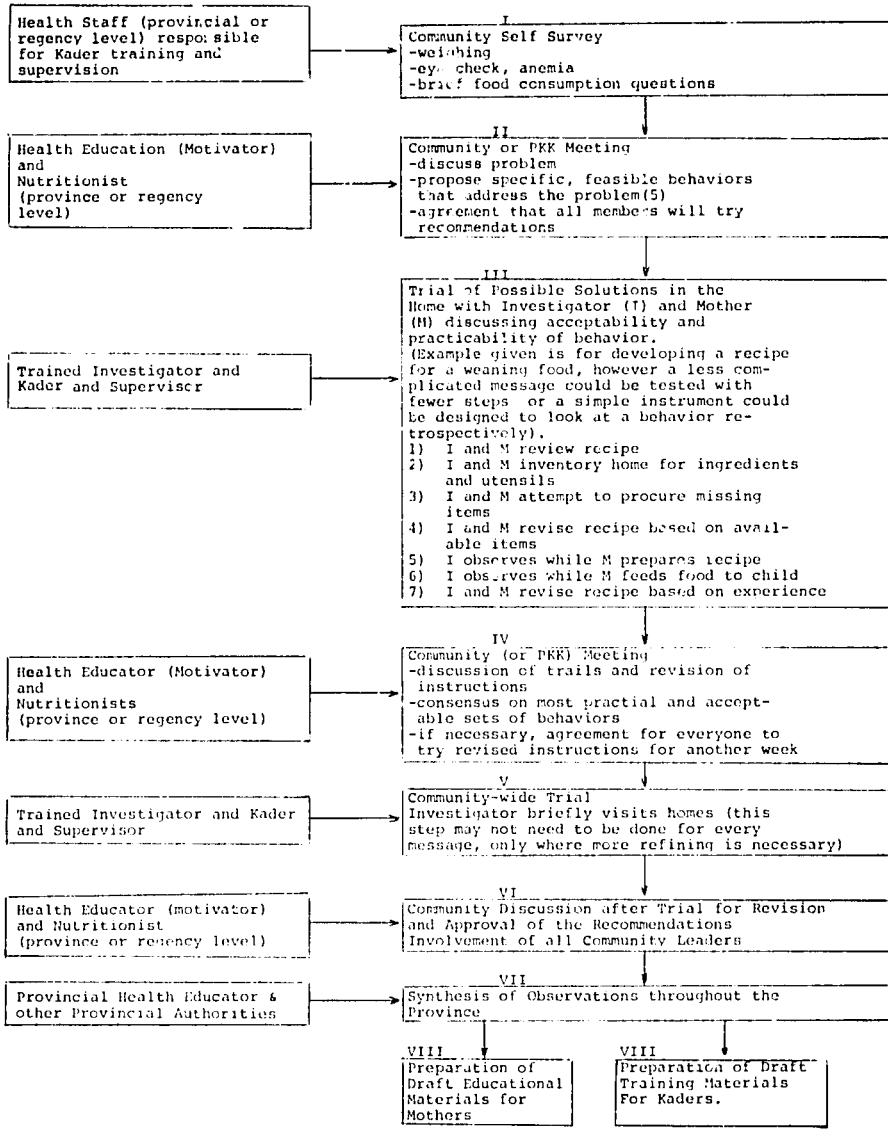
a. Involving the Community in Message Design

Communities should be involved in message design on several levels. Selected representative communities should be involved in the formative evaluation of message content that will be transmitted via educational channels to wider areas. After this tramsmission process begins, each participating community will adapt the messages in face-to-face teaching to local perceptions and practices. Communities that are acting as autonomous units developing their own service delivery systems may design messages and materials independently of national or regional programs.

Figure 8 diagrams a community involvement strategy used by the World Bank Nutrition Loan, 1977 to 1981 (Nutrition Communication and Behavior Change Component, Indonesian Nutrition Development Project 1979) in which selected communities developed message content for province-wide dissemination. The kaders, mentioned in the diagram, are community volunteer workers. The PKK is the village mothers' club. The community was involved in an initial self survey to determine the severity and nature of the nutrition problem. The community or mothers' club members then join with a health educator and nutritionist to discuss the problems and

FIGURE 8

FORMATIVE EVALUATION OF NUTRITION BEHAVIOR CHANGES
TO PREPARE PROVINCE-WIDE EDUCATION MATERIALS



to propose solutions for a week-long community trial. Trained observers entered the homes during this trial period to observe and discuss the procedures. The community then met to discuss the trial and either agree on particular messages or submitted them to another trial period. Nutritional advice that passed the test was channeled into materials preparation and into kader training.

For autonomous community development projects, Freirian methods used by Drummond (1975) in Brazil start with the community's perceptions of its problems and motivate the group to take initiative in organizing and maraging a nutrition program. Similar methods have been applied in Thailand and by Save the Children Federation in Bangladesh, Indonesia, and the Dominican Republic. A central part of these techniques is to present an aspect of the nutrition problem in picture of photograph form to a group of people and then to listen to the discussion which arises spontaneously. Pictures obviously appropriate for presentation are of a baby's coffin, a marasmic child, and a child with kwashiorkor. Spontaneous discussion may indicate whether the people observing the picture perceive that a problem exists, how disturbing they find this problem, and what they believe about its nature and causes. A directed discussion will bring out ways in which the community believes it is possible to act either individually or together to improve the situation.

This procedure may be essential for developing messages that motivate self-directed behavior change. However, the community will not have within its cultural heritage the modern scientific information concerning biological relationships on which the priority themses are based. These themes must be taught to them by outsiders in a manner that builds their confidence in their own ability to understand and take control of their environment.

The adaptation of themes into appropriate messages for face-to-face education should not require elaborate diagnostic and educational techniques. Community-level nutrition and health workers, who have learned the important themes can be taught to recognize malnutrition in the field, to ask about the infant's diet and health, and to respond with an appropriate message. If infants are being weighed regularly and their failure to gain weight is investigated as a part of the consultation with the mother, perceptual problems that interfere with the child's nutrition can be discovered and dealt with by a sensitive nutrition worker. Specific practices common in the community that interfere with good nutrition will also become apparent.

A strategy of community-specific nutrition education messages is elegantly applied in integrated MCH nutrition programs in Kasa and Palgar Blocks, Thana District, Maharashtra State, India. The nutrition talks given by the health workers are entirely determined by the problems encountered during the weighing sessions in consultation with mothers whose infants have failed to gain weight. When a faulty practice or belief is discovered in questioning the mother, the worker stops and discusses the problem with the entire group of mothers waiting to have their infants weighed (Dr. P.M. Shah, May 1978). The worker in this

case is using a set of themes as the basis for improvising messages, some of which he or she memorized in a standard form. A variety of appropriate support materials (such as flip charts or one-page handouts) which he or she could draw upon for illustration would reinforce these messages.

b. Adapting the Messages for Socioeconomic Subgroups with Distinct Attitudes and Lifestyles

The simplest type of lifestyle segmentation doe not require extensive survey investigation and should be considered very seriously. This type of breakdown, which is commonly conducted by family planners (Simon 1977) would divide mothers into groups according to basic factors such as location, time use, and child-care. Basic segments might be urban - not working outside home; urban - working, leaves infant at home with relative or caretaker; rural - more tasks close to home; rural - extended farming, trading or crafts activities. An important theme targeted specifically to both urban and rural mothers who must leave their infants concerns preparation of food before leaving home and teaching and supervising the child's caretaker. Specific messages could differ by urban or rural location.

Commercial advertisers use market segmentation analysis to divide their audiences into subgroups according to their attitudes and motivations. A United States study (Baird and Shultz 1976) applied this type of attitudinal Q-type factor analysis to a sample of Black, Anglo, Mexican, and Chinese Americans in order to subdivide homemakers into groups according to their attitudes toward food and eating generally. The 13 cognitive factors or "people types" they produced are: hostile, social isolate, unhappy eater, home-centered, totally negative, escapist, conservative, pragmatist, indigestion problem, stuck in a rut, sociable, confident and independent, and good cook and enthusiastic eater. The experimenters suggest possible educational emphasis appropriate for reaching each of these groups. The basic themes do not change, but the choice of messages that are applicable and the motivational emphasis differ from one group to another. This type of investigation has not yet been undertaken to look at attitudes toward weaning foods and child care in a developing country, although there is ample anecdotal evidence that attitudes do differ, not only between urban and rural mothers but within each group.

Wortzel (1976) suggests that market segments for health marketing be defined by investigating perceptions of the target group with regard to: (1) their susceptibility to a health disease or problem; (2) the seriousness of the disease or problem if it is encountered; (3) the estimated probability that a given course of action will reduce the threat; and (4) the estimated cost of the action. This information should be used to identify segments and select appeals for each that are most likely to motivate behavior. Questions 1 and 3 were asked with respect to mothers' perceptions of marasmus and kwashiorkor in a survey of health clinics in Ghana by Synectics Corporation.

c. Breast-feeding Messages

Design of messages concerning breast-feeding provides extreme examples of some of the previously discussed points. Breast-feeding is intimately linked to a mother's lifestyle and to her feelings. If she does not find breast-feeding emotionally acceptable, she may be biologically unable to feed because the let-down reflex will not function to release the milk from her breasts.

Discovering beliefs and attitudes towards breast-feeding is difficult because of the interrelationships between breast-feeding and the image of being a good mother and between the breasts and sexuality. A woman may be very reluctant to admit, even to herself, that she weaned her baby onto a bottle because she feared that nursing would spoil the shape of her breasts and make her less attractive to her husband, who may have become involved with another woman while she was pregnant (a concern the writer has encountered in the United States, in Liberia, and in the Philippines). A Nigerian woman who believes that sexual relations will poison the breast-milk similarly will be reluctant to admit openly that the traditional custom that the woman should obstain from sex during breast-feeding and that the man should take a second wife have been making her life difficult since she and her husband moved to live in a single room in the city. Both of these women probably will say publicly that they stopped breast-feeding because they didn't have enough milk. This statement is not false when emotional considerations inhibit the let-down reflex, but it doesn't tell the real story.

Providing different messages for different segments of the target group may be essential. A woman who already is bottle feeding exclusively will have no use for a message telling how to breast-feed.

Breast-feeding attitudes should be investigated preferably by an older woman who has breast-fed successfully. As indicated in the feeding practice questionnaire, she will be more successful if she asks mothers about the attitudes and problems of women in their community generally before discussing their personal experiences.

Important messages to include in most cultures are: that the breasts will keep their shape if the nursing mother wears a brassiere and does not allow the infant to pull on the breast; that breast-feeding will not deplete the health or energy of the mother unless her diet is very deficient; and that an insufficient quantity of breast milk can usually be corrected by allowing the infant to suck very frequently, and particularly during the night over a period of several days. After this time the milk supply will again be abundant enough to space feeds, and problems with the let-down reflex usually will be overcome (La Leche League 1963).

Population segments will be defined by the extent to which breast-feeding is practiced. In areas where breast-feeding is universal and prolonged, as in Upper Volta, little or nor information will be required, whereas in urban areas where the practice is declining, mothers may need extensive reassurance.

Although the nutritionist clearly would like every mother to breast-feed and to have other milk supplements given with a cup and spoon, this preference is not enforceable. Phillips and co-workers (1969) found in Uganda that of a sample of 160 urban pairs of mothers and infants under 2 years old in Kampala, none of the mothers used breast-feeding alone, 41 gave solid food only, 66 fed milk with a spoon and cup, and 51 bottle-fed. Moreover, of those who used bottles, 43 used narrow-neck bottles, 42 had only one bottle, and 33 had only one rubber teat. Among 109 mothers who had heard of sterilization, only 76 practiced it, and only 40 practiced it regularly. Bacterial testing of the food showed suitable low counts for only 26 samples from 110 cups, and in only one of 40 bottles. The study concludes: "One very encouraging feature emerged from our survey. This was the interest shown by so many othe mothers in the problems of feed hygiene and a desire to learn more about it." When addressing such a segment of the target group, nutrition educators must teach safe milk-feeding practices. The lessons, however, should stress the ways in which breast-feeding is better than bottle-feeding and the desirability of using a cup and spoon rather than a bottle.

Excessive dilution of milk powder is a common problem in developing countries (Udani and Parekh 1973). Wagle (1975) has suggested pictorial instructions for illiterates to indicate the amounts of powder and water which should be mixed together. These are shown in Figure 9. Each U-shaped marking signifies one ounce. The same markings could be put on a feeding cup, rather than a bottle. Women would have to be taught to "read" the markings. Both the picture and the teaching method should be pretested to see if the learners can follow the instructions without guidance.

d. In-Country Consistency

When culture-specific priority themes and messages have been defined for appropriate groups, specific content and wording of messages need to be standardized as closely as possible from program to program within a country or culture region. Reasons for standardization are: (1) to prevent confusion and loss of credibility, which occur when one nutrition educator teaches one thing and another gives a slightly different or conflicting message (e.g., one may say to start feeding the baby at 4 months while another says 6 months); (2) to take advantage of the cumulative threshold effects of repetition. An individual may have to hear a message several times before it sinks in and is believed and acted upon. This threshold for belief or action will be reached much sooner if the same information is being received from all sources. Media synergisms will also occur when the same message is received through different media.

4. SUMMARY:

THEME AND MESSAGE DESIGN

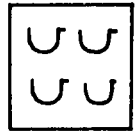
While most traditional cultures recognize that health and diet are related, most have been found to have some dysfunctional beliefs and practices with regard to the feeding and care of infants at the weaning age. Worksheet 2

FIGURE 9

SUGGESTED FEEDING BOTTLES AND SACHET

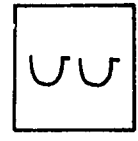
FEEDING BOTTLE MARKINGS

SACHET



CONTAINING ENOUGH MILK POWDER FOR 4 oz. FORMULA

SACHET



CONTAINING ENOUGH POWDER FOR 2 oz. FORMULA

Source: Wagle 1975.

summarizes common disfunctional food and health beliefs; Worksheets 3 through 5 present methods for assessing actual beliefs and practices.

The priority themes for nutrition education are presented in Worksheet 6. These should be adapted to local conditions using the results of the previously recommended assessment. General themes should be broken down into action messages through a process of formative evaluation, in which the action sequences are tested by learner group families, revised, and retested until the advice proves to be practical and acceptable.

Different message content may be required for different segments of the population. Breast-feeding is discussed as an illustration. Messages should be consistent within a given region in order to prevent confusion and in order to take advantage of the cumulative effects of repetition that occur when the same message comes from different sources. In a localized community development project, the process of message formulation may occur autonomously within the community.

## III. THE CHANNELS FOR TRANSMITTING NUTRITIONAL ADVICE AND FOR TEACHING NEW BEHAVIORS

Appropriate message content developed through formative evaluation should be transmitted through a variety of channels. This section will discuss key design considerations for six channels: nonformal education via a range of service structures; mass media; adult literacy programs; schools; professional schools and training programs; and channels for educating policy makers.

The section also discusses questions and issues that arise in combining and coordinating different channels. Ideally all channels should be used. In practice, specific choices of institutions will depend on an assessment of which organizations and service structures are capable of increasing or upgrading nutrition education activities or of adding a nutrition education component. Each infrastructure should be assisted in upgrading its nutrition education efforts, using its own resources where possible. Additional funding may be necessary for training, materials preparation, mass media campaigns and for evaluation.

Discussion of the preparation and uses of mass-produced support media and materials has been included under mass media. Visual materials, such as posters or stenciled drawings, and audio-visual materials, such as slide-sets, are more commonly used by face-to-face educators than distributed via mass channels. The principles that go into designing and pretesting communications materials, however, are the same regardless of

the channels of distribution. Field workers need visual support materials whether or not mass-media activities have been organized. Used in coordination with a mass-media campaign, these teaching materials can reinforce the messages transmitted through the media and the credibility of the face-to-face educators.

Worksheets included at the end of the section assist in conducting an inventory of existing programming efforts. As a general rule, it is desirable to add community-level nutrition education workers to existing rural health, agriculture, and other extension services. The ways in which mass media and face-to-face instruction should be used to reinforce each other will be discussed.

## A. Nonformal Face-to-Face Nutrition Education

### 1. KEY QUESTIONS

- How should the principles for promoting attitude and behavior change be applied to nonformal nutrition education?
- What teaching methods and materials are most appropriate?
- How can proverbs, stories and other traditional forms of communication be used?
- What teaching aids are most appropriate?
- What is the most effective use of personnel for: group classes? One-to-one counseling? The reahabilitation center?
- What other approaches are recommended for other settings and for nonhealth infrastructures?

As any educational activity that takes place outside of the school context can be termed nonformal, the list of possibilities is extensive. The culture-specific priority messages referred to earlier can be taught either to groups or one-to-one, in a center, in some natural outdoor meeting place, or in the home, and education can be part of a large variety of development activities. Such messages can also be taught on an intensive basis to mothers whose infants are in-patients in nutrition rehabilitation units or to mothers who take turns preparing food in day-care centers. In practice, most face-to-face nonformal nutrition education activities are combined with health services.

2. Client-Centered Timing

A basic prerequisite for success of nonformal education programs is to organize them to take place at times when those most in need can participate. In villages this may mean holding classes or consultations after the evening meal or in the early morning. The working hours of personnel delivering the education must be adjusted accordingly in order to be truly client-centered. Mobile health teams in Jamkhed, India, started work at 6:30 a.m. in order to be with the villagers before they left for the fields (Arole and Arole 1975).

3. Learning Skills through Guided Practice

It has been estimated that people remember 10% of what they hear, 50% of what they hear and see, and 90% of what they hear, see, and do (Saunders 1974). Exact percentage figures should vary with circumstances. But there is no question that teaching methods are most effective when they involve people in learning skills through guided practice, that is, when they perform, with supervision and corrective feedback, behavior that they have learned by observing others. The most common form of guided practice currently employed in nonformal nutrition education is to have mothers gather together to cook weaning foods and in feeding the children. They may also garden, shop, and weigh infants together with the educator. Discussion and explanation should go on during these activities as the educator supervises and corrects the mothers, asks questions to stimulate their thinking, and reinforces correct performance by showing her approval. According to Church (1971), observing nutrition education in Uganda, the nutrition educators or staff personnel taught best when they stepped aside and played a guiding role, drawing on the natural motivation of the learner group by encouraging discussion and questions.

A comparative study was conducted in South India of two rehabilitation programs with identical selection criteria and identical feeding schedules offering 800 kcal and 15 gm protein per day (Chandra 1976). Program A, in Government Erskine Hospital, Madurai, replaced formal health talks with informal teaching and total participation of mothers in the preparation of food and feeding. Program B, in Government Stanley Hospital, Madras, provided formal talks and demonstrations without parent participation. Table 6, showing the dropout rate of the two programs over one year, and Table 7, showing nutritional status of the participant children, indicate that the formal health-talk method produced so few results as to be virtually useless, while the participant-learning method appears to have produced significant improvement.

There may be reasons that prevent a mother from applying at home the cooking lesson she learned during group practice. A standard way of overcoming this problem is to have the nutrition counseling session and cooking lesson take place in the home of the malnourished child. This strategy has proved to be economically viable in poor communities, as in Bangong Bayan, Cavite, Philippines, where volunteer nutrition counselors

TABLE 6

ATTENDANCE OF CHILDREN AT NUTRITION REHABILITATION CLINICS PROVIDING PARTICIPANT (A), VERSUS NONPARTICIPANT (B) NUTRITION EDUCATION TO MOTHERS

| | (A) Govt. Erskine Hospital, Madurai, 1971 (N = 150) | | (B) Govt. Stanley Hospital, Madras-1, 1976 (N = 220) | |
|---|---|---|---|---|
| 1-month follow-up | 99 | 66% | 66 | 30.0% |
| 3-month follow-up | 70 | 47% | 30 | 13.0% |
| 6-month follow-up | 56 | 37% | 14 | 6.0% |
| 9-month follow-up | 38 | 25% | 4 | 2.0% |
| 1-year follow-up | 28 | 18% | 1 | 0.5% |

Source: Chandra 1976.

TABLE 7

NUTRITIONAL STATUS ACCORDING TO THE GOMEZ CLASSIFICATION OF CHILDREN ATTENDING NUTRITION REHABILITATION CLINICS PROVIDING PARTICIPANT (A) VERSUS NONPARTICIPANT (B) NUTRITION EDUCATION TO MOTHERS

| | (A) Govt. Erskine Hospital | | | | | (B) Govt. Stanley Hospital | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Total No. | Normal | I | II | III | Total No. | Normal | I | II | III |
| On admission | 150 | -- | -- | 15% | 83% | 220 | -- | -- | 14% | 89% |
| 3 months later | 70 | -- | 10% | 65% | 25% | 30 | -- | -- | 42% | 58% |
| 6 months later | 58 | -- | 8% | 67% | 25% | 14 | -- | -- | 40% | 60% |
| 9 months later | 38 | 4% | 20% | 50% | 26% | 4 | -- | -- | 25% | 75% |
| 1 year later | 28 | 25% | 25% | 25% | 25% | 1 | -- | -- | -- | 100% |

Source: Chandra 1976.

visit their neighbors (Bartolome 1977). The mother who learns in her own home, using her own ingredients and her own utensils, has already started to apply the nutrition education lesson to her family's problems.

The Filipino Nutripak program (Nutrition Center of the Philippines 1976) uses clever packaging to reinforce the nutrition lesson within the home. The Nutripak consists of three separate plastic pouches, containing correct proportions of broken rice, oil, and a cheap minifish, minishrimp, or bean-protein supplement, which are enclosed with cooking instructions in a larger plastic bag. Nutripaks are produced in three sizes that differ slightly in composition for three different preschool age ranges, and are designed to provide half of the daily caloric and protein requirements of the six-month to six-year-old child. Mothers of third-degree malnourished children are supplied free Nutripaks daily for six weeks and are taught how to prepare the Nutripak in a group cooking lesson.

After preparing the Nutripaks at home for six weeks, the mother has ineffect had 42 practice sessions of mixing exactly the right amount of oil with the right amount of rice and the right amount of cheap and available protein supplement to make a nutritionally balanced weaning food. When she is then told to prepare the same inexpensive food for her child using her own ingredients, she can be expected to have "learned by doing" the correct quantities and proportions and also to have observed the improvement in her child from eating the weaning mixture.

Shopping exercises are used in Haiti (Andre 1977). The knowledge of each woman is tested by asking her how she would spend her day's food money in the market. She then states the foods and quantities she will buy in order to feed her family a balanced diet. Participant learning may be increased by using actual foods to simulate the market, giving mothers the amount of money equivalent to their daily expenditures, and asking them to purchase the foods. Nutrition rehabilitation center workers played the role of the merchant in such simulations at the Albert Schweitzer Hospital in Deschapelles, in rural Haiti (Berggren 1979). Mothers may also be tested by asking them to sort a collection of foods into different piles corresponding to the different food groups, as is done in Senegal and Upper Volta.

4. Seeing is Believing

"Did you know that there are things that are so small that you cannot see them, but they can make you sick? They're called germs, and they can fly through the air, or they can be in water even when the water looks clean. They're alive...."

"Did you hear the nurse say that all that medicine they gave Paula was not what made her better? It was really the food that made her get well? I don't believe that, because if it was the food, then why did they give her all that medicine?"

In discussing the credibility of the communicator in the previous section, we did not discuss the credibility of the message. What about these strange new facts we are asking traditional people to believe? Worksheet 7 lists a number of them in rough order by the ease with which people accept different items. This list differs from the list of priority messages for nutrition education in being not a list of correct practices, but rather a statement of the underlying reasons or beliefs behind specified behaviors.

Nonformal teaching methods and materials and clinical procedures that allow people to observe causal relationships with their own eyes are desirable. Several of these have been developed for nutrition education and nutrition-related health education. The commonest, addressing message 3 in Worksheet 7 is probably the practice of curing malnutrition at rehabilitation centers with only cheap local foods prepared by the mothers and the use of as few medicines and as little nutrient-dense milk-based formula as possible, so that mothers will not be able to believe that medicines cured the child. This strategy, which will be discussed in the section on rehabilitation, was devised after it was found in several countries that the alternative practice of quick rehabilitation with highly nutritious formulas failed to produce permanent cures, because the mother did not believe that food had caused the improvement and continued to feed the recovered child the same deficient diet that had originally caused the disorder (Fehrsen 1974).

The Talquist paper hemoglobin test detects anemia by comparing the color of the blood drawn from a pricked finger, to a spectrum of red shades on a color chart (Anemic blood is not red enough). Although less accurate than a hematocrit or hemoglobin reading, this test is sufficiently reliable for clinical purposes. Rosa (1964) described its use in Gondar, Ethiopia: "The health officer or community nurse shows the baby's blood spot (and perhaps the mother's too, if indicated) in comparison with the scale. 'This is how strong your baby's blood should be, but look, it is this thin!' The mother can see that the 'white' milk is not making 'red' blood, and that some good 'brown' cereal or 'yellow' egg yolk is needed. Soon we have mothers bring their children to the clinic to see how strong their blood is." An additional advantage of the test is that it is simple enough to be administered by a community worker with little or no formal education.

The Voluntary Health Association of India (Laugesen 1977) has produced a booklet entitled Better Child Care, which shows colored pictures of the tongues of two pregnant women, one a very pale pink, indicating severe anemia, and the other a deeper, more normal pink. These can be used to screen for hemoglobins of less than 8 g with accuracy by comparing the color of a woman's or infant's tongue with the color of the tongues in the pictures (Morley 1978). Mothers easily understand the purpose of the comparison. An equally simple intervention to reduce iron deficiency anemia, suggested by Brown (1969), is to encourage the use of iron cooking pots.

WORKSHEET 7

CREDIBILITY OF THEMES

| Themes | Comment |
|---|---|
| 1. The new medicines (antibiotics) can cure almost anything fast, particularly when they are given in the form of injections. | The credibility of the modern health care system rests on the obviousness of this fact. The miracle pills and needles have traveled by the open market into remote family stores, spiritual healers' huts, and rural markets. |
| 2. Illness is caused by invisible microbes. Hygienic practices can help us to avoid them and to kill them. | This is still news in remote rural areas - an exciting new idea, generally accepted, but often with a "that's all very well in theory, but I've always done ____, and I'm not going to change now" attitude. |
| 3. Different foods have different functions. The types and amounts of foods a person eats affect the growth, structure, and health of the body. | Acceptance of this fact is extremely variable. Although everybody seems to know that you get thin if you don't eat and get fat if you eat a lot, the correspondences between foods and body conditions in the traditional medical systems often follow a theory that foods qualitatively or magically act upon the body rather than substantively serve to construct the body. |
| 4. In order to grow and develop normally, a baby must gain a specified amount of weight each month. | People are not used to quantifying growth. This concept is acceptable but definitely needs to be taught. |
| 5. The common severe nutritional disorders of childhood, marasmus and kwashiorkor, are different from other childhood diseases because they are caused by lack of foods, and they must be cured by foods rather than by medicines. | This is difficult to convey, because the cases of recovery from these conditions in traditional settings may follow curative treatment (often spiritual or magical) given by a traditional healer. Hospital cures of these conditions often appear to the |

WORKSHEET 7 (continued)

| Themes | Comments |
|---|---|
| 5. (continued) | mothers to result from the medicines given in the hospital rather than from the foods. On the other hand, the idea that proper foods are required usually is not alien. |
| 6. Drawing and examining blood is necessary to prevent certain illnesses and to cure others. | It is hard for people to understand the need for drawing blood, to believe that it is a safe procedure, and to trust the persons carrying out the procedure. |
| 7. Family planning methods are safe and desirable. | Family planning teams have incurred so much resistance and ill-will that nutritionists have had problems with being mistakenly identified with them, notably in Pakistan and India. Rural villagers have sometimes fled from Catholic nuns and from other health and nutrition workers in the mistaken belief that the workers were arriving to enforce family planning (Mother Dolores, St. Joseph's Hospice, Rawalpindi, Pakistan 1972). |

Any health center should have simple facilities that demonstrate sanitation and hygiene. These should include a latrine of a sort that can be built by the people themselves, and also bathing facilities, even if only a simple pan.

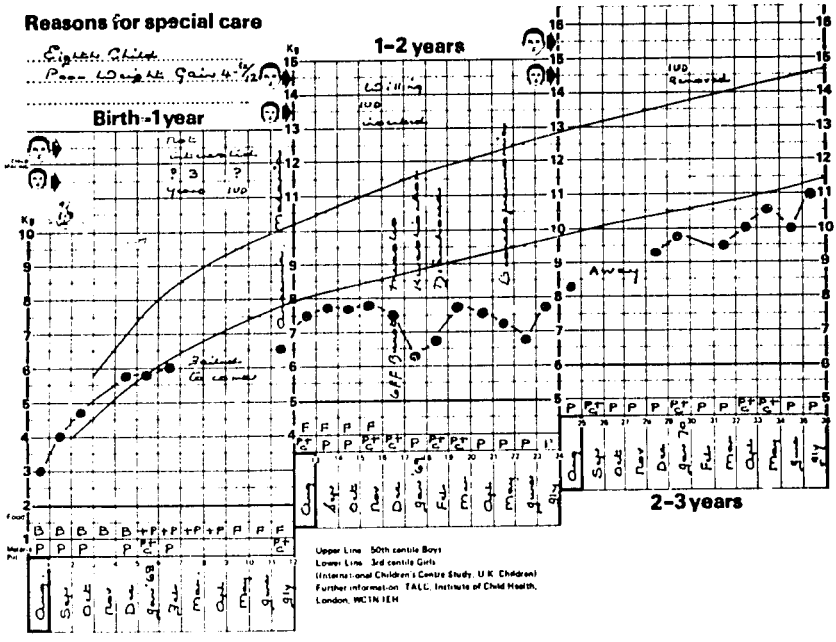
a. Growth Charts

The weight chart, or Road to Health Card pictured in Figures 10 and 11 (Morley 1973a), is the most useful tool available for teaching and illustrating the concept of healthy child growth and proving to mothers that feeding children more makes them grow faster. Since this type of card was first pioneered by Morley in Nigeria in the early 1960s, numerous variations have been developed and used by nutritionists in different countries around the world. A comparative analysis of more than 100 different charts has been carried out by Woodward and Kelley (1977). A recent official WHO chart is shown in Figure 12 (World Health Organization 1978).

The top line usually represents the 50th percentile of a well-nourished population (either an international reference population or local elite children), while the bottom line can be the third percentile of the same group, the median of a local malnourished group, or 60% of standard. The WHO Morley card uses a standard based on United States children (U.S. Department of Health, Education, and Welfare 1977), on which the upper line is the 50th percentile for boys and the lower line is the third percentile for girls. The precise standard used for the upper line is not of great importance, since standards for well-nourished children tend to be very similar and as a child nears the upper line, the direction of the growth curve is more important than the achievement of an arbitrary 50th percentile goal. The lower line also is somewhat arbitrary. However, if it is to be used to distinguish children who will receive special attention from those not requiring attention, it is advisable to place this line at a level where it selects an appropriate number of children for treatment. Several lines or color bands may be used instead of two. According to Morley, however, more than two lines are unnecessary and tend to be confusing. The same lines can be used for both male and female infants, although boys should be slightly heavier than girls. WHO has produced separate charts for boys and girls.

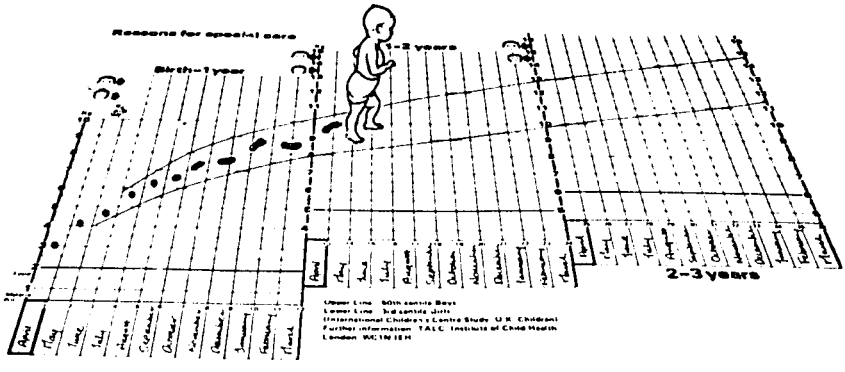
The main educational goal of the card is to teach mothers the importance of maintaining for their infants a growth curve which slopes upwards and is roughly parallel to or steeper than the reference lines. Mothers may be taught that the child should "walk along the path" between the two lines (Cuthbertson and Morley 1962), as pictured in Figure 11. Evaluations of the chart as a teaching tool for mainly illiterate mothers, by Project Poshak in India (Gopaldas et al. 1975) and Catholic Relief Services (CRS in Ghana (Jacob and Gordon 1975; Pielemeier et al. 1978) and Lesotho (CRS 1973b), showed that 75% to 90% of mothers were able to associate a downward slope of the curve with loss of weight and an upward slope with good health. A more recent study of the Ghanain clinics presented as Chapter 4 in Study VII, Integrated Nutrition and Primary Health Care Programs found two thirds of mothers reading the charts correctly on four out of four trials.

FIGURE 10




Source: Morley 1973a.

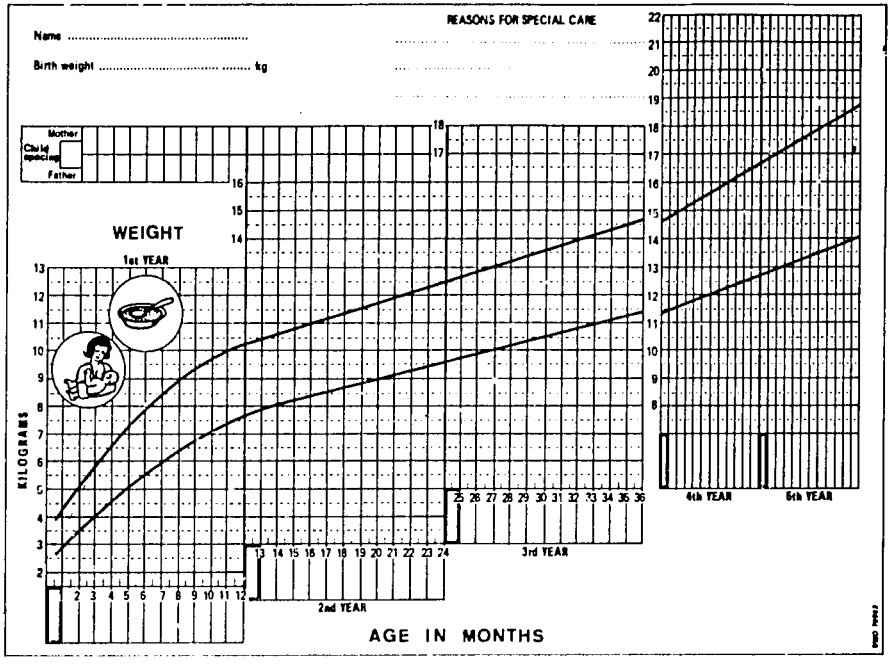
FIGURE 11




Source: Morley 1973a.

FIGURE 12

**A. Face of chart**




**B. Reverse of chart**

APPOINTMENTS

## GROWTH CHART

| | |
|---|---|
| Hearth centre | Child's No. |
| Child's name | |
| Date first seen | Birthday |
| Mother's name | Registration No. |
| Father's name | Registration No. |
| Where the family lives (address) | |

BROTHERS AND SISTERS

| Year/birth | Boy/Girl | Remarks | Year/birth | Boy/Girl | Remarks |
|---|---|---|---|---|---|
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

IMMUNIZATIONS

| | |
|---|---|
| ANTI-TUBERCULOSIS (BCG)<br>Date of immunization | SMALLPOX<br>Date of immunization<br>Date of scar inspection<br>Date of reimmunization |
| WHOOPING COUGH, TETANUS AND DIPHTHERIA<br>Date of first injection<br>Date of second injection<br>Date of third injection | POLIOMYELITIS<br>Date of first immunization<br>Date of second immunization<br>Date of third immunization |
| MEASLES<br>Date of immunization | |

Source: WHO 1978.

Other forms of the growth chart include the growth surveillance chart proposed by Capone (1977) of CRS, shown in Figure 13a, which plots percent of standard (for any standard) rather than the weights themselves. Figure 13b, a Nutrition Health Chart for Babies, produced by the Philippine Nutrition Program, uses the same format as the CRS chart but uses infant weights instead of percentages. A simplified system of color-coded stickers is being tried in the Dominican Republic (Meyer 1977). In filling in this chart, the health worker would put a bright red or pink (healthy) sticker in the upper circle for a child who was well-nourished, a pale pink or orange sticker in the middle circle if the child was moderately malnourished, and a yellow sticker in the bottom circle for a malnourished child.

Growth charts for the use of nonliterate workers have been developed by Zeitlin and co-workers (Zeitlin and Austin 1980) and pretested in Upper Volta. These charts make use of the fact that either the Shakir strip (Shakir and Morley 1974), which is color-coded to measure mid-upper arm circumference, or a similar strip measuring maximum thigh circumference (Zeitlin 1979) can be used relatively independently of age between 6 months and 4 years. Although the two circumferences both increase between 6 and 12 months, the same cut-off point that denotes moderate malnutrition at 12 months identifies mild malnutrition at 6 months - the age by which the mother should be educated to feed the child. Maximum thigh circumference is slightly more accurate than arm circumference because the thigh is about twice as large as the arm and because boys' and girls' thighs don't differ in size, whereas boys' arms are slightly larger than girls'. (For thigh circumference reference standards, see Zeitlin 1979.) Mothers were found to be able to make a pencil mark on the strip that measured the child's circumference and to transfer this mark to the charts pictured in Figures 14 and 15 by matching the shades of the strip against those of the chart. The arm circumference strip is the same length as the width of the arm circumference chart, whereas the thigh strip is 12 cm longer (in than dark grey) than the thigh circumference chart (to reduce printing costs, shades of grey have been substituted for the original colors).

The weight chart serves many functions in addition to being an educational aid for mothers. It is also the most efficient form of clinical health record and nutritional screening tool, and the health worker can enter onto it the child's immunizations, episodes of illnesses and their treatment, and other important information. The chart, which should be supplied in a strong plastic envelope to keep it clean, normally is given to the mother to keep at home and bring with her when she attends the clinic, and is thus referred to as a home-based clinic record (Morley 1973a). Loss rates by mothers are reported to run from 1% to 22%, with most rates reported at only about 6% (Cutting 1971; Langesen 1974; Senanayake 1974).

The home-based health cards have also made it possible to conduct clinic activities in communities that are too distant from health facilities for mothers to attend regularly. In rural Indonesia literate volunteers trained by the health workers meet with rural women in social gatherings each month. During these meetings they weigh the infants, plot their weights on the Road to Health Chart, and encourage the more successful and experienced mothers to teach improved feeding practices to the mothers of children who failed to gain weight. If no gain is made

CENTRE _____ **GROWTH SURVEILLANCE CHART** REFERENCE No.

NAME _____ FATHER'S NAME _____ MOTHER'S NAME _____

DATE OF BIRTH - KNOWN _____ PLACE OF RESIDENCE _____ GROUP _____

ESTIMATED _____ DATE OF ENROLMENT _____ SEX _____

PERCENT OF STANDARD GROWTH

100 95 90 85 80 75 70 65 60 BELOW 60

DATE

WEIGHT (lbs. or kg.)

ILLNESS

AGE IN MONTHS

TO ENTER THE PERCENT, CALCULATE FROM THE MASTER CHART, FILL THE CORRECT SQUARE AND CONNECT THE DOTS AS SHOWN.





FIGURE 13a

FIGURE 13b

Name _____ NO. _____

Date of Birth _____

PHILIPPINE NUTRITION PROGRAM

# NUTRITION HEALTH CHART FOR BABIES

PROVINCE: _____

MUNICIPALITY: _____

BARANGAY: _____

| MONTH | Birthmonth | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| WEIGHT (Kg) | | | | | | | | | | | | | | | | | | | |
| NUTRITION LEVEL | (PLOT MONTHLY WEIGHT IN CORRECT BLOCK TO DETERMINE NUTRITION LEVEL) | | | | | | | | | | | | | | | | | | |
| GREEN ZONE 1 HEALTHY | 3.1 | 3.8 | 4.5 | 5.1 | 5.7 | 6.2 | 6.7 | 7.1 | 7.6 | 8.0 | 8.3 | 8.6 | 8.9 | 9.1 | 9.3 | 9.5 | 9.7 | 9.9 | 10.1 |
| WHITE ZONE 2 MILDLY MALNOURISHED | 2.9 | 3.6 | 4.2 | 4.8 | 5.4 | 5.9 | 6.3 | 6.7 | 7.1 | 7.6 | 7.8 | 8.2 | 8.4 | 8.6 | 8.8 | 9.0 | 9.2 | 9.4 | 9.5 |
| WHITE ZONE 3 MILDLY MALNOURISHED | 2.7 | 3.4 | 4.0 | 4.6 | 5.0 | 5.5 | 5.9 | 6.3 | 6.7 | 7.1 | 7.4 | 7.7 | 7.9 | 8.1 | 8.2 | 8.5 | 8.6 | 8.8 | 9.0 |
| WHITE ZONE 4 MILDLY MALNOURISHED | 2.6 | 3.2 | 3.8 | 4.3 | 4.7 | 5.2 | 5.6 | 5.9 | 6.3 | 6.7 | 6.9 | 7.2 | 7.4 | 7.6 | 7.7 | 8.0 | 8.1 | 8.2 | 8.4 |
| YELLOW ZONE 5 MODERATELY MALNOURISHED | 2.4 | 2.9 | 3.5 | 4.0 | 4.4 | 4.8 | 5.2 | 5.5 | 5.9 | 6.2 | 6.4 | 6.7 | 6.9 | 7.1 | 7.2 | 7.4 | 7.6 | 7.7 | 7.8 |
| YELLOW ZONE 6 MODERATELY MALNOURISHED | 2.2 | 2.7 | 3.2 | 3.7 | 4.1 | 4.5 | 4.8 | 5.1 | 5.5 | 5.8 | 6.0 | 6.2 | 6.4 | 6.6 | 6.7 | 6.9 | 7.0 | 7.2 | 7.3 |
| YELLOW ZONE 7 MODERATELY MALNOURISHED | 2.0 | 2.5 | 3.0 | 3.4 | 3.8 | 4.1 | 4.4 | 4.7 | 5.0 | 5.3 | 5.5 | 5.8 | 5.9 | 6.1 | 6.2 | 6.4 | 6.5 | 6.6 | 6.7 |
| RED ZONE 8 SEVERELY MALNOURISHED | 1.9 | 2.3 | 2.8 | 3.1 | 3.5 | 3.8 | 4.1 | 4.3 | 4.6 | 4.9 | 5.1 | 5.3 | 5.4 | 5.6 | 5.7 | 5.8 | 5.9 | 6.1 | 6.2 |
| RED ZONE 9 SEVERELY MALNOURISHED | 1.7 | 2.1 | 2.2 | 2.8 | 3.2 | 3.4 | 3.7 | 4.0 | 4.2 | 4.6 | 4.6 | 4.8 | 5.0 | 5.1 | 5.2 | 5.3 | 5.4 | 5.5 | 5.6 |
| RED ZONE 10 SEVERELY MALNOURISHED | | | | | | | | | | | | | | | | | | | |

2 - 3 YEARS BETWEEN BABIES MEANS HEALTHIER FAMILIES

DATE OF INITIAL WEIGHING _____

MID-UPPER ARM CIRCUMFERENCE

GROWTH CHART FOR USE BY MOTHER OR AUXILIARY HEALTH WORKER

Child's name: _____

Date of first measurement: _____

Date of birth: _____

Age at first measurement: _____

Name of auxiliary worker: _____

(Measure mid-arm circumference with strip, mark measurement on strip with pencil, and transfer mark from strip by laying the strip on the chart and matching the stripes.

From 6-48 months of age, white means good nutrition; light grey, mild malnutrition; medium grey, moderate malnutrition. Dark grey identifies infants who need in-patient treatment.)

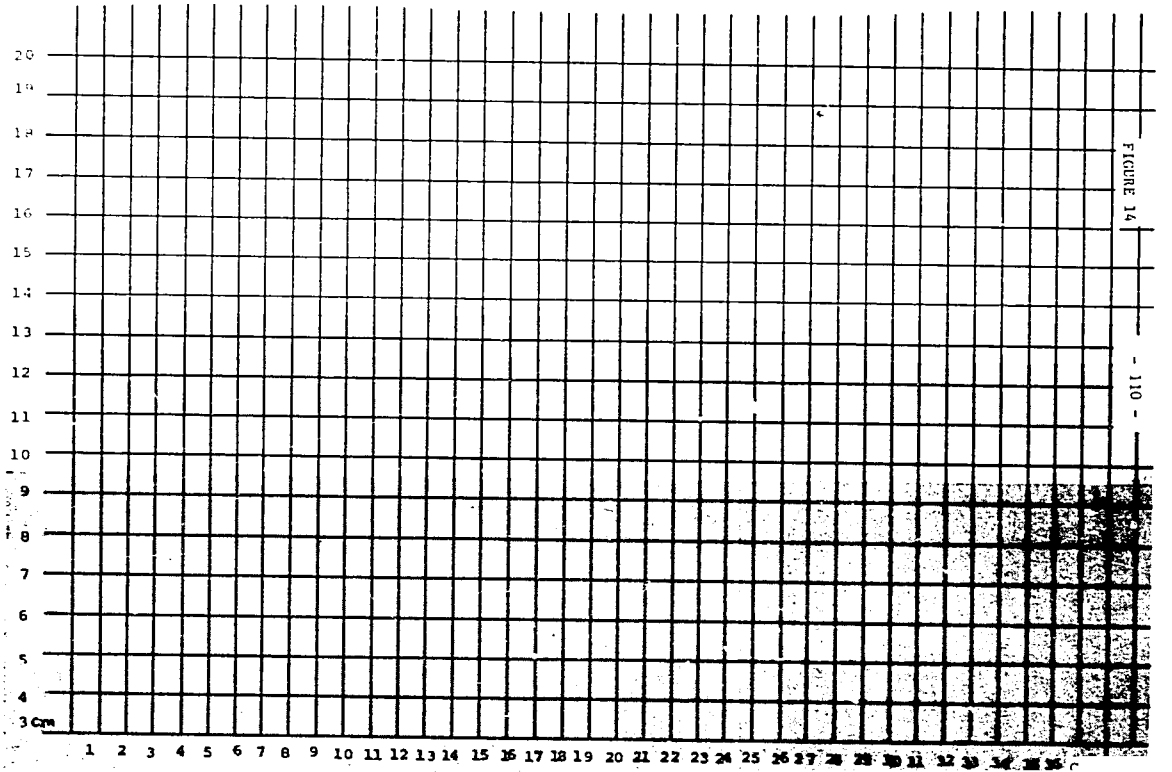



FIGURE 14

**MAXIMUM THIGH CIRCUMFERENCE**

GROWTH CHART FOR USE BY MOTHER OR AUXILIARY HEALTH WORKER

Child's name: _____

Date of first measurement: _____

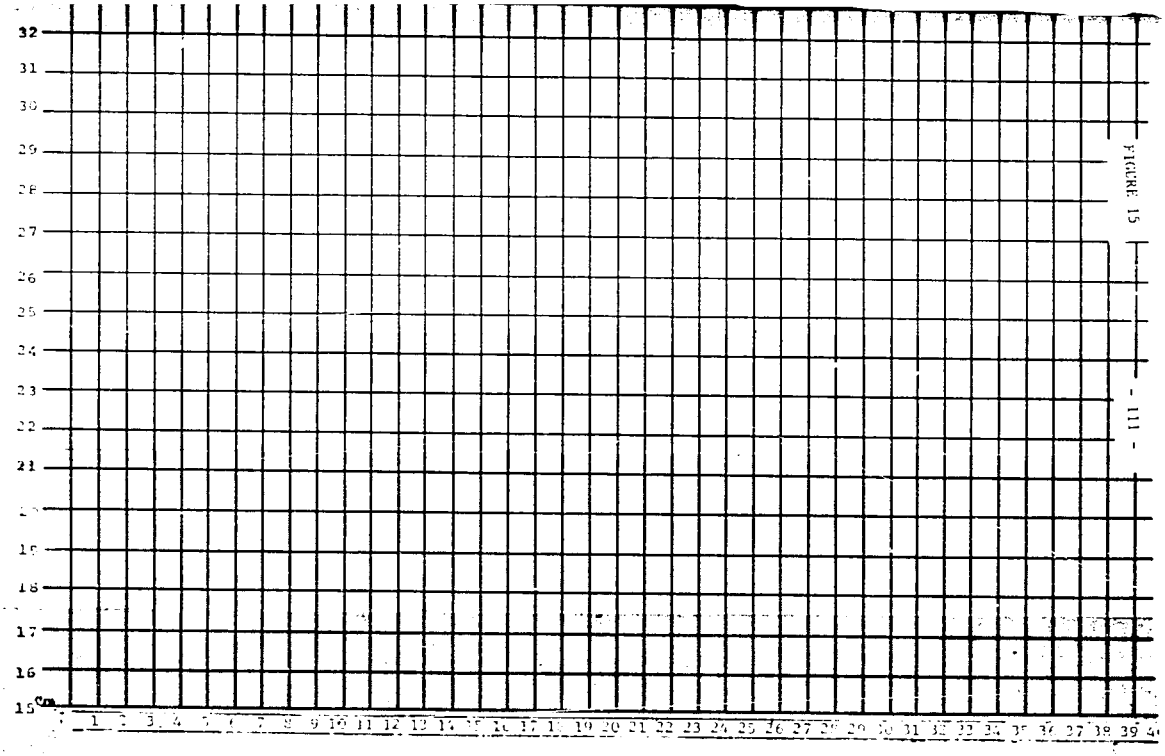
Date of birth: _____

Age at first measurement: _____

Name of Auxiliary worker: _____

(Measure thigh circumference at inguinal fold with strip, mark measurement on the strip with pencil, and transfer mark from strip by laying the strip on the chart and matching the stripes.

From 6-48 months of age, white means good nutrition, light grey mild malnutrition, medium grey moderate malnutrition. Dark grey identifies infants who need in-patient treatment.




SEQUENTIAL MEASUREMENTS

FIGURE 15

for two months, the mother and child are referred to the government health center (Rohde et al. 1975). The circumference growth charts should make it possible to extend similar activities into areas of very low literacy.

A growth chart designed for use in any country should be modified to suit the conditions in that country, particularly in details such as weaning foods, which may be pictured on the chart to teach mothers. Dr. Morley cautions, however, that much money and effort have been wasted by hasty modifications of the standard weight charts, which then proved unsatisfactory. Before country-specific weight charts are printed, he suggests that the well-tested international chart shown in Figure 12 be used in the field for a period of three years, during which time local educators, sociologists, and anthropologists shoul work together with health personnel to develop and field test the required improvements (Morley 1976).

Another caution is to resist the temptation, to which a few countries have succumbed, to allow a milk company to print the charts free of charge. The milk advertisements that are printed on these charts have the effect of subverting breast-feeding.

A yellow, saffron-colored, or pink card is pleasant in appearance and stays cleaner than white. Dark green ink shows up nicely on a yellow card (Morley 1979). More than on color of ink adds unnecessarily to the expense of printing. The European standard A4 size is convenient to use and causes a minimum of wastage when cutting from larger sheets of card. The plastic envelope should be at least two cm. wider than the chart when it is folded and more than 5 cm. longer. The card should include spaces for recording the following information in addition to weight and age: sex of infant, immunizations, whether or not the child is "at risk," birth dates or record of other siblings, parents' use of family planning methods, duration of breast-feeding, and introduction of weaning foods.

Teaching aids for training doctors and low-level health workers in the use of charts can be ordered from Teaching Aids at Low Cost (TALC), Institute of Child Health, London, WC1N 1EH. The most important of these aids, which has been used in many countries, is a large flannel graph depicting a weight chart. A transparency for overhead projectors and a set of slights describing the background of the use of the charts are also available. According to Morley, hanging a bucket on the weighing scale and gradually filling it with water illustrates to health workers the manner in which weight increases as a baby grows.

Regular weight gain registered on a weight chart reinforces the message that the various foods have different functions, as does the obvious improvement of a malnourished child after receiving a normal, well-balanced diet. A common method of proving the same point in elementary schools in the United States has been to keep two litters of white rats in separate cages in the classroom. One litter is fed the nutritious school lunch and the other litter receives less nutritious foods, such as jelly sandwiches on white bread, potato chips, and a cola drink. The children observe that the rats eating the school lunch grow much better than the rats eating the

less nutritious foods. The Community Systems Foundation used a similar experimental approach in teaching subsistance-level farm children and their families in the Colombia village of Buenos Aires (Community Systems Foundation 1975-1976). The villagers weigh the quantities of food given to the rats and then weigh the rats to determine their weight gain.

5. Using the Oral Tradition, Proverbs, Stores, Dramas and Other Forms of Communication

Most rural traditional communities have well-developed oral art and entertainment in the forms of proverbs, stories, songs, poetry, dance, and drama. Although these "folk media" such as dance troupes may be considered under mass media, the oral forms represent basic styles of communication which generally occur in small groups or on a one-to-one basis. They can serve the purpose of making important messages entertaining and memorable.

Stories may also be important vehicles for communicating complicated or sensitive information. As an example, the writer and her husband once were invited to spend several days with a family in rural Ghana, as the guest of a Ghanaian government clerk in the home of his aunt. During their third day there, their Ghanaian friend recounted to them the story his aunt had told him the night before. It was a long tale about a friendship between the elephant and the smallest species of deer in the forest, which stands about two feet tall. The elephant repeatedly entertained his little friend, until the deer, ashamed of having nothing to offer in return, invited the elephant to dine and had himself wrapped in leaves and roasted and served for dinner.

Where such forms are important styles of communication, they may also be used to teach nutrition and health, as is done in the Lardin Gabas Rural Health Programme in northeastern Nigeria (Christian Medical Commission, World Council of Churches 1977). The following parable teaches the importance of preventive health:

> Once upon a time, there was a village which was surrounded by hills where lived many bandits and thieves. When villagers traveled outside the village, they were often beaten and robbed. The elders prepared a stretcher and appointed two men to go out and help such victims by carrying them back to the village. As time went on, the banditry increased, so more and more stretchers and bearers were needed. One day, someone said "Why not do something about these bandits?" So a posse was formed which went out and captured all the bandits and jailed them, and everyone lived hapilly ever after.

Each village health committee in Lardin Gabas selects candidates for village health work who meet the following conditions:

- Must be married and between the ages of 25 and 30.
- Must be able to speak, read, and write Hausa. (One of the problems encountered in the program has been to find literate women in the villages.)
- Must be a good storyteller.
- Should have a mature personality.
- Should be able to learn and accept new ideas.
- Should be able to communicate well with people.
- Should understand thoroughly the customs, beliefs, and traditional practices of the people.
- Should be a stable person in the community, a person who will stay in the community because of family and property.
- Should hold the respect of the villagers and be well-respected and accepted by various clans, tribes, and religious groups in the village.
- Must be in good health and not suffering from any serious diseases.
- Women candidates may not be more than four months pregnant when entering the training course. If the committee chooses a woman with a breast-feeding baby, they should sponsor a nursemaid to accompany the mother during the training course.

Health and nutrition education is taught to the village health workers in the form of stories, parables, riddles, songs, and drama. These workers then use the same stories, riddles, etc. to teach the people in their villages.

A basic and effective parable for teaching the importance of preschool child nutrition can be created by comparing the building of a child's body to the construction of a house, which must be made with the correct materials in the correct proportions if the house is to be strong (Church 1971; Nutrition Center of the Philippines color videotape 1977). The comparison of the benefits of supplementary weaning foods to the effects of using fertilizer on plants is also effective in the writer's personal experience in places such as Pakistan, where peasant farmers have observed increases in yield resulting from green-revolution technology. The message is that modern child feeding yields results which are as beneficial as those of modern agriculture. According to Church's experience in Uganda, plays (like stories) deal particularly well with emotional issues, taboos, and fears; and songs work best when they are highly rhythmic, as are work songs. They should obviously be simple enough to be sung by the average person.

In Botswana, village folk festivals on development education themes, and including drama, puppet shows, and videotapes, were found to draw crowds of 80 to 400 people, in comparison to attendance of 20 to 30 at village meetings and 50 to 100 at Farmer's Days (Kidd and Byram 1976). Traditional forms of entertainment that also are effective when broadcast over radio will be considered again in the mass-media section.

6. The Set Course vs. Ongoing Nutrition Talks and Other Instructional Design Parameters for Teaching Groups

When the same group of mothers can be enrolled to attend meetings at least once a week for a definite period of time, it is possible to formulate a compact, systematic course covering all of the priority themes. Two-month and six-week courses have been held by the mothercraft on-site and Nutripak take-home feeding programs in the Philippines (Nutrition Center of the Philippines 1976; Asia Research Organization, Inc. 1976). Catholic Relief Services in Jordan held 30-day courses (Ramage) which had to be completed before participants were eligible to receive donated foods. As in the mothercraft courses, certificates for all those who have attended regularly can be awarded by a prominent public figure in a celebration at the end of the course.

The advantages of a fixed course lasting for a predefined period of time, from one week to two or three months, are that incentive for attendance is improved, attitude and behavior changes are enhanced by the presence of a consistent supportive group, a fixed curriculum can be covered. Evaluation is easily accomplished by testing knowledge, attitudes, and behavior, and by recording the weights of malnourished children of enrolled mothers at the beginning of the course, at completion, and in spot-check follow-up surveys several months later.

These advantages notwithstanding, a strategy designed to extend nutrition education to the entire population in a developing country should probably view the intensive set course for mothers as an unnecessary luxury, and should instead deploy the personnel qualified to teach such courses in the training, supervision, and management of community-level worker programs. The reasons for this conclusion are as follows:

- The presentation of an intensive, set course requires workers of a much higher level of formal training than is needed for ongoing nutrition education provided by members of the community. The teachers of the previously mentioned mothercraft courses in the Philippines, for example, have at least a junior-college or high-school level of education, with additional training in nutrition. Community nutrition workers with little or no schooling cannot be expected to present organized classes at weekly or more frequent intervals. These less trained workers can, however, be highly effective as informal nutrition counselors and can also present structured "echo" classes and demonstrations at monthly intervals, in a system whereby the worker simultaneously learns or reviews the materials in one class and then repeats or recreates the same lesson and demonstration to a class made his or her peers, as will be described below.

The same intermediate-level worker who can teach set courses or provide other forms of education directly to five groups of mothers, for example, can train, supervise, and use echo teaching through community-level workers to provide nutrition education to ten villages. The second strategy reaches many more people and simultaneously builds community-level service structures.

- Set courses do not terminate the nutrition education process. Mothers "graduating" from a set course must be enrolled in an ongoing surveillance system in which their children are weighed and through which they receive continuing individual nutrition education if their children fall ill or fail to gain weight. This surveillance can be provided by the lower-level community worker.

The Yako program described in the section on community involvement is an example of an inexpensive health care system which provides both group and individual nutrition education to a large population by making efficient use of intermediate-level personnel. One medical doctor and about 20 public health nurses supervise about 800 village-level workers, who provide simple primary health care, nutrition education, and medical referral services to a population of about 100,000, including about 18,000 mothers of preschool-aged children. The community-level workers, all of whom are nonliterate are divided into three categories: (1) about 200 primary-care workers with one month's training, who dispense aspirin, antimalarial medicine, antidiarrheal medicines, and eye drops, dress wounds and perform other first-aid procedures; (2) about 300 traditional midwives with two week's training, who conduct uncomplicated deliveries under sanitary conditions and refer problem cases to the district hospital; and (3) about 300 montrices de bouillie (weaning-food monitors) with one-week's training in a nutrition rehabilitation center, who conduct nutrition education demonstration classes each month (after gathering with other monitrices to learn the month's lesson from a public health nurse) and provide nutrition counseling in the homes of the mothers. These montrices are older mothers who still have preschool children and who either are chosen by the community for training or are trained in a center during the rehabilitation of one of their own infants and then accepted by their community. Although all three categories of workers conduct nutritional counseling, the group classes are given only by the monitrices. Through this program 20 intermediate-level workers succeed in generating and supervising monthly nutrition classes and individual nutrition counseling and surveillance for an average of 900 mothers each, in addition to their other duties as health workers, at an estimated cost of $0.05 per mother per year for nutrition education.

A large variety of programming constraints may make it impossible to deploy personnel in such an ideal manner in the short run. Because funding often is tied to programs of a more limited scope and traditional structure, it is valuable to consider the relative effectiveness of design parameters that might not be applicable in the ideal case.

The literature provides no comparative KAP evaluation of the effectiveness of a large range of the short, intensive versus the longer, more spread-out course options or less formally structured education. One Philippines evaluation compares weekly nutrition education accompanying a 12-week mothercraft on-site feeding program in which mothers helped in the preparation of the foods with nutrition education accompanying a 16-month take-home program. A sound basis for comparison was not available because the nutrition education offered to the take-home feeding group was a series of six classes given weekly at unspecified times during the 16 months (in some cases it appears that the series was given in six days instead of in six weeks), plus an unspecified number of home visits. However, the KAP evaluation suggested that the more structured, on-site results were superior, but levels of significance were low (CRS 1973a).

Another evaluation comparing the impact on nutritional status of on-site versus take-home feeding of imported commodities gave much clearer results, with implications concerning nutrition education (Asia Research Organization, Inc. 1976). When the two-month Department of Health mothercraft on-site feeding program (weekly nutrition education) was compared with 13- to 18-month participation in the Targeted Maternal Child Health (TMCH) take-home feeding program (monthly nutrition education), it was found that the children fed on site achieved greater percentage weight gains in two months than the take-home group achieved over the entire time period, and that 12 to 60 months after the on-site program, the difference between current percent of standard weight for age (wt./age) and wt./age at entry of the mothercraft program was still as large as the difference achieved during the TMCH program. These results probably reflect the well-known fact that food given on site was eaten by the malnourished children, whereas the imported commodities distributed in the take-home program were distributed to the whole family.

The results also reflected the successful nutrition education provided by the brief set course combined with the experience of helping to manage the center. Average wt./age of 120 participant children weighed 12 to 60 months after the completion of the two-month feeding program and nutrition education course was 80.2% of standard, compared to 76.7% at entry. Wt./age of Filippino children from 12 to 60 months old averages 76% to 79% (Engel and Caedo 1979; Caedo and Engel 1973) and drops slightly over this age span. The continued improved status of the participant children long after the termination of the course suggests that improved feeding practices maintained their growth rates at higher than average levels for their communities.

Although these results are of interest, it is impossible to conclude on the basis of one or two studies that one programming format is more effective than another. Any programming approach will prove unsatisfactory if it is inadequately executed, and no programming element works well in isolation. Monitoring the nutritional status of children over a given critical age, for example, does not guarantee continued improvement. Baertl et al. (1976) placed a group of Peruvian infants from very poor families, who had been well-fed for the first 18 months of their lives,

back on their home diets. Without exception, growth ceased in these children for the next six months and then resumed at a slow rate when they had fallen in nutritional status to the level of their poorly nourished siblings.

Where possible, set courses should be linked to the requirements of the on-going surveillance system. Daily two-week courses held in rural homes in Haiti have been used to introduce mothers to a health and nutrition surveillance scheme (Pyle 1977). Whenever possible, the course should provide growth charts for the children, insist on immunizations and deworming, and make sure that the children of graduates are enrolled for surveillance. Each one of the priority messages can form the subject of one lesson, or more as required to cover the subject matter. Each lesson should have a demonstration or other learning activity - often the preparation of a weaning food recipe - which the course members carry out themselves. Part of each lesson should be spent in active discussion. Mothers should preferably have their babies with them during the lesson and be encouraged to breast-feed them and to give them supplementary weaning foods which the group has prepared.

It is easy to organize this type of course activity around the distribution of a free or subsidized weaning food or other incentive (such as food coupons). There is some evidence that programs that require the mothers to donate the foods which they cook together elicit higher levels of personal investment and self-reliance than programs that supply the food (Harland 1975). A Peace Corps volunteer in Niger observed, with initial disapproval, that her local counterpart public health worker insisted that poor mothers bring in cooking ingredients and even sent them back home for missing items before beginning the weaning food preparation. She later discovered that the mothers responded favorably.

Take-home feeding programs distributing donated food monthly or bimonthly sometimes provide set courses given at biweekly or monthly intervals, as do some nutrition and health surveillance programs that do not distribute foods. Long-term periods between classes work against continuity and the formation of a supportive social group. When intensive courses or short-term programs are held in rural areas, the entire population will soon be covered and the educator will have to plan to move to a new district or to change activities (Fougere 1975).

Irrespective of the level of the worker providing the nutrition education, timing and attendance dictate certain parameters. The less frequently the group meets, the more important other means of achieving group cohesion become. Generally speaking, meetings or intergroup contact must occur at least weekly to create a sense of cohesion among individuals who do not normally interact outside of the class, as in the case of urban mothers, who may live in the same neighborhood but belong to different social networks (Ms. Darlene Ramage 1976). In rural villages, at the other extreme, where most women interact together on a daily basis, monthly classes can rely on existing group structure for social approval, cooperative activities, and message diffusion. Visits by the health worker to the home between classes improve group cohesion and make mothers more likely to change behavior.

Whenever meetings are widely spaced or sporadic, or individual attendance is low or sporadic, presentation of priority messages must be altered to take into account the fact that group members will range from those who already know the messages well to others who are hearing them for the first time. Although this situation may be less than desirable, it is inevitable when nutrition talks are extended to groups who come together for reasons not directly related to nutrition, such as women waiting for curative services in a health clinic.

In such a situation, each lesson should review several of the messages judged to be most important locally, in simple introductory form, and should include a demonstration or illustration which focuses very clearly on a single message. The same themes should be illustrated in new ways so that those attending regularly do not become bored. Regular participants should be enlisted to assist in teaching the class.

The focal message should be related to the activity for which the group has gathered. If a group were collected for immunizations, for example, it would be good to teach the message that big babies are healthy babies and are usually stronger in fighting disease. The message to feed more supplementary foods from the age of six months should also be taught. If a group were gathered by an agricultural extension worker to learn about new hybrid seeds, the use of the new grain for preparing weaning foods could be taught.

a. Preparing Lesson Plans

Few guidelines are available for preparing lesson plans for non-formal nutrition education to groups with few if any literacy skills. An integrated functional education program in Machakos District, Kenya (Barghouti 1974), enlisted rural extension workers in agriculture, health, nutrition, home economics, family planning, community development, social, welfare, and adult education in conducting a survey to diagnose problems of rural families. The field workers were then brought together in a workshop to translate their findings into lesson notes. Problems which had been discovered, including nutrition, were rated according to priority, and those of high priority were selected as topics for lesson notes, lesson outlines, and leaflets.

The writing exercise was carried out according to the guide below, which should also have specified a participatory learning activity.

i. Each lesson should focus on one problem. The lesson notes should take into consideration the many dimensions of this problem and the relationships among these dimensions. Thus, the topic of the session is identified as a specific issue or a problem.

ii. The topic (problem) should be introduced by raising main points for discussion by the audience. The introductory points may include questions, case studies, a poster or a picture of the problem, or a description of a relevant situation.

iii. Essential information about the problem is provided after the problem has been identified through the introductory paragraph. It is recommended that essential information be presented through the question-answer method as there will be those in the group who have experiences to share. At this stage the writer should identify the origin of the problem, its causes, effects, symptoms and the proper means for dealing with this problem.

iv. After presenting the problem and the general solutions suggested, the writer should discuss the difficulties which may be encountered in putting into practice this information. For example, local conditions and local methods may constitute a barrier to carrying out new recommendations as well as the financial problems and other limitations.

v. The language used for writing should be simple, clean, and short. Lesson notes should not exceed three to four pages. Illustration, especially photographs relevant to the topic should be prepared.

The value of presenting lesson notes in question form to encourage participation is stressed by Dr. Gourier in Upper Volta. Exhibit 1 presents a lesson plan from his program, concerning weaning foods. This lesson is taught from the plan by public health nurses to nonliterate village nutrition workers who in turn repeat the lesson from memory to their neighborhood mothers' group. As can be seen, most of the questions asked are open-ended, as recommended in the section on attitudes and behavior change.

b. Nutrition in the Curricula of Other Development Education Courses

Family planning, agricultural extension, income-generating women's programs, community development, youth programs, political parties, and religious organizations may all at one time or another present fixed courses or ongoing series of educational demonstrations or talks, either singly or together (as in the Machakos case). Nutrition education may reasonably take up one or more lessons in such a series or may enter partially into a number of the lessons given. It is important for nutritionists either to be a part of the working group or to meet with the persons giving these forms of nonformal education and provide them with the information required to integrate nutrition education into their course materials, if they do not already have such information. This inclusion in courses centering on other subject matter differs from nutrition-centered outreach activities, which may also be offered by these programs. Agricultural extension in particular has a tradition of operating its own nutrition programs. Coordination of nutrition education provided by all agencies is important, primarily to insure delivery of the same clear, nonconflicting nutrition messages by all educators.

EXHIBIT 1

HEALTH TALK FOR THE MONTH OF FEBRUARY 1976

Nutrition

MATERIALS: One large and one small calabash

1. What is a healthy baby?
2. Up till six months when the mother's milk is enough, what is the baby like?
3. When is it necessary to give bouillie to the baby? Why?
4. Should a baby eat bouillie when he has one tooth?
5. Look at this big calabash; you could fill it with mother's milk every day during the baby's first days of life. Does the baby have enough to eat? Now look at this little calabash. When the baby has two teeth, it is all that the mother gives him. Is it enough? What do we need to give him so that he eats enough? He ought to eat more because he is bigger.
6. Do you eat only once a day?
7. If you only eat a little bit of "to" every day, what happens?
8. Do you eat "to" without sauce?
9. What do we need to put in the bouillie?

Proverb:[2] "When the stomach is filled, misery is strangled."
Group cooking demonstration: bouillie either with baobab fruit or with dried fish.

## 7. One-to-One Nutrition Education

In practice, one-to-tone nutrition counseling in developing countries usually can be most efficiently given either in a center by a fairly highly trained person, such as a nurse, family-planning worker, or agriculturalist, or at home by a minimally trained community-level worker. Programs that try to have the same highly trained individual, such as a lady health visitor, handle curative work in a center (no matter how simple the curative task) and simultaneously make regular home visits usually fail to provide efficient population coverage. If the entire population receives preventive health and nutrition services, the incidence of illness and malnutrition will have dropped by up to fiftyfold, to a low enough level that the highly skilled worker may be able to cover the patient load. It has been found that a community-level worker in a neighborhood plagued by high rates of malnutrition, young child morbidity, and mortality can effectively cover a population of only 500 to 1,000 [Dr. Gretchen Berggren, personal communication drawn from experience in Haiti]. A trained worker, however, in an industrialized country such as England where child health is routinely monitored and malnutrition and illness rates are reduced, can serve a population of 4,000 to 9,000 (duToit et al. 1971).

Under present conditions, the more highly skilled worker in the health center should give one-to-one nutrition education to mothers who bring sick infants for curative services and well children for check-ups. In large clinics doctors' and nurses' duties generally are subdivided so that the nurse handles routine preventive and simple curative services and refers cases not falling in this category to the doctor. The doctor and nurse may refer mothers of malnourished children to a third worker for nutritional counseling or for attendance in group classes, as is done in Indonesia (Almatsier 1973). A factor to be considered in deciding who should provide the nutritional advice is the need to shorten the time for passage through the clinic. If children waiting to see the doctor are delayed because some mothers require extensive nutritional counseling, the long wait will be inconvenient for all the mothers (Cutting 1975).

If the community-level worker clearly grasps the nature of the problem, she or he will be able to give higher quality one-to-one counseling than the doctor, for the simple reason that the neighborhood educator can work together with the mother in her home and give her guided practice, while the doctor can only give advice. The intermediate-level worker should supervise community-level workers, who should visit the homes of children recently discharged from rehabilitation centers or of children who are well but poorly nourished, or of very low-income families. These workers should also extend simple curative help and medical and nutritional referral services to areas which cannot be reached by higher-level staff. Extension workers in fields other than health or nutrition should be able at least to recognize the cases of severe malnutrition they encounter and to give appropriate dietary advice or refer the mother to a health worker.

All one-to-one nutrition educators counseling mothers of preschoolers, from medical doctor down to traditional midwife or volunteer mother, should request answers to the questions on Worksheet 8 or otherwise inform themselves concerning these matters. The community worker has the advantage of already knowing more about her neighbors' home facilities, beliefs, economic constraints, and special problems. In interviewing, the worker should not contribute to the mothers' feeling that she should have a complaint requiring curative treatment in order to consult the nutrition or health worker (Rosa 1964). Instead of asking, "How is the child doing?" or, even worse, "What is the matter?" the worker should start the conversation by asking, "What is the child eating now?"

According to Rosa, the worker should not be a "desk officer." Instead, he or she should sit beside the mother in order to easily inspect the child without rising from the chair. The worker should observe and investigate the surroundings and the behavior of the mother during the time they are together. If she observes a baby bottle in the home, for example, she should inspect the bottle and inquire what the mother feeds in it, how she prepares the feed, and how she cleans the bottle. In countries where the habit of covering a child against the sun or the cold is a cause of rickets (Jelliffe 1968), the worker should uncover the child appropriately while explaining her reasons. Rosa suggests comparing the baby with a flower and reminding the mother that a flower needs sunshine to bloom.

Unfortunately, medical school curricula generally allot little time and attention to the diagnosis and management of preschool malnutrition. As of the present writing, the most recent (10th) edication of Nelson's Textbook of Pediatrics (1975), which is 1800 pages long, contains only 6 pages on breast-feeding (as compared with 8 pages in the 1500-page 1954 edition). Most pediatricians do not take the time to weigh a sick child in order to discover whether it is malnourished, do not ask probing questions about its diet, and do not stop to give dietary advice. Lower-level health workers also frequently overlook mild to moderate malnutrition and are too busy to give nutritional counseling. (The problem of the nutrition education of health workers will be taken up in a later section.)

An important technique to use in extending the outreach of one-to-one nutrition education in both the center and at home is allowing other mothers to learn by overhearing (Rosa 1964). While privacy may be considered a necessity in some cultures, it often is possible to arrange a small, quiet clinic room where the mothers waiting their turn sit on a bench within listening range of the consultation. It may even be easier for a mother to concentrate on the message being given to the woman next in line. When addressed directly, she may be flustered and think more about her personal contact with the health worker than about what the worker is saying. The Kasa and Palgar program, mentioned in the section on community involvement, uses the findings in the one-to-one consultations as the basis for nutrition talks to the groups of waiting mothers.

WORKSHEET 8

QUESTIONS TO BE ANSWERED IN THE PROCESS OF PROVIDING ONE-TO-ONE NUTRITION COUNSELING TO THE MOTHER OF A PRESCHOOL-AGED CHILD

1. What is the child's present diet? How many times a day does the baby breast-feed? or, when was it weaned?

2. How is the child's health?

3. What is the child's nutritional status: weight for age or arm circumference; height (when equipment and charts available); clinical symptoms such as edema or hair changes?

4. What does the mother think of the child's condition?

5. What are the mother's home food resources, including:

   a. foods she cooks daily for the family?
   b. prepared foods she purchases from vendors?
   c. foods she has in the house or garden?
   d. other foods she can afford to purchase regularly?
   e. land for vegetable gardening or poultry raising?

6. What are the mother's kitchen facilities, including:

   a. type of fire and cost or amount of fuel?
   b. type of cooking utensils?
   c. type of water supply?
   d. type of food storage?

7. What are the mother's time constraints and her child-care arrangements?

8. Is the mother willing or unwilling to follow the nutritional advice given by the worker? What reasons does she have for any reservations?

9. What other questions does the mother have? (Note: the mother should be asked if she has any other questions. These should be answered in direct discussion.)

Neighbors may naturally gather at the home in which the community worker is visiting. In societies in which old women play a vital role in family decision-making about child care, these women should be encouraged to be present for the consultation, which may equally well be held in their home (Prasada Rao 1972). The one-to-one nutrition educator should encourage the women she counsels to pass on the information to their friends.

8. Nutrition Education of Mothers in Nutrition Rehabilitation Centers

Nutrition rehabilitation centers are simple facilities in which severely malnourished children receive a complete diet. The center staff provides nutrition education to the mothers by instructing and supervising them in preparing the foods used for rehabilitation, in infant feeding, and in hygiene. This educational experience is more intensive than the usual schedule of group classes or one-to-one counseling and is limited in duration to the recuperation period.

The organizational structure of rehabilitation centers differ in different countries and regions. These differences represent different methods of dealing with the dispersed distribution of the target group. The percentage of children in the population who are so malnourished that they require rehabilitation in a center generally is low. The proportion of preschool children falling below 60% of weight for age varies between 0% and a maximum of about 25%, as in Bangladesh, but generally falls well below 10%. Therefore, the number of children requiring rehabilitation who live within convenient walking distance of any given center will be low. Once these children have been rehabilitated and nutrition education has been provided to the families in the neighborhood, a center that serves a walking-distance cachement area will have completed its primary task.

Two principal formats have evolved for providing services to this disperse target group. The original Bengoa method (Bengoa 1967), used extensively in Latin America and the Caribbean, utilizes rotating centers that provide day care for severely malnourished children living within walking distance. A valuable description of several country experiences with this method is given by the Research Corporation (1970. When all children in the neighborhood have been treated, the program moves the center to a new area, leaving behind a surveillance system for monitoring the recent graduates. Centers operating on this model provide three- to four-month cycles and should remain in each location until new cases recruited are children of mothers who have already received education in the center. Short 12-day cycles may be held in individual homes with all neighboring mothers in attendance. Such short cycles are termed Foyers Nutriionnels, or Foyers, in Haiti (Division of Family Hygiene, Department of Public Health and Population, Republic of Haiti 1979). Each cycle should be held in a different community home.

The second format is residential. Severely malnourished infants and their mothers are screened and brought in by vehicle from a wide cachement area and are admitted together for a period of a few days to about a month. These centers, which are more common in Africa, cover a wide enough

region to remain open for a period of years, until with adequate development, the incidence of severe malnutrition drops within the entire population. After approximately eight years of operation in the Yako district of Upper Volta, for example, such centers are virtually empty and are used primarily as training sites for village-level health and nutrition workers. The Philippines also offer this type of service for critical malnutrition in the form of nutri-huts in which the mothers stay with their infants and in malnutrition wards attached to hospitals.

Because the mother is removed from her normal activities, the stay in residential centers is as short as possible. At a nutrition rehabilitation unit in Chimbua, Papua New Guinea, for example, it was found that mothers would leave the unit and return home with the child after about a month whether they were discharged or not (Barnes 1975). The speed with which the child should be returned home depends on the availability of nutrition surveillance within the community, so that the recent graduates can be visited frequently at home during the recovery period. In Upper Volta, infants are kept only as long as is required for the child to start gaining weight and for the mother to master the necessary food preparation and feeding routine. After returning home they are visited daily at first, and then weekly, by the village-level weaning-food monitor in their neighborhood. Mothers from areas without village-level workers may be kept longer and be trained to become monitors for their communities.

Beghin and Viteri (1973) assessed reports from rehabilitation centers operating on the Bengoa day care format in Haiti, Guatemala, Costa Rica, Brazil, Peru, and the Philippines. They found that 62% to 84% of children treated recuperated by standards of weight gain or edema loss, and that mortality rates were held at 0% to 6%, which is significantly lower than rates for hospital wards. The average recuperative period for a severely malnourished child in all of these countries was four months. Another assessment of activities in Haiti indicated that in the short run 75% of the children benefited, while 16% failed to respond to treatment and another 9% failed to maintain their improved nutritional status after they returned home. Eighty percent of siblings of treated malnourished children also were found to be protected from severe malnutrition (Webb, Fourgere, and Papillon 1975). King and co-workers (1975) have calculated that these benefits were achieved at a cost of $6.82 per child improved or protected. An evaluation by Beaudry-Darisme (1971) of centers in Haiti and Guatemala, however, did not find consistent, statistically significant, long-term gains for discharged children, although this study did show reductions in mortality. While none of the evaluations separates the effects of education from the effects of feeding and medical treatment, long-term improvement can generally be assumed to be the result of improved behavior taught by nutrition educators, if the learning experience is participatory.

The decision whether to establish nutrition rehabilitation centers as an intervention should depend on the incidence of malnutrition. Beghin and Viteri (1973) suggest that a critical density of 2% to 3% severe malnutrition is necessary for centers to be functional. He claims that supervised supplementary feeding can be provided at one eighth the

cost of in-center rehabilitation. In the absence of centers, rehabilitation at home has been found by Shah and co-workers (1975) in India to result in lower mortality rates in the year following treatment and in more behavior change on the part of the mothers than hospital care. This study found that 100% of mothers in a domiciliary care group received nutrition education compared to 60% of mothers whose children were rehabilitated in a teaching hospital.

A comparison in Haiti by the Division of Family Hygiene, Department of Public Health and Population, Republic of Haiti (1979), however, found that participation in a rehabilitation center followed by home surveillance resulted in a significant drop in mortality among the treatment group and their siblings that was not achieved by surveillance alone.

The choice of format should depend on cultural and sociodemographic factors. Very disperse populations may have difficulty utilizing day-care facilities. Existing day-care facilities may provide a convenient base for nutrition rehabilitation. As shown in the Philippines case, the two forms are not mutually exclusive, and day-care feeding may be provided for the less severely malnourished, while in-patient care may be appropriate for critical cases of marasmus and kwarshiorkor. If a day-care center approach is adopted, a limited residential service may still be necessary for breast-fed infants and for children screened from distant locations that do not currently have a day-care facility. Breast-feeding mothers might also return to the center during the day to feed the infant, or take the infant away with them between meals and cooking lessons at the center.

In all formats, it is imperative to protect the malnourished children from exposure to infection A facility that admits sick and well malnourished children together may do more harm than good, since resistance to infection is severely reduced by malnutrition. An apparently well child discharged from such a facility may return home and fall ill with disastrous consequences. A majority of malnourished children brought for rehabilitation may be ill at the time of arrival. They should be kept isolated from other children in a hospital or clinic or in a village home until the infection has been cured. Although such isolation may entail special arrangements, particularly in a village setting, the success of the rehabilitation program depends on such measures. Medical referral also should be available for children in the center.

When children are apart from their mothers during recuperation, they must have responsive caretakers who provide them with a loving and stimulating environment. Observations by Monckeberg (1978) on more than 800 marasmic children rehabilitated in Chile showed that infants who were left in hospital beds with relatively little stimulation excreted absorbed nitrogen in their urine and took as long as four months to recover, whereas infants receiving loving psychomotor stimulation retained absorbed nitrogen and recovered rapidly.

High drop-out rates are common in the early stages of establishing a residential center. Snap (1978) estimated that up to 80% of mothers admitted to a new center in Gorom Gorom, Upper Volta, left with their infants within a few days of admission. Program operators should not be discouraged with such an initial response in areas where the center concept is unfamiliar. They should, however, investigate the reasons why mothers drop out and attempt to modify the program to make attendance more acceptable.

a. Factors that Promote Successful Nutrition Education in the Rehabilitation Center

The following success factors are drawn from discussions with program designers and managers of nutrition rehabilitation centers in Haiti, Upper Volta, Uganda, and the Philippines.

- The rehabilitation center should provide an environment for mothers and children that is as similar to their homes as possible. Three mud hut centers in Upper Volta, built at no cost to the government or to outside donors, successfully rehabilitated 80 children from 1976 to 1978. Similarity of cooking facilities, utensils, and water source maximizes the probability that lessons taught in the center will continue to be carried out in the home, because the specific food preparation and feeding behaviors taught can be continued at home with a minimum of change. Adequate latrine and washing facilities should be provided. The malnourished children should sleep with their mothers if this is the practice at home. This physical contact may prevent hypothermia, to which critically malnourished infants are susceptible (hypothermia can also be prevented by an around-the-clock feeding schedule for children in the critical early stages of recovery).

- All innovations, including latrines if these are not customary in target communities, should be of a simple enough level of technology and a low-enough cost that the target community can afford to adopt them at home. Such innovations may include safety measures such as packed earth platforms for elevating cooking fires, sanitation measures such as soak pits, or increased food production through kitchen gardens or simple animal husbandry.

- Supervisory personnel who work closely with the mothers should be selected not for their technical training, but for their ability to interact educationally with the mothers in explaining, encouraging, and answering questions, and taking an interest in each mother's individual case. A person of the same educational and social background as the mothers, so long as she has a clear grasp of the tasks to be accomplished and the reasons for them, may be a better educator than a person who has a higher level of training and a different social-class background.

- Foods used in rehabilitating the children should be low-cost foods which the mothers can afford to purchase. Ideally, as in Upper Volta, the foods used for rehabilitation should be provided by the mothers themselves, but twin infants and infants whose mothers are absent or who have

been bottle feeding for some time and do not wish to breast-feed will obviously require milk. Clearly a hard and fast rule of sticking only to cheap local foods should not be applied at the risk of the life of an infant whose digestive and absorptive system proves too fragile to respond well to a cheap vegetable-based rehabilitation mixture. If the nutrition educators achieve credibility among the mothers, the message that lack of food alone causes malnutrition may be accepted in spite of the use of highly nutritious foods in the first phase of rehabilitation.

- Mothers whose infants are malnourished because their milk supply has decreased or dried up through the use of bottle feeding or use of other substitutes for breast-feeding, can regain their milk within a few days if they are instructed to spend most of their time in bed nursing the infant continuously, drinking large amounts of fluids, and eating a diet high in calories and protein. Vitamin and mineral supplements and hormonal nasal sprays are also desirable, but not necessary.

- The rehabilitation centers should be used as training sites for teaching nutrition education and the identification and management of malnutrition to health and nutrition workers of all levels. As in Upper Volta, community-level workers may live at the center and help with its management as part of their training. Medical students, nurses, and many other trainees should be involved both in center management and in field work to identify malnourished infants for admission to the center. Politicians and high-level government officers should be invited to visit the center in order to form an understanding of the region's nutrition problem.

- Mothers of children rehabilitated in the centers should be preferentially selected as village-level nutrition workers when they are competent and acceptable for the role. Such mothers have been successfully trained in Upper Volta and in Uganda (Sneidman et al. 1971; Church 1971). Therapeutic programs of many sorts have found that persons who have themselves been through an experience are in a unique position to help others with it. Moreover, putting "graduates" in a role of authority restores self-respect to all concerned by providing that the condition is not degrading.

Local folk beliefs might affect the acceptability of mothers of previously malnourished children as nutrition workers. In the Subcontinent a woman whose child has died of marasmus, or "the shadow," is widely believed to be able to pass on the disease to pregnant women and infants (Kakar et al. 1972), whereas among the Dinka in the Sudan a woman whose child has died of "shalak" (marasmus) is believed to possess the power (left to her by the dying child) to cure the disease.

In the Uganda program, according to a follow-up study reported by Sneidman and co-workers (1971), 70% of a subsample of 55 discharged mothers were found to be teaching others in their neighborhoods. The 55 had contacted 200 other families, including 78 new cases of kwashiorkor.

• All children on discharge should be assigned to a community-level worker who should visit the home frequently in the recovery phase and refer the child back to the center if required, as is done in Yako, Upper Volta. Follow-up of discharged children is the only way of gaining accurate feedback on effectiveness of the center. Presence in the home of foods and preparation methods taught in the center is a good indication of effective behavior modification (Latham 1973). In remote areas without village-level programs such a follow-up may require the efforts of a mobile team.

• A system must be devised for screening for malnutrition and for disseminating the messages taught at the rehabilitation center within the cachement area. While village-level workers trained at the center to provide continuing nutrition surveillance in the community provide an ideal mechanism for screening and dissemination, this system may not be practical in all areas. All mothers attending the center should be encouraged to detect malnutrition and to teach the messages they learn to their friends whether or not they are formally enlisted as nutrition workers. However, the program may also wish to enlist the efforts of vaccination teams, community development workers or agricultural or other extension agents to detect malnutrition using arm circumference strips and to issue tickets referring the mothers of malnourished children to the center. Other nutrition education programs should be aware of the existence of the centers and should be encouraged to teach the same messages.

• It is important to avoid attaching a stigma or a sense of shame to the misfortune of having a malnourished child. In spite of efforts to avoid this, in a community health program where mothers helped to weigh their babies on a regular basis in Haiti, some mothers were observed to refuse to admit that their previously malnourished children had swelled (kwarshiorkor) because they had come to realize that such an admission would imply that they had fed the child improperly (Berggren 1979). Pride in one's ability to be a good mother may be a valuable motivating force. However, if a sense of shame is attached to malnutrition, the center is likely to become unpopular, and mothers who are already struggling to cope with their problems may sink more deeply into attitudes of hopelessness.

9. Day-Care Centers

Village mothers in Danfa, Ghana, organized their own day-care center on nonclinic days in the health compound. Preschool children could be left in the center while their mothers worked in the fields or went to market. Old tires, bottle caps, and tin cans served as toys. The mothers cooperatively prepared a hot lunch for the children under the guidance of the clinic nutritionist. The meal planning in this case was an important opportunity for nutrition education. Day-care centers in Manila, Philippines, operated by the Department of Social Service and Development, also provide nutrition education to mothers.

Day-care arrangements for the children of working mothers exist in the cities of most countries and vary vastly in monthly fees and in quality of services provided. Because of the number of children whose diet depends on the day-care meal, there is a need to provide education to the persons operating such facilities. This has been done in industrialized countries. A program was started to give nutrition education to day-care providers in Dorchester, Massachusetts, in 1978. If possible, mothers of the children attending the centers also should be reached by this educational effort.

10. Nutrition Education of Vendors

It does a limited amount of good to educate the mother if she is dependent on ready-cooked foods over which she has little or no control. In much of Nigeria, mothers buy the "ogi," or maize pap, which they feed to their infants, as well as many other cooked foods for the family, from neighborhood vendors. This is true in many areas of developing countries where the neighborhood food vendor, who has invested in efficient cooking utensils and makes efficient use of fuel, can actually prepare and sell food at a lower cost than the individual can cook at home.

In Isoya, Nigeria (Isoya Rural Development Project 1975/76), a Women's Training Center graduate was hired to come to the project area daily to cook and sell soft, high-protein, low-pepper foods. The research vendor, as she was called, used the kitchens of local food vendors, trained the vendors in the preparation of the foods, sold the foods, and kept accounts of all costs and sales. After the foods were accepted in any village, a meeting was held and the accounting was presented. Factors responsible for the realized profit were discussed, as were any comments on the program. After these meetings, parents were asked whether they would like to continue to buy the food, and vendors were asked whether they wanted to become involved with its sale. Where villagers wanted to carry on with the program, the research vendor stayed an additional week to assist. Profit from the sales was made available to the local vendor as a capital loan to be repaid after the next maize harvest. Although the program, which operated in four villages, was badly disrupted by lack of transportation and bad roads, at the time of the annual report one vendor had adopted the new food and three others were awaiting further visits from the research vendor. More efforts to train street vendors to prepare nutritious weaning foods at low cost and to act as sales agents/nutrition educators for these foods should result in improved nutritional status.

11. Administrative Formats for Delivering Nonformal Nutrition Education

The commonest service infrastructure through which nutrition education is delivered (9% in the HIID survey, Austin et al. 1978) is the health clinic, which provides preventive and some curative care to mothers and infants on an outpatient basis and which refers severely malnourished infants for rehabilitation either in centers or in hospital wards. Clinic activities may be held at MCH centers, under-5 clinics, dispensaries, health posts, rural health centers or subcenters, or at facilities with a variety of other names. They may also be held in outpatient wings of larger

hospitals or in mobile vans, which visit given areas weekly, monthly, bi-monthly, or even at three-month intervals. While some activities may be conducted outdoors, a building is required to store supplies and in case of rain. In a growing number of programs, community-level workers extend the reach of the health clinic by conducting home visits and a variety of other simple clinic activities in their immediate neighborhoods (see section on community involvement). Ideally, the health program should offer all of the forms of face-to-face education previously discussed, and when inpatient care of severely malnourished infants is required, it should be provided on the rehabilitation center model.

a. Family Planning, Agricultural Extension, Social Welfare, Women's Programs, Community Development, Youth Programs, Political Party Activities, Religious and Civic Organizations

For planners two basic strategies exist for combining nutrition with each of the above types of program activities. The first is to leave nutrition administratively under health and to coordinate all of these other activities with the health-nutrition program at the village level. The second is to run nutrition programs or some nutrition activities within each of these other infrastructures. Both approaches are valid, depending on the existing service structures in rural areas. Encouraging each of the structures to run their own nutrition education projects in addition to those existing in the health services is generally the procedure which generates the greatest number of nutrition activities, but may be inefficient and uneconomical if programs are not coordinated and standardized.

All of the forms of nutrition education mentioned above may take place within other service structures except for rehabilitation, which requires primary health care. Immunizations, deworming, and medical referral should be coordinated between any nonhealth nutrition program and the health services.

12. The Desirability of Integrating Different Types of Nonformal Development Education within the Same Program

When the writer visited the CIDR rural development program in Gorom Gorom near the desert in northern Upper Volta (Lemasson and Beghin-Petillon 1977), the network of village-level pharmacists and nutrition workers was still struggling through early growing pains, and the relatively recent nutrition rehabilitation center (run in association with the program by the British Save the Children Fund) was still experiencing drop-out rates of up to 80% during the first three days after admission (Snap 1978). The formation of women's gardening and marketing collectives, however, was off to a fine start and the 17 demonstration gardens - growing onions, carrots, cabbages, and showpiece tomatoes - were the pride of the project villages. The obvious success of this one form of nutrition education extended credibility and popularity to the entire program and bought time for those aspects that were not yet successful. The Gorom Gorom case illustrates the desirability for nutrition education projects to work with a variety of goals rather than "put all of their eggs in one basket."

13. SUMMARY:

NONFORMAL FACE-TO-FACE NUTRITION EDUCATION

Nonformal nutrition education should be scheduled at times when the learner group can participate without inconvenience. Main emphasis should be on guided practice in cooking and feeding weaning foods, growth surveillance of infants, and other skills determined in the culture-specific list of priority themes. Information should be presented primarily through the use of open-ended questions. Teaching methods and clinical procedures which allow the learners to observe causal relationships are desirable. Growth charts are a major tool for teaching the effects of diet on child growth, and may also be the most efficient form of health clinic record. Different types of growth charts may be used depending on the technological skills of the community. Weight charts are best for communities with literate auxiliary workers; simplified circumference charts can be used by nonliterate village workers, or by the mother of the child.

Where stories and proverbs are important forms of communication, they should be used to teach nutrition and health. Parables, riddles, songs, and drama also may communicate nutrition themes and may attract large groups of folk festivals.

Short intensive courses may achieve rapid knowledge change. However, such courses must be delivered by workers with a high level of training and do not usually represent the best use of time and effort of intermediate-level personnel. To reach large numbers of mothers effectively, intermediate-level workers should not be assigned to teach groups of mothers directly, but should rather teach and supervise groups of community-level workers. Each intermediate-level supervisor may hold a full-day or half-day meeting with her group in a central location. During this meeting she should teach and rehearse with them the demonstration-lesson for the month. Each worker should then "echo" or repeat the lesson at home with her neighborhood mother's club.

The same intermediate-level personnel should preferably also supervise one-to-one nutrition surveillance and counseling given by their community-level workers to the mothers in their neighborhoods. One-to-one counseling also should be given in health clinics and by other types of development workers such as the agricultural extension agent, who detects a malnourished child. Other mothers and community members should be allowed to learn by overhearing the one-to one sessions.

Nutrition rehabilitation centers are inexpensive facilities, where severely malnourished children receive a complete diet. They may be organized in a day-care format, for families within walking distance, or may be residential. Because the number of critically malnourished children in each neighborhood will be low, centers operating on the day-care model should rotate to a new community after a period of time ranging from two weeks to about three months. Residential centers keep infants with their mothers only until the child has started to show consistent weight gain on a diet the mother has learned to prepare. In both types of center, sick children should be carefully isolated because malnutrition greatly increases susceptibility to infection.

The centers should be similar to the homes of the target group, and should be staffed with socially and culturally similar caretakers. Foods used should either be provided by the mothers or be foods that they can afford to continue to provide in the home. Innovations, such as latrines for groups not normally using them, should be simple and inexpensive enough to be adopted at home by the target families.

Mothers should participate in the care and management of the centers which also should be used as sites for training field workers and others in nutrition education. Mothers of rehabilitated children may be trained as community-level workers. Infants discharged from a center should be placed under the surveillance of a neighborhood worker, who visits the home frequently during the early stage of recovery. Below a critical density of 2% to 3% severe malnutrition in the population it may not be functional to maintain such centers exclusively for nutrition rehabilitation.

Two special groups requiring nutrition education are day-care attendants and vendors who may prepare all or most of the meals eaten by preschool children. Vendors can be taught to prepare and market improved weaning foods.

Although most nutrition education activities take place within health programs, other infrastructures can be encouraged to sponsor the same activities, so long as arrangements are made with health services for immunizations, deworming, and medical referral. When possible, nonformal nutrition education should be combined with other development activities in a program with multiple goals, so that successes of any aspects of the program can motivate continued effort in aspects that take longer to demonstrate results.

## The Mass Media

### 1. KEY QUESTIONS

- What media forms are most suitable for nutrition education?
- What design considerations apply to each form?
- What role should each communication change play in a nutrition education campaign?
- How effective is mass-media education in the absence of face-to-face activities?
- What procedures should nutritionists follow in making use of the media?
- What steps are required in the production of materials?
- What are the roles of visual materials in teaching illiterates?
- What rules should be followed in preparing pictures for mass distribution?

The term "mass media" frequently refers to the broadest media, radio and television, but it also includes printed media that are distributed through commercial or other mass channels such as newspapers, comics, photonovels, booklets leaflets, signboards, posters, flipcharts, calendars, and product labels. The visual materials that are normally used in face-to-face teaching also are referred to as support media, or small media. Audio-visual materials such as films, slides, tapes, and closed-circuit television, as well as traditional communication forms such as dance troupes may also be considered in mass-media strategies. The majority of programs making use of the media use a multimedia mix, although radio may be emphasized when it has highest penetration into rural areas. A multimedia approach is desirable because the different media are useful for different purposes and phases of the educational process and because receiving the same message from different sources enhances learning.

### 2. Radio and Television

According to the HIID survey (Austin et al. 1978) 19% of nutrition education programs made use of radio. The APHA survey of low-cost health delivery programs (Karlin 1976) showed 59% making some use of mass media.

Most country-level programs do use radio to some extent for health education, which generally includes nutrition, whereas the majority of field-level programs within countries are not yet tied in with mass-media operations. While television reaches only the urban elite, transistor radios penetrate extensively into rural areas in developing countries. Although exact figures would be hard to gauge, the ICIT (1976) estimated that during the decade from 1966 to 1976, the number of radio sets in the world doubled, and that in Third World countries increases ranged to over 300%. Radio listeners in rural areas of low-income countries, however, have been shown to be relatively more educated than nonlisteners (Zaltman et al. 1971). A weakness of all the media is that the very poor and least educated who are most in need of intervention schemes, are least likely to be reached by mediated messages. However, radio and other media may still reach these groups more effectively than institutional channels.

Radio and television are capable of transmitting awareness of a uniform message to a very high percentage of listeners within a time span of a few weeks or months. In the Manoff Project in the Philippines (see Chapter Four), although only 48% of the rural families in Iloilo owned working radios, 75% of housewives interviewed randomly at the end of a year of broadcasting were able to identify the nutrition education spot messages (Cook and Romweber 1977b). Radios could frequently be heard from one "nipa" and bamboo cottage to another. The spots were 60-second dramas instructing mothers to add oil, fish, and greens to their babies' rice porridge. Sixty-two percent reported hearing the messages by the end of the first six months. Judging from other media experience, a high level of awareness might have been registered had a survey been conducted after the first three months of broadcasting (Kreimer 1977). Awareness was achieved at a cost of less than $2.00 per family, using year-end figures. The reader is referred to the Clearing House on Development Communication (1976), to McAnany (1973) and to Jamison and McAnany (1977) for additional source materials and discussion of the use of radio.

a. Radio Spots

The repeated use of spot announcements or advertisements on radio can reach an entire listening population because the listener is not required to make any active effort to learn, so long as he or she is within range of the radio. Brief 15- to 60-second spot messages are inserted several times a day during or between a range of popular programs. The listener does not turn to a different station, because by the time he or she can reach the knobs of the radio, the spot is over. Information is injected quickly and painlessly into entertainment. Apart from government-controlled broadcasting, this technique, to which Manoff has given the name "reach and frequency" is the only guaranteed means of capturing the attention of an entire listening population with a uniform message unit. Longer shows with nutritional themes can also be highly successful. However, they depend on the quality of talent available to make them appealing to mass audiences.

b. Nutrition Information Programs

The major problem to be overcome in radio and television presentation of educational messages is holding people's attention. When given a choice between entertainment and educational programs, the great majority of listeners choose entertainment. For this reason, a public information broadcast, which has great appeal to educators because it can explain thoroughly how to practice good nutrition and why these practices are important, will generally reach a very small percentage of total listenership, and will be preaching to the converted, to the same listeners week after week. A regular hour-long family planning program in the Dominican Republic, broadcast from one of the top radio stations in Santo Domingo from 8:00 to 9:00 p.m. Monday through Friday, was found to have a listenership of less than half of 1% of the women of the target age group (Cooke and Romweber 1977a).

Interest and learning appear to be interrelated. As people learn more about a subject their interest grows, and as interest grows, more and more learning can take place (Hyman and Sheatsley 1947). It is difficult for the target group - those with no prior knowledge about modern nutrition and with little formal education - to take an interest in unfamiliar subject matter presented over the radio in a lecture or news format. Tichenor and coworkers (1970) have used this "knowledge gap hypothesis" to account for the fact that public affairs and science news (a category which includes nutrition) presented through the media generally reaches only the better-educated segments of the population. Mendelsohn (1973) affirms that the "public most apt to respond to mass-mediated information messages have a prior interest in the subject areas presented."

It still is important to provide such nutrition information programs for the educated minority with prior interest, who may be at the forefront of movements producing social change. Technical target audiences, such as the field staff of outreach programs, also can be effectively reached by programs which not only communicate new information but boost morale and create a sense of unity among workers operating in different areas. The radio in Upper Volta, for example, broadcasts regular interviews with rural agricultural extension workers.

c. Government-Controlled Broadcasting

Radio diffusion can be used to broadcast a single government station in public locations where it is unlikely to be turned off. Doctors' question-and-answer shows and other forms of straightforward nutrition broadcasts can be lively and can hold wide listenership under these and other circumstances where they do not have to compete with film music, or radio dramas. A radio doctor show initiated in 1977 over government-controlled broadcasting in Tunisia created a character, Dr. Hakim (Hakim is a surname which also means "doctor"), who became so popular that newspaper articles debated whether or not shortages of beans, eggs, and oranges in and around Tunis were caused by his recommendations to eat these foods.

Figure 16 shows a newspaper cartoon poking fun at Dr. Hakim's advice to eat bean soup for strength. Midwives and nutrition workers at rural Maternal-Child Health centers reported unanimously that the mothers had widespread knowledge of Dr. Hakim and the content of the program. Personnel at five of the six centers indicated that when Dr. Hakim encouraged use of the formulated weaning food called SAHA (which was sold in the centers), their sales dramatically increased (Meyer 1978). Dr. Hakim, however, used a 30-second, prerecorded spot. Longer nutrition programs also were broadcast in Tunisia but were not judged to be popular.

Another radio doctor show was broadcast in Haiti, over the only two stations which have nationwide coverage, and featured a radio team called Fanny and Ti Jo. Each program consisted of 10 minutes of dialogue in which Fanny and Ti Jo assumed the roles of husband and wife, doctor and patient, or patient and nurse. A survey of a village of 4000, where the program had been heard for eight years, showed high levels of health knowledge on subjects covered in 20 basic themes, some of which contain nutrition messages (Hollnat 1978).

d. Mixing Nutrition Content with Entertainment

Nutrition themes may be presented in entertainment programs. Songs with nutrition messages have remained high in popularity for years in a number of East African countries. In Tanzania, a song by Mbarak & Mwinshehe entitled "Mother of Good Food," the theme song of a film, was on the "top ten" in 1977 (Konig 1977). Jack Allison (1977) in Malawi wrote and recorded hit songs on health and nutrition themes, including one called "The Best Foods for Our Children are a Mixture," of which each verse gave a different weaning food recipe. "Flour of Groundnuts," a song with the message to put pounded peanut flour into a baby's maize porridge and feed it to him three times a day, became Number One on the hit parade for several months. Songs featuring agricultural messages have been used in Pakistan and elsewhere.

In Tanzania a weekly comedy show entitled "Giving Birth and Caring for Your Children" featured three of the top radio comics, who improvised 15 minutes of entertainment around child health, including nutrition, every Sunday afternoon (Information Center on Instructional Technology (ICIT) 1976). Radio dramas probably have conveyed nutrition and health information more frequently than is documented, insofar as some scriptwriters are idealistically motivated to deal with social themes. The quality of information provided would be more reliable if nutrition education were extended to radio writers. A radio drama series or soap opera featuring nutrition themes was being planned in 1977 in Botswana, at a projected annual cost of about $1,000 (Jere 1977).

The mixture of political, ethical, and social education of all sorts with entertainment has been standard operating procedure for producing behavior change through the media in socialist countries for many years. The effectiveness of socialist governments in improving nutrition has been undeniable.

FIGURE 16
NEWSPAPER CARTOON CONCERNING RADIO DOCTOR SHOW IN TUNISIA


Thanks to Dr. Hakim for this advice. I will regain the championship by eating poschiches (a bean soup).

Source: Meyer 1978.

e. Programs Combining Broadcasts with Face-to-Face Activities

Another proven method of using radio or television is to make it an integral part of a program within the educational or political structure, which also includes a face-to-face component and in which participation is guaranteed by educational or political incentives.

i. Media Schools

Pioneering work in this type of radio use was conducted in a number of Latin American countries. In 1947, for example, an organization called Accion Cultural Popular (ACPO) was established in Colombia with the objective of creating through the delivery of "radiophonic education" "a new type of Latin American man, capable of making rational decisions based on a Christian ideology and of contributing to the establishment of a different social order based on the idea of human dignity" (Brumberg 1975). ACPO has broadcast courses in literacy and basic education on three levels (basic, progressive, complementary) to an estimated participating group of 170,000, mainly illiterate rural adults. The incentive has been primary-school completion equivalency. ACPO has combined the broadcasts with some direct teaching and with the provision of printed materials through private and Catholic Church-affiliated organizations. Many ACPO broadcasts have dealt with health and nutrition, and several evaluations have indicated that the programs have stimulated innovation in areas including nutrition. An attempt to measure the effects of radio alone has not been made and might not be highly relevant, since the program operates as a package.

A program called "Hygiene Class" in Haiti has operated an annual contest for a target audience of up to 30,000 fifth- and sixth-grade students, in the 10- to 15-year age range. There are 12 lessons, each broadcast three times within a specified week. Five questions have tested the students' comprehension immediately after the lesson. The students have written their answers and the teacher has corrected the papers, giving two points for each correct response. At the end of the 12 sessions the teachers have sent their results to the center, which awards certificates to all students answering 75% or more of the questions correctly, prizes to the top six students, and bonuses to the urban and rural schools with the highest percentages of participation. Prizes have included bicycles, watches, radios, and basketballs, while the school bonuses have consisted of U.S. $50 worth of educational materials or equipment of the school's choice (Hollant 1978).

In the Philippines, the Nutrition School of the Air trained a total of 1,200 persons between 1973 and 1976 in a Radio-Print Synchronization and Participation Program, which combined radio broadcasts with coordinated vernacular language magazine releases and with group classes and examinations (Intengan 1977).

ii. Media Forums and Other Listening Groups

The forum is a radio discussion group, which decides upon and impliments action (Hall 1978). Village political leaders or their appointees receive printed materials and a training course instructing them how to prepare the villagers for the broadcasts and how to record the discussions and send results back to the program. A manual by Crowley and co-workers (1978) provides detailed instructions (how to run a radio learning group campaign. The radio forum series in Tanzania featured a three-month program on nutrition entitled "Food is Life" in 1975 (Jere 1977). It is known that 37.5 million man-hours of labor was mobilized to build latrines by the previous "Man is Health" campaign (Hall and Dodds 1974). A radio forum teaching Homemaking in the Philippines was evaluated with positive results (Gomez et al. 1971). Forums have been used extensively to teach both agricultural and health themes in Indian villages (Schramm et al. 1967).

In Botswana, the Tanzanian model was adapted by the government in a campaign to permit the zoning of tribal grazing lands by fencing so that waterholes could be protected (Government Printer, Gaborone, Botswana 1976). Each listener group had a volunteer leader and an assistant, both of whom were literate (when possible) and some of whom were children (because they were the only literates who could be found). A total of 3500 group leaders received a two-week training program, a packet of printed support materials, and the loan of a radio.

The 30-minute broadcasts began with 15 minutes of music and spot announcements requesting people to gather for the program. A 7-or 8-minute drama was then presented, followed by the flipchart explanation. The study guide was written in English and Setzwana; however, the Setzwana translations over the air were free translations given by two of the country's best-known radio announcers, one male and one female. After the broadcast, a group discussion was held and the group helped the leader to answer the questions required on the report form. Ninety percent of the groups sent in more than one report form, and 50% sent in 9 or 10 forms.

The Chinese Communist Party has used magazine and newspaper discussion groups for more than 40 years (Rogers and Shoemaker 1971). Approximately 60% of adult Chinese have regularly participated in study groups where printed material is read and discussed (Hiniker 1968). Study groups were considered essential elements in public service campaigns launched to achieve such goals as fly-killing, no spitting, family planning, farm production, and "Mao learning." Since about 1969 these Patriotic Health campaigns have made use of radio (Hall 1978).

3. Printed Media

With the exception of newspapers and magazines distributed through mass channels, printed visual material generally are known as small media or support media. These materials are used to enhance face-to-face teaching, to extend the outreach of face-to-face and broadcast

media programs, and to coordinate programming efforts. The best method of coordinating the ongoing activities of face-to-face workers with radio campaigns, for example, consists in distributing packets of support materials to workers illustrating new radio messages shortly before these messages come on the air. Such packets inform local educators of the purpose of the campaign wave and provide them with adequate teaching aids to present the campaign messages (see section on media planning). Visual materials also play a central role in community motivation and involvement (Sanghvi undated). Important considerations in the design of materials for audiences with limited experience in interpreting pictures are presented in Section C.

a. Billboards, Posters, Calendars

Weaning-food messages have been posted on signboards resembling street signs in Niamey, the capital of Niger. Signboards, posters and flipcharts have particular promise in rural areas of developing countries because of a general scarcity of visual materials. Small posters or calendars with nutrition messages are treasured in rural homes. Home-gardening calendars have been distributed in the Philippines (Nutrition Foundation of the Philippines 1977). Church in Uganda (1971) distributed a nutriton calendar with pictures for each month.

b. Comic Books and Photonovels

Comic books and photonovels are popular forms of commercial entertainment in many countries and have also been used extensively in development education. Although the main apparent difference between the two media is that comics use drawings where photonovels use photographs, in practice the two forms prove to be effective for different reasons and for different purposes. Parlato and co-workers (1977) provide a careful and detailed study of the best ways to use both forms, and their report is recommended reading for nutrition educators interested in these media. Their findings include the fact that both forms are well-liked and are frequently kept over periods of more than a year.

While a number of nutrition comics have been produced, the writer has come across no report of nutrition photonovels. According to the experience reviewed by Parlato and co-workers, photographs are particularly effective for portraying intimate emotions, rather than action or fantasy sequences. The photonovel thus would be an ideal medium for family planning motivation. Marital problems, romance, and children are traditional subjects of drama. It could be much harder to build an exciting and realistic story around, for example, the theme of eating beans. Dramatic conflicts tend not to center on food. The problem of malnutrition itself is often chronic and is not recognized.

This does not mean that good nutrition photonovels cannot be made. The treatment of malnourished children produces striking before and after photographs. Three plot possibilities are: (1) A mother feels self-conscious that her baby is small and underdeveloped compared to her

sister's (or neighbor's) child and confesses these very personal feelings to a friend who takes her to a health worker. She is taught how to supplement the baby's diet, and the child improves visibly. (2) A family is opposed to the adoption of a malnourished orphan because the child is thin, sickly and ugly. The family is reconciled as the child becomes healthy and beautiful. Other cases of malnutrition with the family are detected and treated; and (3) A baby's malnourished state is believed to be caused by "evil eye" or magic caused by someone in the community. The child recovers through the efforts of the nutrition worker, and the mother is reconciled with the person or family believed to be causing the problem. A plot is not always required, moreover, because the photonovel or comic may be used not to motivate but to illustrate why and how certain procedures should be carried out.

There are several good reasons for using photonovels. They are better understood than comics by visually naive, semiliterate and illiterate rural populations because photographs are more realistic than drawings. The photonovel has more potential for multimedia campaigns than the comic book, because the photographs can realistically picture the same characters that the audience has heard on the radio and seen in posters, films, or television. The photonovel also has more potential for participatory education, because community members can be invited to make their own photographs for use, whereas they can't draw their own comics. A book by Cain and Comings (1977) explains how to produce photoliterature using the participatory process.

Comics are more abstract, flexible, adaptable, and emotionally neutral than photonovels. They are also more capable of fantasy, humor, and caricature. For this reason they appeal to a more visually sophisticated and literate audience. Limitations of comic books for development education as revealed by an evaluation of family planning comic magazines in the Philippines, are that they are perceived by their readers to lack seriousness and to be dubious sources of knowledge, and (as previously noted), to lack realism (Movido 1971).

To overcome the problem of seriousness and reliability of the information provided, nutrition education comics always should include an address box of a responsible agency and an invitation for readers to write to or visit this agency for additional information. In a study by Valdecaras in the Philippines, 48 persons responded by mail to such an address box included in a two-page nutrition story in the July 4, 1973 issue of Espesyal Komiks Magasin. The majority of these respondents were found in a subsequent survey to express no prior knowledge of or interest in nutrition. Seventy-seven percent of the surveyed respondents were female, and 76% of these women were in the 21- to 40-year age group. If comics are considered for children, the presentation may be targeted to children with the knowledge that adults will also read them and benefit from the message.

Comic books have been judged to be effective in India (Protein Foods Association of India 1972), Korea, and the Philippines (Valdecanas 1977). In Korea, evaluation of a multimedia campaign to teach five food groups and the need for balanced meals, which used 30-second radio spots, calendars, comic books, and pamphlets, showed that 80% of those interviewed had seen or were aware of the comic book, 53% remembered the comic book's balanced-diet message, and 20% could name nutrients in the food groups. While about 90% had heard or were aware of the radio spots, a limited evaluation of radio message recall suggests that it may have been less reliable than recall from the comic book (Higgins and Montague 1972).

c. Leaflets and Booklets

Printed materials such as leaflets or booklets appear most useful among population subgroups with higher-than-average levels of education. In New York City a distribution of a prenatal leaflet series was evaluated with four groups of pregnant women (Downs 1973). The leaflets, written at a fourth-grade reading level, were designed to answer commonly asked questions. Two groups received the leaflets, and two did not. One of each of the subgroups were pre- and post-tested, while the other two groups were post-tested only. No difference in information level was found among the groups. However, clear differences in correct responses were found between women who had achieved a 12th-grade education and those who had less. In this experiment the leaflets were distributed without being explained and without being requested by the women, who were of a low socioeconomic group.

The production of easy-to-read printed materials remains an extremely important part of multimedia campaigns for the education of community influentials, including school teachers and nutrition educators. A wide variety of materials can prove useful. In the Philippines, for example, the Food and Nutrition Research Institute produced a series of menu guide leaflets for the different regions, designed to correct deficits discovered in nutrition surveys. The menu guide for Southern Tagalog Region (Food and Nutrition Research Center 1966) provides a daily food plan for a sample family of six members, specifying approximately weights of different food categories to be purchased (e.g., 0.8 kg meat, poultry, or fish; 8.5 cups cereals, etc.), together with daily menus and recipes.

d. Newspapers, Magazines, and Direct Mail

Direct mail will play some part in almost every campaign, and is particularly useful for informing field workers and influentials about program activities. In the Philippines case study presented in Chapter 4, a single letter to each health worker signed by the head of the National Nutrition Council requesting the worker's personal cooperation with the radio campaign was found sufficient to mobilize substantial active support for a mass-media project. Newspaper and journal articles and advertisements also assist in informing and influencing opinion leaders.

e. Product Labeling

Nutritional information on the labels of commercially packaged products is an important means of educating opinion leaders in the modern sector. Laws requiring such labeling also are a step in the direction of cutting down on any adulteration which may occur, such as the addition of cornstarch to milk powder or beans to coffee. Studies investigating different formats for presentation of such information were used by the United States Food and Drug Administration to establish a standard format for nutritional labeling in the United States (United States Department of Health, Education, and Welfare 1973-1974).

Audio-visual Materials

Many films, filmstrips, slide presentations, tapes, and videotapes have been produced on nutrition subjects with the intention that they will be used in mass-education attempts (Taylor and Riddle 1971). When used, these tend to be shown sporadically in various public information campaigns. Mobile health units in India, for example, screened a film called "A Child's Horoscope" from the back of a van to groups of villagers assembled randomly (Indira 1973). (This film was, however, part of a multimedia campaign that achieved knowledge, attitude, and behavior change among a primarily middle-class, urban-target audience at a per-person cost of 28 paisa (Protein Foods Association of India 1972).) The film compared the importance of a child's diet in determining his future to his horoscope, which is a matter of great seriousness in India. Filmstrips are often made available to village-level nutrition educators, community development personnel, and literacy teachers. They tend to remain unutilized where teachers are not trained in their use, curriculum guidelines do not require their use, or problems exist in the supply and maintenance of equipment.

An example of a comprehensive and well-planned package of audio-visual and printed teaching materials is the Nutrition Education Multimedia Package prepared by the Philippine Business for Social Progress (PBSP) for the use of its Applied Nutrition Program (Aleta 1977a). The package provides teaching materials for six lessons, consisting of six sound slide sets, posters, a mother's handbook, a trainer's chart, and a flow chart showing the interrelationships of the components of the packet. The mother's handbook, which summarizes the six stories in the soundslide sets, includes a weight chart for her child and a printed certificate of attendance to be filled in at the end of the course. The topics covered in the soundslides are: Set 1, Food and Health; Set 2, Food Values; Set 3, Pregnancy and Lactation; Set 4, Infant Feeding; Set 5, Nutrition for Preschool Children; and Set 6, Health and Sanitation.

An evaluation of these soundslides showed excellent message recall, although they did not succeed in impressing the target audience with the seriousness of the consequences of malnutrition in spite of slides that showed edema, marasmus, skin sores, retarded growth, loss of hair, and distended stomach. In the prestudy, 22% of respondents rated

malnutrition as very serious, and 60% rated it as not so serious. In the post study, 74% rated it as serious, while 48% still rated it as not so serious (Aleta 1977). This study tends to confirm other findings that a mediated message without personal interaction is more successful in achieving knowledge than attitude change.

A seventeen-year-old girl was hired to play tape cassettes presenting health and nutrition themes at the pilas or communal wash houses where women came to do their laundry on a Guatemalan plantation (Fernandez and Colle). The women subsequently improved their use of the formulated weaning food (Incaperina).

One of the more effective formats for the use of audio-visual materials in developing countries is in outpatient waiting areas of urban hospitals. Capacity to operate technical electronics equipment is high in hospitals, and facilities for providing maintenance and repair of equipment tend to be available in the cities. At the same time, because of limited hospital facilities compared to population needs, waiting time for outpatient maternal-child health and other treatment tends to extend to several hours. Large numbers of the neediest target audiences may therefore be reached by a tape or filmstrip if the noise level of the waiting area can be kept down.

5. The Relationship between Mass-Media and Face-to-Face Education

It is well established among communications researchers that mass-media and face-to-face instruction serve different purposes in the change process and that the use of the media alone is relatively limited to the stages of arousing interest, transmitting knowledge, and affecting types of attitudes and behavior for which change is not perceived to involve risk (Rogers and Shoemaker 1971). High-risk behavior change usually requires face-to-face persuasion by trusted individuals. Face-to-face education also is most effective for teaching behavioral skills. Skills training occurs best through live or photographic modeling of the desired behavior together with guided practice and feedback during the initial performance of the skills until they become habitual.

Mass-media and face-to-face efforts are mutually reinforcing in that the mass media can motivate more face-to-face activity, which in turn can motivate greater attention to learning from the media. Both work most effectively together to stimulate opinion leadership activity within the community, which leads to an increase in face-to-face diffusion (1977). The findings of the case study evaluation in Chapter Four show radio and face-to-face education together were 2.7 times as effective in producing change as radio and 2.4 times as effective as face-to-face education alone.

a. Retesting the Effectiveness of the Media Alone

Because it is variously estimated that face-to-face health and other development activities reach a very small percentage of the populations in need in developing countries (possibly no more than 10%), it has been important to retest the general findings concerning the mass media to

see if some useful behavior change in nutritional practices cannot be generated by the media alone. This research is practically important for making decisions about whether to extend broadcasts into rural areas, where face-to-face networks are very weak and cannot be strengthened in the immediate future. The research is also useful for assessing radio's impact on the percentage of the population who are exposed to the media only in a combined campaign because they are not contacted by extension workers.

Nearly a dozen primarily experimental nutrition education projects in the early and mid-1970s made use of multimedia approaches or radio to reach villagers, many or most of whom had no contact with face-to-face nutrition education (Development Communications Report 1977). These projects did not rely exclusively on the media. Even when the stated goal was to explore the impact of radio alone, as in the case of the Manoff Projects in Nicaragua and the Philippines, good public relations required that project personnel inform local doctors, nutrition extension workers, and educators about the campaign. These individuals could not help but pick up the radio messages themselves and incorporate them into face-to-face nutrition education they were providing. Nonetheless, the majority of people reached by these experiments probably were reached by the media alone.

Unfortunately, the evaluations of these projects are incomplete. While most measure outreach, only about half measure knowledge, attitude, and behavioral changes, and the case study of the Manoff Philippines project presented in Chapter Four is the only evaluation that attempts to measure differences in nutritional status. Evaluation results invariably confirm earlier findings that the media alone achieve high levels of interest arousal and awareness, and fair levels of recall of specific messages.

Results concerning attitude and behavior change appear to depend on the degree of risk perceived in adoption. They confirm that to accept messages involving risk, people require face-to-face interaction with significant others. This fact reduces the chances of affecting those most in need because the more marginal a family's subsistence, the higher risk of experimenting with innovation.

Perception of risk levels must be considered in interpretation of the findings of these studies. An estimate of the risk level perceived to be involved in accepting nutritional messages is written on the list of priority themes presented earlier in this chapter. Perceived risk level will differ from culture to culture and from individual to individual. In general, messages to keep on doing things the old way - e.g., to continue breast-feeding - will be lower risk than messages attempting to introduce innovation in behaviors governed by cultural belief systems - e.g., the message to introduce supplementary foods by the age of six months, where it is culturally believed to be unsafe to do so before 9 to 15 months. Where infant and preschool mortality rates are high, the risk of a change in behavior that causes the child to become sick and die is always present. In the author's experience in Pakistan, Philippines, and Sudan, rural mothers most feared diarrhea for their children.

Introduction of new foods is widely feared to cause diarrhea or indigestion. In the case study to this volume, this fear was the most commonly given reason for not adopting the radio message. In an evaluation of a program in Madras teaching mothers to add Bengal grain to their child's diet, Yankauer (1975) also found fear of diarrhea given as the main reason for not adopting the new feeding method. Bai (1973) reports similar fears in Tirupati, India, and Levinson (1974) found them in Morinda.

A CARE India program in 1972 used radio, newspapers, posters, comic books, wall paintings, mime shows, and other media to teach the introduction of solid foods into the diet of the 6-month-old child and the increased iron and vitamin A-rich green leafy vegetables into that of pregnant women. The same survey, with different samples of 2500 interviews (approximately 1%) was conducted to provide a baseline before and an evaluation after the campaign. On the subject of weaning, the average awareness score rose from 'J to 93; on diet during pregnancy, from 58 to 90; and on questions on general nutrition, from 72 to 96 (Parlato 1973). The negative approach used in South India attempting to frighten people with the consequences of malnutrition by using pictures of devils and other traditional means of inducing fear, proved to be better remembered than the positive approach used in North India. However, change in awareness did not result in a change in attitudes and behavior.

Parlato, who directed the project, concluded, "A gap existed between people's understanding and their attitude towards new ideas; they understood the concept but simply did not accept it.... In order to change food habits in these villages made aware by the media, it is necessary to have face-to-face contact with an indepndent credible person who will act as a reassuring agent."

The Manoff campaign in the Philippines also achieved low levels of behavior change compared to levels of awareness of the program. Only about 5% of those who had heard the radio message were found to have actually implemented it during the 24 hours preceding an evaluation survey.

The Manoff radio spot campaign in Nicaragua in 1976, teaching mothers to give infants with diarrhea a rehydrating drink made by adding a pinch of salt to the popular local lemonade, or "Limonada," achieved a high level of awareness by advertising the new mixture as "Superlimonada." The project again attempting to affect high-risk behavior also ran into an unforeseen stumbling block in the hot-cold food beliefs system, which forbids children who have colds or coughs to have lemon juice because it is "cold." Unfortunately, infants who have diarrhea may also have respiratory infections. Although the superlimonada radio campaign may not have immediately induced many mothers to give the drink to infants with both diarrhea and colds, it should, however, have produced an important secondary benefit by weakening a counterproductive belief.

The Manoff project in 1974-1975 in Ecuador was unsuccessful in attempting to persuade people to boil drinking water, possibly because of the risk of killing living spirits believed to inhabit the water, or possibly because it proved too threatening for people to believe that the

water supply they had lived with all their lives was polluted (Manoff International 1975). Ecuadorians who had heard the broadcasts acknowledged that some people had dirty water that made them sick, but would not conceive of their own water as being dirty. Families also told interviewers that the cost of fuel was too high to warrant using it for the low-priority task of boiling water.

If infant feeding is such a high-risk topic, it may well be asked why the companies producing infant formula have had such success in changing breast-feeding behavior. A partial answer is that they never have relied entirely on the mass media but have successfully enlisted numerous health professionals to promote formula feeding. Another part of the answer is that they have had unlimited funds as compared to nutrition education activities.

It may well be, however, that the promotion of breast-feeding is sufficiently low risk that the media alone can significantly affect attitudes and behavior. The message that mothers' milk is best was broadcast and evaluated in Manabi province by the Manoff project in Ecuador, where 83% of the population had access to a working radio. Before the broadcasts began, only 30% of those interviewed thought mother's milk was best, while 47% believed fresh cow's milk was best and 61% favored powdered milk. By the end of the campaign 15 months later, 73% knew that mother's milk was best. Promotion of iodized salt, another low-risk message of the Ecuador campaign, was reported to increase use from 5% to 98% among a Mestizo target population (Manoff International 1975).

A six-week campaign to promote breast-feeding conducted in 1974 by the Housewives Association of Trinidad and Tobago made use of radio, newspapers, and posters (Clearinghouse on Development Communication 1977). Immediately following the end of the campaign, the evaluators, without revealing their association with the campaign, interviewed 418 mothers during the first 48 hours after delivery. Four months later they interviewed 348 of the same women. Eighty-five percent of the women recognized the radio spots. Among those still breast-feeding, 97% of those who remembered the campaign were supplementing mother's milk with cow's milk slightly later than those who had lower recognition scores. However, the number of breast-feeders who had weaned their infants by four months was only marginally affected by the campaign - 41% of those who remembered the campaign versus 44% for all breast-fed children born immediately previous to infants born at the time of the study. The results of this brief campaign (total radio time: two hours) would probably appear more noteworthy if it were known how many of the mothers heard commercial advertisements for infant formulas over radio and received face-to-face visits by nurses employed by the milk companies, who continued advertising indefinitely.

A possibility of misinterpretation exists if simplified radio instructions are not explained or monitored through the extension system. In the Philippines Project the amount of oil that infants were to receive was difficult to specify in a 60-second spot because the nutritionists wanted the mothers to build up gradually from a drop to half a teaspoon

at each meal preferably three times a day. The amount of oil actually received by nine infants the previous day at the end of a year of broadcasting varied from .03 to 2.5 tsp. Face-to-face instruction would probably have been needed to convey the instructions in reliable detail, just as face-to-face instructions are necessary to teach safe bottle-feeding. In this case, though, since oil is nontoxic, an unreliable amount is definitely better than none at all.

The possibility that media advice may be substituted for other sound feeding practices should also be considered. Only five out of the hundred 6- to 15-month-old children in our study sample had received no milk of any kind in the 24-hour recall. All five of the mothers claimed to be adding oil to the child's lugaw regularly, and all of the infants were severely malnourished. Although the study did not investigate these results more closely, it is quite possible that some low-income mothers interpreted the radio spot to mean that if they gave oil they would no longer need to give milk, which was more expensive. It would have been easy to modify the messages to explain that milk was needed in addition to oil.

6. The Social Marketing Point of View

It has often been pointed out that the criteria for success of a program promoting health or nutrition practices are very different from those of a commercial advertising campaign. In highly competitive markets, commercial radio advertising is considered to be highly successful if it persuades 2% to 5% of a target market to purchase a specified brand of cigarettes, for example. In more restricted markets, such as automobiles, major manufacturers may gain a 15% to 30% share. A health promotion campaign must persuade all but the very high end of the bell-shaped curve to adopt behavior in order to succeed. As pointed out by Meyer (1978), if only 10% of the population in a large urban area such as New York City were not using toilets, the implications for health would be devastating; it would not matter that hundreds of thousands of residents were in fact using toilets as the result of a health campaign. An actual example was the Salk polio vaccination campaign of the 1950s in the United States (Glasser 1958). The threat of an epidemic of paralytic polio was judged likely to continue until 80% of the population were vaccinated. Eighteen months after its beginning the campaign was judged to be a failure, although almost 50% had started to receive the series of vaccinations. However, promotion, mainly through face-to-face health workers during the next few years, increased the numbers to a satisfactory level.

While malnutrition is not contagious, low rates of adoption of good child-feeding practices are equally unsatisfactory. It is unacceptable for any percentage of the infant population to remain malnourished because of poor weaning practices. Viewed from this perspective, it is evident that the percentage of behavior change that can be achieved by the mass media alone will always fall short of reasonable goals. The need for face-to-face intervention becomes obvious if it is realized that there always are laggard groups who don't live up to the standards set by society. These groups always require face-to-face assistance through social welfare agencies.

Social marketing has adapted the theories and techniques of commercial marketing to promote social goals, including changes in nutrition and health behavior. Kotler and Zaltman (1971) and Kotler (1975) stress the importance of the existence of an effective face-to-face mechanism or agency to assist in the implementation of the behaviors promoted. Figure 17 presents Kotler's schematization of the social marketing planning system, in which the change agency responds to influences in the environment and to program feedback by determining the products, types of promotion, place or mechanisms of promotion and price of the project in direct and indirect costs. Mass-media and face-to-face channels mediate effects of these planning variables on the markets.

## 7. Further Rationale for Combined Approach in Low-Income Areas

In the late 1970s a modest resurgence of hope for inexpensive face-to-face intervention occurred in the international health and nutrition community, based on reports from community-level health and nutrition programs in a variety of traditional rural cultures (including the Yako program described earlier). A discussion of these projects can be found in our volume on Integrated Interventions. Each program demonstrates in a format growing out of the local social structure that low-income, predominantly illiterate communities can learn to take responsibility for providing their own health care at nominal external cost to the government.

The presence of government structures that support such community-level development may be a prerequisite for extending such programs to cover the majority of any population. However, the realization that preliterate communities can make the technological leap to providing themselves with minimally adequate health care and nutrition education in a matter of months and without expensive training brings the feasibility of inexpensive, universal face-to-face intervention onto a par with that of mass-media techniques. (The same awareness of community and individual capacity to take responsibility for medical care is expressed in the growing self-care movements in industrialized countries.) When the potential for large-scale inexpensive outreach exists in both modes and the two are proven to be mutually reinforcing, the rational course for nutrition educators is to combine the mass-media with the community-level worker approach.

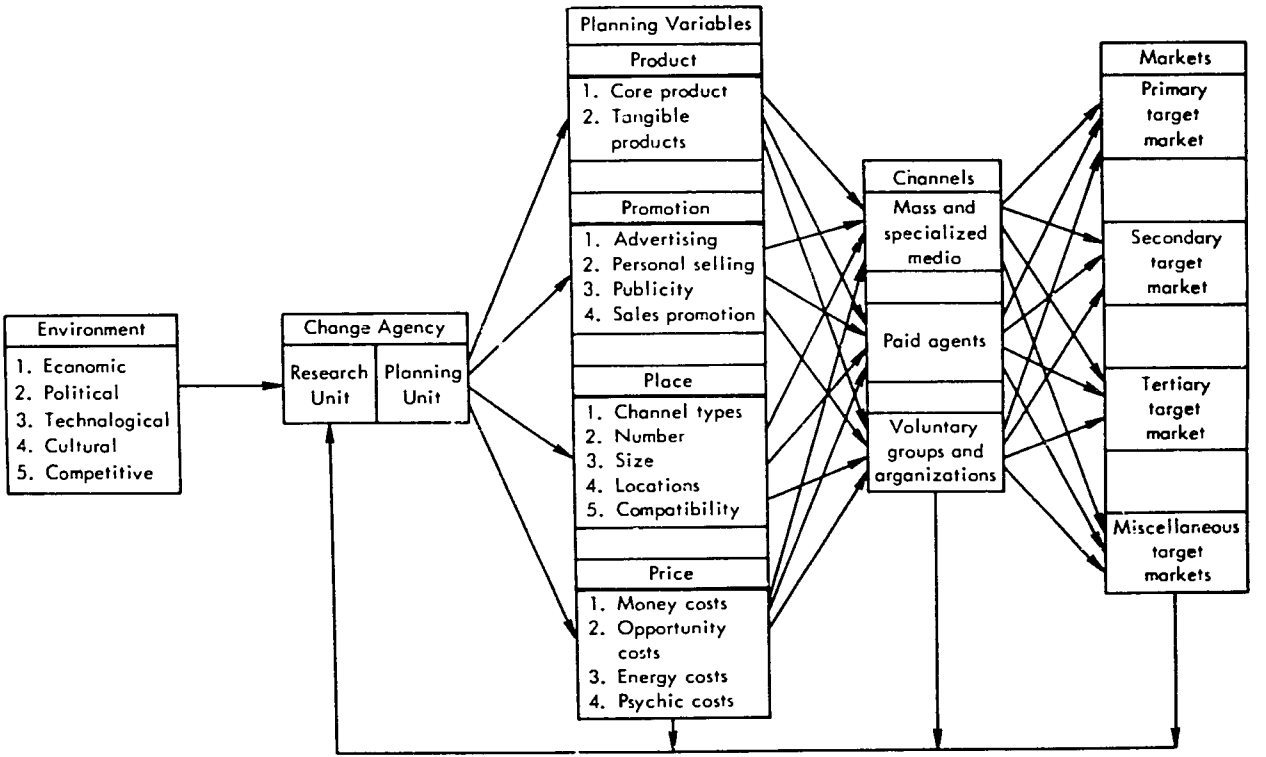
The strengths and limitations of the broadcast media are summarized in Table 8.

## 8. How to Use the Mass Media

Much of the following section is drawn from three articles by Manoff (1973a, 1973b, 1973c) of Manoff International, a Washington, D.C.-based organization devoted primarily to applying consumer advertising techniques to nutrition education. Cooke and Romweber (1977a and Manoff and Cooke, 1977) provide a further detailed discussion of how to mount a nutrition education campaign using radio spots.

FIGURE 17

**Social Marketing Planning System**




Source: Kotler 1975, P. 297.

TABLE 8

STRENGTHS AND LIMITATIONS OF THE BROADCAST MELIA FOR DELIVERING NUTRITION EDUCATION (RADIO AND TELEVISION)

| Strengths | Limitations |
|---|---|
| 1. Radio and TV spots, popular entertainment programs and government-controlled broadcasts can create rapid message awareness, knowledge, and attitude change in almost the entire radio-listening or TV-viewing population. (Even the literate, who are accustomed to reading newspapers and books, may be reached most widely by nonwritten media.) | 1. Few people made aware by the media alone will actually change behavior if risks are involved. The feeding and care of young children is generally perceived to involve risk because of the high under-5 mortality. |
| 2. Nutrition education over radio and TV has low per-capita costs where media penetration is high and where populations are homogeneous in language and culture, so that broadcasts reach large numbers. | 2. Those most in need in developing countries are least likely to have radios and most likely to perceive high risks associated with change, because they lack resources to cope with failure. |
| 3. The accurate advice of a few highly competent professionals can be widely disseminated in uniform messages and at controlled intervals using radio and TV. | 3. Incomplete message content, lack of individualization, or misinterpretation of the one-way communications may result in incorrect behavior change. Locally irrelevant messages may reduce the credibility of nutrition educators. |
| 4. Radio and TV can strengthen effectiveness of face-to-face efforts by (a) increasing institutional impact of field programs, (b) motivating communication by field workers and opinion leaders, and (c) reinforcing learning of message content by repetition and communications synergisms. | 4. Radio or TV programs that are long enough to explain nutritional principles in detail have small specialized audiences, unless (a) broadcast over a single government-controlled station and/or (b) the messages are cleverly mixed with entertainment or (c) mass audiences can be induced to participate in listening groups. |

TABLE 8 (continued)

| Strengths | Limitations |
| --- | --- |
| 5. Media forums, in particular, can mobilize nationwide mass action in food production, environmental sanitation, etc. | 5. While listening group activities may reach important subgroups, sustained political commitment to the problems of development and a high level of community and/institutional organization are required to involve mass audiences in group listening or viewing activities. |

The nutrition educator's use of the mass media will not occur automatically. It has to be made to happen. Nutrition educators must seize the initiative. In countries with privately licensed broadcast systems for radio and television, the licensee is usually obligated to devote a significant portion of air time (the amount usually left to his discretion) to "public service." It is up to nutrition advocates to establish their claim to a share of that time. Where radio and television are government monopolies, the problem of access should be easier to deal with. The nutrition educator must gather evidence that malnutrition is a national problem, develop a strong case for nutrition education, and know where to go and whom to persuade. Where educational stations exist, obtaining media time may be easy, although listenership of such stations tends to be limited and specialized.

It is not necessarily difficult to claim a share of public service time from privately licensed stations. Sr. Gustava Herdoiza Leon, for example, head of Radio Tarqui, the most popular station in Quito, offered to donate 50 one-minute spots per week for nutriton education in Ecuador in 1972. Stations in Brazil and the Philippines also agreed to give substantial time to proposed nutrition education projects. In the United States, an Advertising Council obtains air time for approved public service campaigns on a voluntary basis.

Under licensing systems the trend is growing for governments to recapture portions of air time from commercial stations on a nonvoluntary basis. The Ecuadorian government retains at least a half-hour of air time per week. Brazilian law insures that five hours a week on both radio and television are reserved for government. Mexico reserved 12.5% of commercial radio and television time for government use. All of the time for the Manoff campaign in Iloilo, Philippines, was donated at government request.

Nutrition authorities in all countries need to take an inventory of government communication policies and activities and identify the responsible agencies. They are usually the Education Ministry, the Information and Broadcasting Ministry, or some special government agency created to manage the educational use of the radio and television time reserved by government. These agencies should provide information not only for procedures for obtaining radio and television time, but also newspaper, magazine, and billboard space, and commercial cinema time, which are governed by regulations analogous to those described for radio and television.

a. Finding Communications Specialists

A typical food manufacturer goes outside his own organization to plan and execute his media program - he appoints an advertising agency. The option of working with an advertising agency is also open to nutrition educators. There is a tradition among advertising agencies to do voluntary public service work, free of charge or on an at-cost basis. The professional direction for such a campaign comes from the group

initiating the nutrition education activities, which will include specialists in nutrition, education, and communications. This group defines the subject matter and priorities and identifies the target audiences. The two groups work together to conduct formative evaluation of message content. The execution comes from the advertising agency, which distributes and schedules the materials.

Because of the differences between the goals of commercial and social marketing, however, it is important to find an agency that either has previously conducted campaigns for nonprofit organizations or is at least sensitive to the differences involved and willing to follow an established social marketing approach with the guidance of noncommercial communications specialists. Nutritionists also should be appreciative of the fact that frequently less motivation exists to do free-of-charge or reduced-rate work when higher rates are normally paid. The nutrition agency should therefore be sensitive to the factors and appeals that are motivating the advertising agency.

Nutritionists also commonly find communications specialists and production facilities in the government agency charged with communications, or at the radio or television station. They may also decide to invest in an in-house production unit to join with the ministry of health or family planning or another field with an interest in development communications in sharing such a unit.

Within the nutrition organization, at least three people will be required for: (1) media management, coordination with communications agencies, and radio and television stations, and monitoring of broadcasts; (2) formative evaluation of message content and materials, curriculum development, and materials production; (3) coordination of the mass media with face-to-face instruction, management of training for field workers, distribution of explanatory letters, posters, photonovels, manuals, and other matierlas. These three may require assistants.

If a commercial agency is used, the audience research required by a mass-media campaign may be undertaken jointly by professional market researchers, by communications specialists, by nutrition agency staff in charge of formative evaluation, and by academic or technical consultants to the nutrition agency. The field interviewers required for formative evaluation, pretesting and effectiveness tracking should be primarily nutrition field workers. Their participation is necessary to simultaneously pretest their ability to communicate the messages and to use the materials. The evauation process is discussed in Chapter 3.

To ensure that radio spots or other programs are aired on schedule, the nutrition education project should establish its own monitoring system by hiring several clinic personnel, students in health and nutrition training programs, or others in different regions to fill in monitoring sheets after following a randomly drawn schedule of listening hours for selected stations. The persons in charge of formative evaluation should supervise the monitors. In the Manoff Philippines project, monitors listened to about 7% of the total broadcast time of the 15 participating stations (Cooke and Romweber, 1977a).

Broadcasts generally are more reliable when radio time is paid for than when it is free, since public service time, which gets run-of-station programming, means that spots or programs are played in the middle of the afternoon and late at night. Visits by the project manager to the stations to discuss the project and to observe whether a schedule of spots has been posted and the spots are entered in the station log are an indispensible part of the monitoring process.

b. The Danger of Unprofessional Efforts

A danger in all collaborative ventures between groups who have essentially different professions or occupations, such as nutritionists, educators, academic communications specialists, and advertisers, is that people of one profession attempt to do the jobs of the other, in which they have no experience and therefore produce a low-quality product. It is just as technical and difficult to create an effective 30-second radio spot as it is to write a successful popular song, or a successful radio drama. If this were not so, social marketing and commercial advertising would not exist and government agencies and commercial companies would save millions of dollars by writing and producing their own broadcast materials.

Whether professional talents are hired individually or through an agency, professional skills are required to make radio messages (1) emotionally appealing, in order to motivate the target audience to take action; (2) memorable, in the double sense that the good spot is phrased in catchy words and also that the importance of the advice and how it is to be used are easily remembered; and (3) capable of repetition, so that key messages can be repeated frequently both by the radio and by the listeners without growing tiresome. Even professional copywriters have been found to indulge in unprofessional flights of fantasy or "creative trips" when writing materials for public service campaigns (Schlinger 1976). For this reason, action goals of the campaign must be clearly stated.

When nutrition content is mixed in with entertainment in open broadcasting, successful strategies have been either to employ known song writers or dramatists or to hold contests for the best song on a nutrition theme (Dr. Jack Allison 1977). This type of contest, which may also be applied to drama, has an additional nutrition education impact by making local community entertainers and their audiences aware of the nutrition messages.

c. The Selection of Media Mix

Choice of the media mix for any given program should depend on the target groups for the program, on their literacy level, and media habits, and on the production capabilities and costs of the different media products. Worksheet 9 is designed to assist in summarizing the information necessary to make a selection of media. Much of the information required to fill in this worksheet may already be available through advertising or government information agencies. Costs and impact of alternative combinations of media should be estimated separately.

WORKSHEET 9

OVERVIEW OF INFORMATION REQUIRED FOR DETERMINING MULTIMEDIA MIX

| Educational Target Groups | % Radio Ownership | Radio Penetration or Listnership | % TV Ownership | TV Penetration | Average years Education | % Newspaper Readership | Other Media Penetration | 1. | 2. | 3. | 4. | 5. | Logical Phases | Selection of media by logical phase |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |

| Media Production | radio | television | newspapers | magazines | publishers | artists | printers | other | |
|---|---|---|---|---|---|---|---|---|---|
| Names of Stations or Companies in Region | | | | | | | | | |
| Summary of Range of Costs | | | | | | | | | |
| (information to be entered after costing of individual services and calculation of relevant price list) | | | | | | | | | |

Media selection, face-to-face channels, and themes to be presented should also be considered in view of the following logical phases of the learning and adoption process. Some target groups will not participate in all phases. Some of the phases, such as interest arousal and global instruction concerning broad outlines of the tasks, may already have occurred prior to the educational effort; and some, such as repeated trial, adoption, and reinforcement, might be condensed. It may also be most appropriate for several to occur simultaneously. It is important, however, to think through each of the phases and to determine which should be conducted through which channels. The media and other channels listed at the right are for purposes of illustration only.

| Logical Phases | Possible Channels |
|---|---|
| (Learning prerequisite for teaching others) | (Education of vertical levels above the main target groups) |
| 1. Interest arousal | 1. Radio, news announcements, posters |
| 2. Initial global instruction, high-payoff components, most important things to be done | 2. Radio, face-to-face, photonovels, leaflets (featuring success stories) |
| 3. Trial of the practice | 3. Initiation of opportunities for trial, demonstrations |
| 4. Repeated trial | 4. Opportunities for practicing the skills with feedback and reinforcement, radio |
| 5. Adoption | 5. Social approval via radio, certificates of graduation |
| 6. Reinforcement | 6. Billboards, one-to-one counselors enquire about performance |

Because of the wide reach of radio spots, it is valuable to use them to promote action in the trial through adoption phases. If funds are limited, expenditure on phases that do not directly recommend action may be less cost effective than condensation of interest arousal and global instruction with the action messages. It is important to avoid wasting funds on interest-arousing "teasers" that lead nowhere.

d. Mass-Media Message Design and Presentation

Presentation of priority themes over radio should be layered, giving two or three months to a first set of messages, reducing the exposure of these messages and phasing in another set, so that the full series of priority themes is delivered over a protracted period as has been done in the Dominican Republic (Cooke 1977). The time sequence should be worked out in coordination with face-to-face activities and with the other media, so that posters and photonovels, for example, are synchronized with the broadcasts, whether or not feedback via a radio forum or school is established.

e. Media Planning

A major shortcoming of mass media campaigns in developing countries has been lack of planning and management in coordinating mass media with face-to-face message presentation (Alexander 1979). The media plan should be designed to meet scheduled program goals. Letters and meetings with personal visits to influential individuals are an important preplanning step in arranging the central and regional training seminars that must be held before the launching of a new campaign. These seminars are required to train the medical doctors and other field workers who will be enlisted to teach campaign messages face-to-face and to participate in evaluation activities

Packets of training materials must be prepared before the initial seminars. As the campaign develops, new packets of materials should be distributed to all face-to-face workers several weeks before the beginning of each new wave of messages. Each packet should ideally contain: (1) an explanation of the purpose and objectives of the campaign (or of the new wave of messages); (2) a schedule of events; (3) scripts or synopses of broadcasts; (4) suggested face-to-face follow up activities; (5) support materials, such as flip charts or leaflets, if these can be provided; (6) anticipated questions from the target audience and answers to these questions; (7) an evaluation checklist for the field worker asking questions concerning needs not being met, situations that came up that presented problems, particularly successful features of the wave, suggestions, etc. If resources are not sufficient to prepare extensive packets, each field worker must at the very least be informed by letter or in person by her supervisor before the beginning of each new wave. Supervisors also must personally collect and report feedback responses concerning the campaign from their field workers at reasonable intervals.

Announcements concerning the campaign should go out in advance of each new wave to a selected list of persons, who may include politicians, heads of appropriate ministries and planning divisions, educators, and civic leaders and groups with an interest in nutrition such as the Red Cross. Direct mailing of letters plus some combinations of press announcements and explanatory leaflets should be sufficient.

Radio messages must be broadcast at those times when the largest numbers of the target audience listen, and over the stations most popular with the group. Simple as this should be, in the past nutritionists have sometimes used low-audience government stations or stations and hours with little listenership among target groups. Although free radio time is preferred a purchased spot on a commercial station that people listen to may be better than a free spot on a government-owned station that is not popular. In Nicaragua, a nutrition campaign purchased a one-minute spot next to the Radio Corporation's "Pancho Madrigal," the most popular program. A similar spot on the government-owned station was free, but a survey showed that not a single rural family mentioned the government station as a favorite (Manoff and Cooke 1977).

## 9. Materials Production

Major design considerations hold true for the production of all communications materials from weight charts to posters to radio cassettes. Generally speaking, message content which has been determined by formative evaluation procedures described in the section on message design is translated into preproduction materials.

### a. Pretesting

All types of preproduction materials should be pretested to insure comprehension, memorability, emotional appeal, and cultural relevance of the presentation. These draft materials are then revised for mass production and distribution. About 15 test interviews should investigate each item in a realistic setting. For example, interviewers should play the radio messages in the home on a cassette recorder. Posters should be displayed for several days in villages in which they will be used. Interviewers should then question mothers about the poster and its impact. Health workers should test flip charts in their regular education sessions. In some instances, interviews may be conducted after a time lapse to measure the strength of impression created by the materials. The likelihood of the respondent changing his or her behavior in response to the message, with reasons for changing or not changing and the believability of any characters, story lines, or special effects used to illustrate the message may also be investigated.

Although pretesting greatly improves the effectiveness of materials it is a relatively new procedure which is not yet a part of standard operations in all production units. Factors that continue to inhibit the use of pretesting procedures are summarized in Worksheet 10 (Research and Evaluation Unit DSCS, Asia 1974). This list points out that pretesting must be included in the budget and schedule. Valuable additional guidance may be found in Communications Pretesting by Bertrand (1978).

### b. Design of Radio Messages and Matching Support Materials

For presentation in radio spots and in entertainment, themes should be broken down into elemental action messages, each of which describes a single specific task to be solved. This breakdown is the means of overcoming the 15- to 60-second time limit. When necessary, different components of the theme can be presented in different spots. In 1976, in the Dominican Republic, for example, the breast-feeding theme was broken down into the following simple action components: (1) mothers will feed their babies only breast milk for the first six months, feeding the child at least 5 or 6 times a day; (2) mothers will continue breast-feeding their babies for at least 12 months; (3) mothers will not give their children herbal teas instead of breast milk; and (4) mothers will learn that their milk is the best for the baby because it is the most nourishing, it never carries infection, and it does not need refrigeration (Manoff and Cooke 1977).

WORKSHEET 10

SOME FACTORS WHICH HAVE INHIBITED AND MAY CONTINUE TO INHIBIT THE DEVELOPMENT AND ADOPTION OF PRETESTING PROCEDURES

A. The Designers/Producers of Communication Materials

1. May not realize or accept that their audiences' needs and perceptions are different from their own.

2. May realize that the audience does have different needs and perceptions and are confident that they have a thorough grasp of these differences.

3. May simply wish to express themselves artistically without thought to their audiences' needs and perceptions; the audience is an irrelevancy.

4. May realize that their own conceptions of what is artistic and pleasing differs from those of their audience, but feel that they should raise the latter to their own sophisticated level.

5. May not have the time or the budget for preoperational research or pretesting.

6. May assume that what they have always done in this field is just fine.

B. The Audience

1. May have totally different and regionally specific visual preferences and language and a low level of literacy.

2. May have little regular exposure to any kind of communication materials and are thus not in a good position to form (relative) judgements.

3. May be unused to the interview procedure; cowed by the interviewer; eager to please.

4. May have instinctive reactions to some materials but unable to articulate their reasons behind their choices.

WORKSHEET 10 (continued)

C. Other Difficulties Inherent in Pretesting Situation

1. In a developing country because of lack of basic statistical data and a greater degree of heterogeneity (between, regions, provinces, even villages) it is often difficult if not impossible to select a sample for which one can predict the degree of probability of its being representative of a wider universe.

2. Even after a sample has been chosen there are often practical difficulties of physical communications and seasonal movements of population, which make interviewing difficult, time-consuming and expensive.

3. The majority of the audience may be illiterate, so questions must be orally administered.

4. They may be intimidated by outsiders into giving what seem to be the preferred answer; "local leaders" may prove to be more effective interviewers.

Signboards, posters, photonovels and other printed visual materials made to accompany a radio or TV campaign should illustrate the same component messages presented in the spots or in entertainment programs. This strategy should satisfy the need for simplicity and clarity in visual materials and also provide communications synergisms between the broadcast and print media and the face-to-face efforts.

All of the rules for formative evaluation of action messages should be rigorously applied to mass media design because the messages, as broadcast or distributed, will not be adapted to individual circumstances. Risk level of messages should be considered in relationship to the numbers of people who will be contacted by the media only. Drafts of preproduction materials, except for extemporaneous comedy shows, should be reviewed by experts and modified before they are pretested with the target group.

C. Design of Visual Materials for Audiences of Low Literacy Levels

A number of special design characteristics must be considered in producing visual materials for illiterate or pictorially inexperienced audiences, whether these materials are used for face-to-face teaching or for TV broadcasts or for photonovels, for example. Visual materials are important for illustration of priority messages and for helping people to remember information they have learned. Illiterate people can refer back to pictures in place of written notes or instruction. Like other media materials, pictures can be in many places at once, while the individual nutrition educator cannot. In low-income rural homes pictures tend to be carefully kept and treasured. Visual materials also can be used to stimulate community involvement in nutrition activities. Materials for this use have been developed by Save the Children Federation.

However, both illiterate and literate people living in cultures that do not make regular use of drawings or photographs sometimes have difficulty understanding the meanings of pictures (Fonseca and Kearl 1960; Holmes 1966; Fugelsang 1970; Deregowski 1973; and Mitton 1976). Some cultures with high rates of illiteracy regularly use pictures. Thus, in selecting media for a particular audience it is necessary to determine not only verbal literacy levels, but pictorial literacy levels as well (Paylato et al. 1977). The implications of people's difficulty with interpreting pictures are not clear, because it may be that this skill can be learned with relatively little practice. Chimpanzies have been shown capable of recognizing problem situations shown in pictures and of selecting pictures that show specific solutions to the problems (Premack and Woodruff 1978). Nonetheless, the opportunity to gain such practice cannot be assumed for all who might benefit from pictorial representation.

The results of studies of the ability of persons not used to pictorial representation to comprehend visual materials reveal the following.

- No picture conveying a message will be reliably understood unless it is explained to people. However, once an explanation has been given and understood, even a relatively simple or crude picture can help people to remember important messages. More complicated visual materials, such as growth charts, can also be explained and used effectively. This implies that:

- Pamphlets and handbooks are required for literate nutrition educators and should contain pictures which they can use to explain messages to nonliterates. Such handbooks should also include advice on how to use the pictures and other visual aids most effectively (Fussell and Haaland 1976).

- Even nonliterate educators can use a series of pictures which they understand to illustrate and explain a nutrition or health message to other nonliterates. This has been done by village women in Bangladesh (Dobyns 1978) with apparent success.

- Those using pictures and posters to reinforce nutrition messages should discuss them with as many villagers as possible and make sure that portrayed messages are understood. The meaning of all conventional symbols such as x, √, ?, →, upturned mouth for happiness, downturned mouth for sadness, etc., should be clearly explained (Fussell and Haaland 1976).

- Lack of funds for high-quality drawing or photo reproductions should not delay the creation of pictorial aids, since amateur hand-drawn posters and mimeographed sketches can be effective if they are explained. World Neighbors (undated) have produce a handbook with line drawings of common objects for people who are not artists to copy.

- Posters and wall charts should express their message in words as well as in pictures. The words should be large enough, few enough, and simple enough to be read by children, even if the message is actually intended for adults. It can at least be hoped that children who are learning to read at school may read the messages to unschooled adult villagers (Fussell and Haaland 1976).

As funds permit, the nutrition educator naturally would like to provide pictures that can be recognized with as little explanation as possible, particularly when producing materials for mass distribution. The following principles are important:

- Realism without confusing details. Photographs or realistic shaded drawings are most easily recognized. Irrelevant background details tend to interfere with recognition, partly because inexperienced viewers have not developed depth perception

(Hudson 1960). For this reason, blockout photographs probably are most reliable (Fugelsang 1973). These are photographs from which background details have been removed by cutting out the important objects represented in the picture, such as a malnourished child and a plate of food, for example, and attaching these objects to a blank sheet of paper.

Representations of an incomplete object or body, such as a man whose feet are not shown in the picture, are not as realistic and therefore not as well recognized or as well accepted as the whole object or the whole body (Degerowski 1973). The viewer may ask, "What happened to the man's feet?"

- Familiarity. Familiar objects, clothing styles, houses, etc., are much more clearly identified than those that are foreign or unfamiliar (Fonseca and Kearl 1960). In countries with a local artistic tradition, local artists should be enlisted to illustrate posters and other materials because the images they produce will be familiar. In Haiti, for example, a common method of representing the three food groups with a picture of fire for energy, a house for body building or protein, and a lock and key for protective foods was found to be incomprehensible. The three food-group idea was explained to a popular local artist, who chose to represent foods from the three groups growing on three separate trees. His painting, which showed fish and eggs growing on one of the trees, was far from realistic, but was in a local familiar style, and appeared to be easily understood and accepted by local mothers. This painting is reproduced on the cover of Nutrition Education in Developing Countries or the Joys of Eating Dark Green Leaves (Shack 1977).

- Special care in picturing sequences. The illustration of a process involving separate steps or actions should have at least as many individual pictures or frames as there are main steps or actions of the depicted process. Unless villagers are taught to "read" the meaning of such steps, they are likely to attempt to go through them in the wrong order. Individual pictures should also be numbered to show in what order to read them. Despite this need for extra clarity, it still is far easier to teach illiterates to read instructions from pictures than to teach literacy (for a discussion of use of pictures to teach people of low literacy levels, see the section on comic books and photonovellas).

- Correct color associations. If colors are used to represent good health or illness, the meaning that the colors have for the learner groups must be investigated. A common dubious practice is to take the traffic-light colors - red, amber, and - to represent danger, warning, and good health. Most of our world's population have never seen traffic lights. Tests in India by the Project Poshak staff and similar tests in the

Dominican Republic revelaed that red was a color associated with good health, orange with warning, and yellow with illness or malnutrition (Meyer 1977). In rural Ghana and Upper Volta, by contrast, red connotes danger and white is a color appropriate for good health (Kwansa et al. 1972). The same symbolism is explained in a thorough account of color in Zulu medical beliefs (Ngubane 1977).

Table 9 shows the results of a test of color associations among villagers in the far western region of Nepal. Such a study conducted for nutritional purposes should specifically discover which colors are associated with healthy, well-nourished children and which with sickly children, and possibly which colors are associated with health and strength in adult women and men as well. Color printing is much more costly than black and white. The extra expenditure for color may not be cost-effective.

- Repeated Pretesting. All drafts of materials should be discussed with members of the viewer audience, first without explanation of the meaning of the picture to see what they spontaneiously perceive, and then after explanation. Surprises may keep surfacing. The writer thought that a pictorial sequence on a hygiene poster distributed to all Maternal Child Health Centers in Pakistan had been thoroughly pretested and revised, only to be informed several years later that the presence of frames picturing food at the top of the sequence and a frame (illustrating what not to do) showing a child defecating by the roadside, at the bottom of the sequence had the combined effect of making the poster unappetising. (Of course. But why didn't we notice that!)

The pictures and text in Figures 18 and 19, from a study in Nepal, illustrate the necessity to explain pictures. The first, showing breast-feeding versus bottle-feeding, was not explained and was not understood. The second, showing the transmission of germs in tuberculosis, was not understood in villages where it had not been explained, but was well understood and remembered in one village where it had been shown and explained five months earlier.

Organizations providing visual aids for teaching nutrition in developing countries are listed in Worksheet 10. Additional organizations are listed in a Directory of Sources of Assistance on Educational Technology for Development prepared by The Information Center on Institutional Technology (ICIT) (1975).

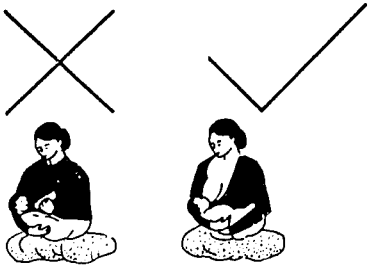
TABLE 9
TOTAL SCORES FOR THE COLORS USED IN THE STUDY

| | purple | bright pink | red | orange | yellow | ochre | tan | dark brown | black | white | grey | lt. blue | turquoise | dark blue | light green | dark green |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Liked | 75* | 73* | 61* | 54 | 51 | 7 | 6 | 4 | 15 | 58 | 18 | 47 | 44 | 55 | 52 | 37 |
| Disliked | 4 | 6 | 9 | 11 | 12 | 56 | 33 | 129* | 134* | 13 | 78* | 13 | 5 | 9 | 3 | 11 |
| For happy occasions | 80* | 69* | 72* | 54 | 48 | 6 | 6 | 7 | 7 | 56 | 4 | 17 | 23 | 34 | 38 | 34 |
| For sad occasions | 5 | 13 | 8 | 7 | 14 | 27 | 33 | 79* | 119* | 81* | 35 | 18 | 6 | 14 | 11 | 10 |
| For women | 84 | 109* | 98* | 67 | 37 | 1 | 4 | 4 | 13 | 3 | 0 | 17 | 40 | 50 | 60 | 49 |
| For men | 21 | 17 | 23 | 12 | 35 | 17 | 13 | 14 | 24 | 119* | 22 | 91* | 72* | 66 | 18 | 30 |
| For gods | 9 | 35 | 84* | 124* | 170* | 7 | 4 | 2 | 19 | 79 | 4 | 4 | 5 | 9 | 10 | 10 |
| For devils | 5 | 14 | 27 | 17 | 24 | 8 | 11 | 88* | 25[illegible]* | 42* | 15 | 4 | 2 | 8 | 11 | 5 |
| Total mentions | 283 | 336 | 382 | 346 | 391 | 129 | 110 | 327 | 585 | 456 | 176 | 211 | 198 | 245 | 203 | 186 |

* The highest three scores in each of the eight categories are marked with an asterisk.
Source: Adapted from Fussell and Haaland 1976.

FIGURE 18

Artist's intention: BREAST-FEED, DON'T BOTTLE-FEED



Question 1: What is this?

Adult(s) and child(ren) 82%

Question 2: Is there any difference between the two pictures?

Responses:
- Bottle-feeding and breast-feeding 19%
- One feeding, the other not feeding 14%
- One feeding medicine, other feeding milk 3%

Question 3: What might the pictures be trying to teach?

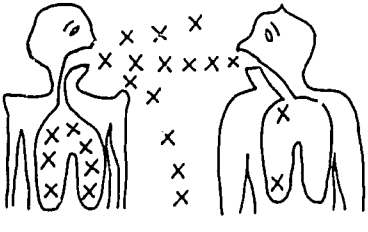
Responses: Breast-feeding better than bottle-feeding 3%

Notes: Yet another attempt to express the ideas of "good" and "bad." Ticks and crosses are used in Nepalese schools to indicate "right" and "wrong," but it came as no surprise to find that unschooled villagers were not familiar with these signs. Four of the respondents (i.e., about 1%) stated that "✓" meant "right," but only one of these connected the sign with the picture beneath it. It is likely that the other ten respondents who said "Breast-feeding is better than bottle-feeding" were stating their own opinions rather than "reading" the picture.

Most of those who mentioned the ✓ and ✗ either said they did not know what they were, or gave them a pictorial interpretation, such as "plough," "hook," "spade" (for ✓), "fan," "aeroplane," "bananas" (for ✗), or "sticks," "rods" (for both ✓ and ✗).

FIGURE 19

Artist's intention: TB CAN BE TRANSMITTED FROM A SICK PERSON TO A HEALTHY ONE (first and second stages)



Source: Fussell and Haaland (1976).

This drawing was included in the study at the request of a member of the British Nepal Medical Trust, which uses it in TB-prevention campaigns. It was taken to six villages and shown to over 100 people. In five of the villages, none of the villagers could understand it, for reasons which probably included the fact that germs and lungs are not usually visible. However, in the remaining village, large numbers of villagers were able to explain what the picture meant. The reason for this proved to be that a team from the British Nepal Medical Trust had visited that particular village five months before, and had shown this picture and explained its meaning. This is very encouraging indeed, indicating that even quite crude drawings can serve as reminders for villagers, provided they are adequately explained.

WORKSHEET 11

## ORGANIZATIONS SUPPLYING MATERIALS FOR TEACHING NUTRITION EDUCATION IN DEVELOPING COUNTRIES

African Medical and Research Foundation
Wilson Airport
P.O. Box 30125
Nairobi, Kenya

Alfalit Boliviano
Junin 6305
Casilla 1466
Cochabambu, Bolivia

American Home Economic Association
2010 Massachusetts Ave., N.W.
Washington, D.C. 20036

Bureau d'Etudes et de Recherches
pour la Promotion de la Santé
Kangu-Mayombe
Republique du Zaire

ENI Communication Center
P.O. Box 2361
Addis Ababa, Ethiopia

FAO
Nutrition and Home Economic Division
Rome, Italy

Health Education Department
Addis, Ababa, Ethiopia

Helen Keller International, Inc.
22 W. 17th Street
New York, N.Y. 10011
(specializing in vitamin A and
blindness prevention)

Chief Education Officer
Health Education Department
Public Health Department
Ministry of Health
Ibadan Nigeria

Christian Medical College
and Hospital
Vellore 4
Madras, India

Derechos Reservados
Centro Andino de Communicaciones
Casilla 2774
Cochabambu, Bolivia

I.Y.D.G.
Parnell House
Wilton Road
London SW1, England

Material Realize a l'Atellier de
Material Didactique
Busiga, P.B. 18 Ngozi, Burundi

Medical Recording Service
Foundation (Royal College
of General Practitioners)
P.O. Box 99
Chelmsford CM1 5HL, England

National Food and Nutrition
Commission
P.O. Box 2669
Lusaka, Zambia

N.A.V.I.C.
254 Belsize Road
London NW6, England

WORKSHEET 11 (continued)

I.L.O.
Geneva, Switzerland

International Development
Research Centre (IRDC)
P.O. Box 8500
Ottawa, Canada K193HG

Nutrition Center of the Philippines
Communications Department
Nichols Interchange
South Superhighway
Makati, Rizal, Philippines

Nutrition Section
Public Health Department
Box 2084
Konedobu, Papua, New Guinea

O.C.E.A.C.
P.P. 288
Yaounde, Cameron

Overseas Development Materials
World Neighbors International Hdqtrs.
5116 North Portland Ave.
Oklahoma City, OK 73112

Phillipine Lutheran Church
P.O. Box 507
Manila, Philippines D404

Professional Health Media Services, Inc.
Health Education Supply Centre
P.O. Box 922
Loma Linda, California 92354

The Nutrition Foundation, Inc.
Office of Education and Public Affairs
888 Seventeenth Street, N.W.
Washington, D.C. 20006

U.S. Department of Agriculture
Federal Extension Service
Office of International Extension
Washington, D.C. 20520

Saidpur Concern,
Teaching Aids Workshop
c/o CONCERN
P.O. Box 650
Dacca, Bangladesh

Service d'Images Catholiques
Africaines (SCIA)
Maison de Diapositives
B.P. 936
Kinshasa 1
Republique du Zaire

Shanta Bhawan Community Health
Program
Box 252
Kathmandu, Nepal

Stichting TOOL
P.O. Box 525
Eindhoven, The Netherlands

Teaching Aids at Low Cost (TALC)
Institute of Child Health
30 Guilford Street
London WC1N 1EH

V.I.T.A.
3706 Rhode Island Ave.
Mount Rainier, Maryland 20822

Voluntary Health Association
of India (CAHP)
C-45, South Extension, Part II
New Delhi 110049, India

WHO
Geneva, Switzerland

## 1. SUMMARY:

## THE MASS MEDIA

The term mass media embraces radio, television, signboards, posters, calendars, comics, photonovels, newspapers, magazines, booklets, leaflets, product labels, direct mail, audio-visual materials and traditional communication forms such as dance troupes. A multimedia approach combined with face-to-face channels is desirable because different channels are most appropriate for different educational phases and because communication of the same message through different channels creates media synergisms that enhance learning.

Radio generally has the widest penetration in rural areas of developing countries. Radio spots can create message awareness in an entire listening population within a period of a few months. Nutrition information programs, by contrast, tend to reach only the well educated with a prior interest in nutrition, unless broadcasting is controlled by government, so that listeners cannot turn to an alternate station providing entertainment. Information programs remain an important means for educating opinion leaders and technical audiences such as field workers. Where broadcasting is controlled, radio doctor shows have proven popular and effective in reaching large audiences. Nutrition themes have also been widely disseminated through entertainment, such as comedy shows, popular songs, and soap operas.

Radio schools, which combine listening with face-to-face program activities and correspondence, effectively reach special audiences, particularly when they offer incentives such as certificates for adults on prizes for school children. The radio forum generally is a village community-level discussion group which sends feedback to the program and which can be highly effective in deciding upon and implementing community action.

Nutrition signboards and posters have high visibility in rural areas because of a general scarcity of visual materials. Small posters and calendars are treasured in rural homes. Comic books have been used effectively for nutrition education. Photonovels are potentially more effective than comics, but have not yet been used.

Reading materials such as leaflets, booklets and texts are important for the more educated segments of the population who act as opinion leaders, and for field workers. Newspaper articles and advertisements, direct mail and product labels also reach these groups.

Audio-visual materials such as slides, films, and tapes can be effective but will not be utilized unless their use is taught in the training curriculum of the field workers and is required by the field program, and unless adequate arrangements are made for maintenance of equipment.

Nearly a dozen experimental nutrition education media projects in the 1970s have reconfirmed the previous findings of communications researchers that the mass media alone are highly effective in creating awareness and transmitting knowledge, but that face-to-face persuasion is required to change behavior that is perceived to involve risk, such as infant-feeding practices. Face-to-face guidance also is required to teach skills.

Nutrition educators must take the initiative in claiming their share of public service resources with regard to radio, television, and the print media. Government production units or advertising agencies with experience in social marketing may be enlisted to design nutrition education materials either free of charge or at cost. Song, drama, and art contests may also be held to develop materials. The nutrition organization should coordinate all aspects of the program and should involve field workers in formative evaluation, and in monitoring broadcasts.

Selection of the media mix should depend on the target groups for education, the exposure of each of these groups to the different media, on logical phases, and on media costs. The sequence of themes presented and timing should be coordinated with face-to-face activities. Messages to be communicated by radio spots and through pictorial materials must be carefully broken down into their component elements in order to meet the 15- to 60-second time limits of the spot and the need for simple clarity of visual aids. The media plan should be closely coordinated with predetermined project goals.

Artists and others designing media materials should present messages developed through formative evaluation. Draft materials should be pretested for comprehensibility, emotional appeal, and cultural relevance before they are mass produced.

Pictorial illustrations such as posters are extremely useful in reinforcing face-to-face nutrition education. Even simple or crude drawings or charts will be reliably understood by rural villagers, but only if their meaning is thoroughly explained.

Design factors which improve recognition and acceptance of pictures by groups with little pictorial experience include: realism, achieved by use of block-outs, uncluttered photographs, or realistic drawings; familiarity of objects, clothing styles, or of style of artistic representation; special care in picturing sequences, so that each step has a separate illustration or frame, and each frame is numbered to indicate the order in which the sequence should be read; and correct color associations. Posters and wallcharts intended for illiterate adults should express their message in simple words in addition to pictures, so that school children or adults attending literacy classes can explain them to others.

## D. Adult Literacy

### 1. KEY QUESTIONS

- What advantages do adult literacy programs have as a channel for nutrition education?
- How should nutrition content be introduced into the teaching of literacy?

One appeal of adult literacy programs is that in many countries they reach a larger target audience than other face-to-face infrastructures normally used for teaching nutrition. In Pakistan, for example, it was calculated that 50,000 people were reached by nutrition education through the MCH system in 1976, versus 700,000 through adult literacy programs.

Throughout the 1950s and 1960s, literacy was considered to be an essential starting point for the mechanisms underlying substantive social change (Harman 1974). The consensus opinion was that the teaching of literacy alone did not produce development goals rapidly enough, which led to the formulation in 1965 of the concept of functional literacy (United Nations Educational, Scientific, and Cultural Organization (UNESCO) 1965). This sought to couple literacy instruction with material of functional use to learners. The material, including lessons on food and nutrition, usually was delivered in short pamphlets intended for use in the second phases of literacy programs (the first phase was almost always devoted to the instruction of reading and writing skills, without other content). Tunisia's Petite Encyclopedia des Adultes contains several such nutritional pamphlets as part of a 71-"volume" post-literacy series. Zeitlin's series of three booklets on nutrition and health in Pakistan (1973) was similarly

prepared for the 4th- to 6th-grade reading level. Since literacy teachers have not been proficient in nutrition education, the materials should be introduced as readers, and it is assumed that the materials alone will convey the desired messages.

Such pamphlets may indeed have an impact if, as in Pakistan, they are sold on the open market and are thus available to primary-school graduates and dropouts with a low but functional level of literacy. The commercial demand for booklets of this reading level has been found to be high. However, such pamphlets have not worked within the functional literacy approach, for the simple reason that most adult literacy programs very rarely achieve the second level of instruction. Most adult learners drop out before they become skilled enough to read the prepared materials. A recent survey of UNESCO's World Experimental Literacy Program once again points to the inadequate fashion in which the merger of literacy instruction and any substantive content has been effected (UNESCO 1976).

The fault does not lie with the idea of combining literacy teaching with nutrition education, but with the way in which the combination has been structured. The next logical step, which is to combine subject matter with literacy starting with the ABCs, has been shown to be successful in an experimental program designed and implemented in Thailand (Harman and Vorapipatana 1971), and is also currently being used experimentally in Malaysia, Ethiopia, and the Philippines (Harman 1977). The Thai program has been proved to produce favorable attitude changes (Roy 1972), though the behavioral consequences of these changes have not been investigated. While no systematic evaluations have been conducted of the other experiments, teachers and supervisors report similar success.

The Thai project uses two promising new techniques. The first is to determine the vocabulary words to be used from discussion with the class. A photograph of something provocative or problematic in village life is shown to the group. For the purposes of nutrition education, this could be of a malnourished child pictured beside a healthy child, or it could be of a child obviously eating. Words used spontaneously by the group in discussing the picture are then used to teach the sounds of the letters. The words are then duplicated and given to class members on a learning sheet to be entered into loose-leaf notebooks. The loose-leaf feature of the materials is the second innovation. Instead of receiving a discouragingly long book at the start of classes, a student receives only one lesson at a time and gradually builds a book of lessons already mastered.

A high level of technical expertise and administrative capacity is required to develop the first set of such lessons by integrating appropriate content with the photographs and with the new words, but this set probably could be used by a less experienced teacher working in a similar culture area, particularly if the subject content was adequately taught to the literacy teacher. Some supplementary activities providing the opportunity to learn by guided practice are offered in the Thai program through special interest groups. Such participant learning opportunities may be necessary to insure behavior change (see Section A on nonformal education).

2. SUMMARY:

ADULT LITERACY

Adult literacy programs may reach a larger population than health clinics or other service structures. Previous attempts of functional literacy programs to deliver nutrition information in the second phase of literacy, after learners had mastered independent reading skills, proved unsuccessful because of high dropout rates. Recent experiments incorporating nutrition content into the first stages of learning show promising results, including positive attitude changes. Group activities providing the opportunity to practice nutritional skills should be coordinated with literacy lessons in order to insure behavior change.

## E. Formal Nutrition Education through the Schools

1. KEY QUESTIONS

- What percentage of the target population attend school?
- How should nutrition be taught in primary and secondary schools?
- How can the school lunch be used to teach nutrition?
- How can teaching of nutrition in the school be combined with nonformal education of the community and with delivery of nutrition services?

The wide population coverage of elementary schools makes in-school nutrition education a potentially important means of reaching a major proportion of the world's people. Greater efforts have been made over the past several decades to establish and expand systems of primary schools than any other educational form. Investments in this expansion have grown far in excess of GNP growth in most developing nations, and have resulted in enrollment growth of major proportions; thus, by 1968, 75% of all children in Latin America, 45% in Asia, and 40% in Africa attended primary schools (Zymelman 1973; United Nations 1973). Percentages of low income target group children in school can be expected to be lower, but still substantial.

Within rural primary schools, which cater to members of that population group in which malnutrition is prevalent and nutrition education would be beneficial, one finds two distinct approaches to the introduction of appropriate content. On the one hand, there have been numerous attempts to create systematic nutrition courses as a separate subject area; while on the other hand, there have been efforts to introduce nutrition messages to those subject areas normally included in the curriculum. According to the FAO (1971), "The results of the two systems have not been properly compared by simultaneous evaluation in similar groups, but it would seem a priori, that an uninterrupted educatory process, well developed, would be preferable to a separate subject. Also, it should be borne in mind that most countries cannot overload their curriculum, and even less appoint special teachers for this subject."

In advocating the integrative approach - the most widely accepted and promulgated of the two - the foregoing statement admits that this decision is based on common sense rather than upon any systematic investigation of the issue. Although several programs in which nutrition content has been incorporated into ongoing subject matter are reported in the literature (FAO 1971; WHO 1973), an indication of the effects of such instruction does not exist. It is not, in fact, clear whether the examples cited have advanced beyond the planning phase to actual implementation.

The same posters used for teaching nutrition to mothers in non-formal education programs should be distributed to the primary schools to be used in health class. Food function or food group, hygiene, and sanitation posters, showing the difference between the appearance of well-nourished and malnourished children, and "breast-feeding is best" posters, are all appropriate. Children may also be encouraged to draw their own posters.

If possible, each primary school should have a scale and a tape measure. As is common in schools in industrialized countries, children in arithmetic class should be taught to weigh and measure themselves and to record their measurements, in order to check their own growth and development, to learn weights and measures, and to learn the importance of quantifying growth.

Although it definitely should be conducted in the schools, a main hindrance to the effectiveness of nutrition education of elementary students is that 6- to 15-year-old children are too old for such education to prevent damage to their physical and intellectual development, too young to be ideal agents for influencing the behavior of adults, and frequently too many years removed from their own child bearing to carry over what they learn to their own future behavior. At present, most children do not receive more than four or five years of education, and the dropout rates from first class on may be 50% or more per year (Beira et al. 1972).

Secondary schools usually have a much smaller enrollment than primary schools; they are largely an urban phenomenon and tend to serve a predominantly urban social elite. While this group may not top the list of population segments most in need of nutrition education, it generally also

suffers from faulty weaning practices and mistaken beliefs concerning food and health. Moreover, its behavior is important in setting the example for the lower classes in matters such as bottle-feeding. Secondary school students are close to the age when they will bear their own children. For these reasons, nutrition education concerning the feeding of infants is very important for secondary school girls, who should be taught all of the priority themes, with special stress on the importance and management of breast-feeding and the preparation of nutritious weaning foods from inexpensive local ingredients.

Boys require a similar curriculum (even in societies where women take primary responsibility for child care), because men have an important influence on the eating habits of the family. The boys' curriculum should stress the fact that the infants and preschool children, and pregnant and lactating women, need a proper share of the animal protein foods in order to produce goo brain growth in the child, and boys should be informed that a large share of such foods is not required to insure their physical strength and sexual potency.

2. The School Lunch

School lunch programs, using either local or donated foods, provide an additional opportunity for educating school children about the importance of good nutrition. In the village of Buena Vista, Iloilo, Philippines, primary school children learn by growing in the school gardens all of the foods used to prepare their lunch, which consists mainly of dishes of green vegetables, starchy tubers, and beans, and also of fruits such as papaya. The principal regrets only the relative absence of protein foods and oil, and remembers that the lunch fed to the children when the school was receiving donated Title II foods was of superior nutritional quality.

Children may contribute to or pay for the school lunch, partially or entirely, in a variety of ways: by bringing raw ingredients or cooked rice, working in the school garden, helping with the cooking, or making cash payments. Ideally, the lunch preparation should be used to teach food values and cooking methods. Unfortunately, up until now, very few schools have taken advantage of this opportunity for a practical nutrition lesson.

3. From the School into the Community

One of the most promising methods of teaching nutrition, both at primary and secondary levels is to teach the students to detect malnutrition in their own homes and neighborhoods. In mainland China, one child in each classroom becomes "classroom health aide" and is responsible for first aid, sanitation, and nutrition of class members (Wise 1978). In Bangladesh, senior secondary school students organized into nutrition squads have been trained to identify malnourished children and to assist in nutrition and health education programs (Dillard 1976). In a variety

of countries including Zambia, India, and Colombia, primary or middle school students have been instructed to check the nutritional status of their own younger brothers and sisters, most commonly by means of an arm circumference bracelet or bangle, but sometimes by bringing the children to be weighed. In Kenya, 1400 preschool children have been brought to the school for deworming and for nutrition surveillance. Mothers of these found to be malnourished have received nutrition education. The cost of this program was $2 per child per year (Stephenson et al. 1979; Austin et al. 1978). In Isoya, Nigeria, schoolchildren monitored the growth of their younger siblings and also participated in the preparation of high-protein foods for them (Isoya Rural Development Project 1976). This is a potentially excellent method of teaching the importance of normal child growth and of involving children directly in the process of producing behavioral change and rehabilitating the malnourished. The child who informs his/her mother that a baby sister is malnourished is giving as well as receiving nutrition education.

At the least, parents should be informed in advance that a school-referral of critically malnourished children to the health facilities. Ideally, community involvement should include provision for nonformal education of mothers of children identified by a school program as malnourished. Primary school buildings prove a convenient meeting place for nonformal education and other community activities, as borne out by the HIID survey (Austin et al. 1978) which indicates that approximately 24% of nonformal nutrition education programs make use of school facilities.

4. SUMMARY:

FORMAL NUTRITION EDUCATION THROUGH THE SCHOOLS

Up to half of all children in developing countries enroll in elementary school, thus nutrition education through the schools has wide potential coverage. The same visual materials produced for nonformal education of mothers may be used for teaching in the elementary school. Nutrition probably is best incorporated into other subjects such as health, art, and arithmetic. Schools should have a tape measure and scale so that children can record their own growth. Secondary school students also should be taught nutrition, although they represent an elite minority. School lunch programs should be used for nutrition education by involving children in growing foods for the lunch where possible, planning the meals, and in cooking and hygienic food handling.

Teaching school children to detect malnutrition in their own families and in the community has proved successful. Malnourished preschoolers may be brought to the school to eat

nutrient dense foods prepared by the older children, and for other surveillance activities. School children may also carry food home for their younger siblings. Nonformal education for mothers may be provided through the school. Secondary students may also provide simple nutrition and health surveillance in the community.

## F. Educating the Educators (Health, Agriculture, and Other Professionals)

### 1. KEY QUESTIONS

- What is the quality of nutrition education currently offered in professional training programs?
- What changes in emphasis are required?
- What types of programs and materials are needed?

In some places, such as the Philippines, health professionals have been shown to be a source of nutritional misinformation, about breast-feeding in particular (Burgess 1976). In Canada, the knowledge of public health nurses of nutritional requirements during pregnancy and other periods of the life cycle was found by Schwartz (1976) to be inadequate. A recent survey in the United States by Cyborski (1977) showed that out of 102 medical schools, only 19 offered a required course in nutrition. According to Williams (1973), nutrition courses that are given to doctors, nurses, and other health professionals are basically unsatisfactory because they are institution-based. "Because their entire training takes place in institutions, these workers cannot be expected to know about the needs and resources of various homes, even though it is in the home that nutrition matters."

In addition to improved general education in nutrition, a reversal of priorities in the pediatric training of health workers in developing countries is required. Overt forms of infant malnutrition are a relatively rare occurrence in industrialized countries, and therefore the detection and management of malnutrition do not have priority in the textbooks written for health-worker training in these countries. In the majority of developing countries, by contrast, preschool mortality is numerically the single largest health problem (up to 80% of total annual deaths in many areas) and malnutrition is a causal factor in most of these deaths. Medical training should therefore have a very different focus in the two settings.

Suitable developing country or region-specific textbooks, reference materials, and teaching materials with emphasis on preschool malnutrition and on the management of other major local public health problems, are much needed. Nutrition texts and leaflets for agriculturalists, social

rkers, and other student groups are also required. Figure 20, which pre- nts educational material about nutrition between birth and three years simple graphic form is an example of useful material for professional d paraprofessional field workers. Texts and source materials for middle- vel workers which can either be used or adapted for use in a variety of ttings are available from TALC and from other organizations listed in rksheet 11.

Creation of field training programs that involve medical and ramedical students in national nutrition surveillance, as in Tanzania, d in the management of maternal-child health centers and nutrition rehab- itation centers is important both for training health professionals and r the extra manpower for national health services. If illiterate bare- ot doctors can provide basic primary care after a few weeks of training, dical students are certainly qualified from the beginning of their studies be involved in health care delivery in exchange for government financing their education.

Nutrition education should also be a part of primary-school acher training, and coursesin nutrition and refresher seminars for achers in rural areas should be held at periodic intervals, as has been ne by UNICEF in Pakistan.

Messages that are particularly important to convey to agricul- ral extension workers are: (1) diversion of land for industrial or port crops must not be carried out at the expense of local food produc- on; (2) pulses, legumes, and other high-protein crops must be grown in dition to high-yielding cereal grains (May 1969); and (3) where women e traditionally responsible for a large share of agricultural food pro- ction and are expected to produce the foods for their children, providing dern-sector agricultural extension services exclusively to men is a allocation of resources which may produce a deterioration in nutritional tus. A study in Fada N'Gourma, Upper Volta, for example, has shown that e extension of cash cropping opportunities to men has left women to farm e sorghum fields previously tended by their husbands, in addition to the getable fields on which they rely to feed their children (Hemmings 1978).

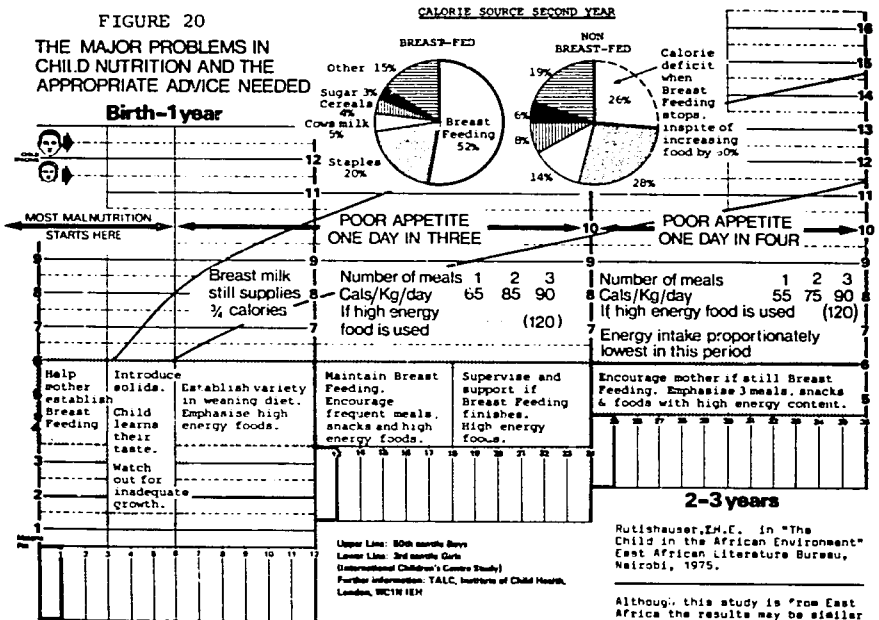
2. SUMMARY:

EDUCATING THE EDUCATORS

The training in nutrition of many health professionals has been found to be inadequate. Health professionals have been a major source of misinformation concerning breast-feeding, in particular. The emphasis of medical training in developing countries should be changed to reflect the importance of malnutrition as a public health problem. Nutrition texts and other teaching materials for worker training at

FIGURE 20

THE MAJOR PROBLEMS IN CHILD NUTRITION AND THE APPROPRIATE ADVICE NEEDED




Rutishauser,I.H.E. in "The Child in the African Environment" East African Literature Bureau, Nairobi, 1975.

Although this study is from East Africa the results may be similar for other areas.

all levels and in a variety of disciplines are required. Texts prepared in one country may be adapted for use elsewhere. Nutrition training in the field should be accomplished by involving trainees in the management and evaluation of ongoing field programs.

Agricultural professionals in particular must be taught not to divert land for export or industrial crops at the expense of food production, to emphasize protein-rich vegetable crops, and to provide extension services to women as well as men, since women frequently are responsible for growing crops used in child feeding.

## G. Educating the Policy-Makers

### 1. KEY QUESTIONS

- Why may policy-makers remain unaware of the importance of malnutrition?
- What ongoing efforts should be made to keep them informed?
- What materials should the individual program prepare for policy-makers?

International and bilateral assistance agencies have expended considerable effort in recent years to communicate the importance of national-level nutrition planning to developing country governments, with the result that the importance of nutrition is acknowledged in many national planning exercises. The seriousness of existing nutritional problems, however, is still not recognized by most high-level planners because, as mentioned earlier, most malnutrition is not visible. A politician untrained in nutrition who is walking through a village can be expected to identify no more than 2% of its malnourished children. High-infant mortality rates and generally low-intellectual performance of peasant farmers are regarded as normal, rather than as outcomes of endemic malnutrition.

Energetic efforts on the part of nutritionists to obtain good press coverage of the results of nutrition surveys and to organize high-level seminars with politicians and planners are important. The most valuable teaching aid for educating influentials is a nutrition rehabilitation center located in a prestigious hospital in the capital city, close to government offices. An influential individual or group should help to arrange for all policy-makers who are involved in planning or funding nutrition-related programs to be given a guided tour by a prestigious nutritionists or medical doctor. Exposure to rural malnutrition and interventions would also be desirable.

The individual nutrition education program should prepare at least two items for distribution to high-level officials and to policy-makers. The first of these is a single-page fact sheet or short brochure describing the program in simple terms, emphasizing its innovative approaches and its successes. This group should not be expected to read lengthy technical reports. A summary sheet, however, can help them to recall basic program information for decision-making purposes. The second item is a more technical description or evaluation such as an annual report which can be publicly distributed.

The program should identify ministerial and policy-level personnel who are invovled or potentially interested in nutrition education activities and should arrange periodic meetings with these individuals. The summary sheet should be distributed routinely at such meetings. The more technical materials should be available as back-up information for technical considerations. Policy-makers should be invited to make site visits to the program's field activities.

2. SUMMARY:

EDUCATING THE POLICY-MAKERS

Despite recent international seminars teaching the importance of nutrition planning, the majority of politicians and high-level planners are not yet aware of the seriousness of malnutrition. The reasons for lack of awareness are that most malnutrition is not immediately visible and that the damage it causes, such as high-infant mortality rates and low-intellectual performance of low-income groups, tends to be taken for granted. Nutritionists must continue to use a variety of public information approaches to reeducate policy-makers. A method which has proven effective is to invite opinion leaders of all groups to observe severe malnutrition in one or more strategically located rehabilitation centers.

The individual nutrition project should arrange meetings, including field visits, with policy-makers interested in nutrition education, and should distribute a single-page program description. At least one project paper or technical report should be available to provide back-up information.

## IV. THE INTERVENTION DESIGN INVENTORY

An important step in planning nutrition education consists of conducting an inventory of forms that already exist and of analyzing their approximate strengths and weaknesses. Worksheets 12a and 12b provide a format for summarizing the findings of informal inquiries into existing nutrition education activities, so as to make visible at a glance areas of strength and areas of weakness requiring special emphasis in new program planning. These worksheets are organized in three dimensions: vertical and horizontal organizational structures, and face-to-face versus mass media within each structure. A maximalist approach requires suitable strength in each dimension. However, because some agencies have a more peripheral involvement in nutrition than others, a lower level of importance is attached in the worksheet to activities in these agencies.

WORKSHEET 12a

INTERVENTION DESIGN INVENTORY

SYMBOLS: FF-face-to-face/RC-rehabilitation
SEM-seminars/center
RP-reports/MM-mass media
CL-classes/TB-textbooks
FST-field supervisory training
DM-diffusion media (leaflets, pictures, comics, photonovels)

INSTRUCTIONS: Fill in each box with a number from 0-10 indicating the current strengths of the sector (0=none, or no services, or no materials and 10=excellent quality performance and materials).

| Service Structure | Policy-Makers | | | | | Professional Worker Training | | | | | Extension Worker Training | | | | | Community Worker Training | | | | | Opinion Leaders | | | | Mothers/Pregnant Lactating | | | | | | Other Groups with Special Nutritional Problems | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | FF | SEM | RP | MM | RC | CL | TB | FST | MM | RC | CL | TB | FST | MM | RC | FF | TB | FST | MM | DM | RC | FF | MM | DM | RC | FF | Group | One-One | MM | DM | RC | FF | MM | DM |
| Nutrition (if separate) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Health | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Family Planning | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Agriculture | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Rural Development (if separate) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Education Schools | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Education Adult | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Social Welfare | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Women's Programs | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Day Care/ Preschool Education | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Community Development | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Youth Programs | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Religious or Voluntary Groups | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

INTERVENTION DESIGN INVENTORY

SYMBOLS: FF-face-to-face/PC-rehabilitation
SEM-seminars/center
MP-reports/MM-mass media
CL-classes/TB-textbooks
FST-field supervisory training
DM-diffusion media (leaflets, pictures, posters, photonovels)

INSTRUCTIONS: Fill in each box with a number from 0-10 indicating the urgency of further efforts in the sector designated (10 most urgent). Note that nutrition activities in health should have higher priority than in youth programs, for example.

| Service Structure | Policy-Makers | | | | | | Professional Worker Training | | | | | | Extension Worker Training | | | | | | Community Worker Training | | | | | | Opinion Leaders | | | | | | Mothers/Pregnant Lactating | | | | | | Other Groups with Special Nutritional Problems | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | FF | SEM | MP | MM | DM | RC | FF | CL | FST | MP | DM | RC | FF | CL | TB | FST | MP | DM | RC | FF | TB | FST | MP | DM | RC | FF | DM | MP | DM | RC | FF | Group | One-One | MP | DM | RC | FF | MP | DM |
| Nutrition (if separate) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Health | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Family Planning | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Agriculture | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Rural Development (if separate) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Education Schools | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Education Adult | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Social Welfare | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Women's Programs | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Day Care/ Preschool Education | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Community Development | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Youth Programs | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Religious or Voluntary Groups | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

# CHAPTER THREE

# INTERVENTION EVALUATION*

## I. THE EFFECTIVENESS OF NUTRITION EDUCATION IN IMPROVING NUTRITIONAL STATUS AT REASONABLE COST

This chapter first reviews the documented cost-effectiveness of nutrition education programs, summarizes the design factors promoting cost-effectiveness, and then discusses in detail the technical aspects of evaluation that are applicable to nutrition education.

### A. KEY QUESTIONS

- How can effectiveness be estimated from existing data?
- What conclusions can we draw concerning the cost-effectivness of nutrition education?
- What major design parameters influence cost-effectiveness?

### B. The Evidence Concerning Cost-Effectiveness

Very few evaluations of nutrition education programs have looked at their effectiveness in improving the nutritional status of preschoolers, although the literature is dotted with individual anecdotes of improvement. Similarly, very few comparative cost data exist for nutrition education programs. Fewer than one-third of the nutrition projects surveyed by HIID were able to hazard a rough estimate of total program costs per recipient per year. The costs of the nutrition education component of integrated programs are rarely separated from total costs.

Many nutrition educators working in developing countries have personally assisted in the rehabilitation process, which is straightforward and dramatic. The mother is convinced by someone she trusts to try a new feeding regime for the baby based on foods she can afford; the baby then starts to thrive. The question is not whether such change is possible, but the degree to which it can be accomplished by large-scale nutrition education programs at reasonable cost.

All of the evidence we have that the nutrition education component of large-scale programs is effective in improving nutritional status of weanling children is indirect. The impact of nutrition education has rarely, if ever, been separated from the impact of other services, such as

*This chapter was written by Marian F. Zeitlin.

immunization, curative health care, or feeding, which were provided simultaneously. Nutrition education appears to work most effectively in periods when food production and resource distribution favor the nutritional improvement of lower-income groups, as has occurred in socialist countries, which makes it difficult to separate educational from overall development effects. Nevertheless, the indirect evidence is convincing.

When the nutritional status of preschoolers improves dramatically compared to the population as a whole or compared to a baseline, with an intervention that does not increase real income, and at a time when real income is not increasing, it is reasonable to assume that nutrition education has caused the improvement, particularly when changes in knowledge, attitudes, and behavior have also occurred. Health care alone cannot normalize nutritional status if dietary intake remains insufficient. Similarly, when nutritional status remains at a higher level than is expected for the population generally after participation in short-term educational activities, nutrition education can be assumed to have caused the improvement.

The eight-year-old program previously described in Yako, Upper Volta, had reduced the incidence of severe malnutrition in the district as detected by vaccination teams using arm circumference strips to 0.2% by 1977, compared to national prevalence estimates ranging from 3 to 15%. Ninety-four percent of mothers of 6- to 24-month-old infants in three Yako villages surveyed by the writer were able to give correct recipes for a weaning food taught by the program, and 60% had prepared this food for their children during the 24 hours preceding the survey. None of the infants were severely malnourished, and only 12% were moderately malnourished (Zeitlin 1978).

The low cost to the central government of the Yako community-level worker program in Upper Volta, which provides monthly nutrition education classes and one-to-one home monitoring at a cost of only $0.05 per recipient mother per year, is an indication that face-to-face nutrition education can be delivered inexpensively. Marginal costs of this total community-level health and nutrition program were $0.29 per year per beneficiary (Zeitlin 1979). A detailed example of cost-effectiveness analysis of this program is presented in a technical appendix to the volume on formulated foods.

Similar low costs for nutrition education were found in Malawi and Cuba. Calculating half of staff salaries and the cost of weight charts as applicable to nutrition education in Malawi under-5 clinics gave an estimated cost of $0.02 per child per visit (Cole-King 1976). Radio nutrition education has similarly been delivered in Cuba at a cost of only $0.07 per recipient per year, and cost of radio and TV together was $0.39 per recipient per year (Weil 1972).

In Papua New Guinnea over the past 20 years, higher cost MCH services have succeeded in significantly improving the nutritional status of preschoolers at the same time that food availability was dramatically

reduced by the introduction of cash crops (Lambert 1975). Papuan health authorities believe this improvement to have been produced largely by weaning practices taught by the health services. In view of the drop in food production, it appears unlikely that health care alone, without deliberate redistribution of family foods, could have brought about an increase in nutritional status.

Table 10a, showing average food intakes of adults, and 10b, nutritional status of children in 1956 and 1976, present the changes that were measured. Table 10c shows further improvements occurring in the Eastern Highlands Province from 1975 to 1977. The amount being spent for this transformation is $12 to $15 per year per child (Aitken 1978) or about five times the entire health budget of most developing countries.

A study of nine Ghanaian preschool clinics, presented in Chapter Four of the volume in this series on Integrated Nutrition Programs found two nutritional knowledge variables to be highly correlated with weight for age of 6- to 24-month-old infants, after the effects of socioeconomic factors were controlled. The first variable was whether or not the mother named a high-quality protein source in response to the question: What foods promote the growth of infants? The second was whether or not she mentioned fluids in response to a question concerning diet changes during episodes of infant diarrhea. Insofar as both desired responses were taught by the clinic educators and neither was part of the traditional belief system in Ghana, it was presumed that nutrition education given by the clinics had a significant impact on nutritional status. Assuming that one half of staff time was spent on nutrition education, cost of education per recipient per year was $2.80. The similarly calculated cost in Lesotho preschool clinics was $2.48.

A study of infant-feeding practices in the Boston area in the United States (Zeitlin 1977) found differences in feeding and in nutritional status between groups of infants attending different pediatric offices. Mothers visiting pediatricians who encouraged the introduction of solid foods by three months were behaving quite differently from those whose pediatricians recommended introduction of solids by one month. Children whose mothers were advised by the latter pediatricians had a greater incidence of obesity than those attended by the former group. Mothers attending the lower cost offices that recommended early solids and did not screen for obesity received about half the amount of staff time for individual consultation as mothers visiting the higher cost pediatricians. In both cases the cost of staff time was between $1 and $2 per minute.

The findings (reported earlier) that mean nutritional status in weight for age of graduates of mothercraft on-site feeding programs in the Philippines remained steady at about 80% (higher than the national average) in the four years following the program (Asia Research Organization 1976) provides evidence that nutrition educational gains achieved during the program were maintained over time by improved feeding practices. Similarly, the finding that younger siblings of children rehabilitated in Haiti had a lower than expected incidence of severe malnutrition (Webb et al. 1975) implies that mothers used the weaning practices they had learned at the rehabilitation centers with their subsequent infants. Costs of this program were estimated to be $6.82 per child protected (King et al. 1975).

TABLE 10a

MEAN PROTEIN AND ENERGY INTAKES IN CHIMBU DISTRICT, PAPUA NEW GUINEA, IN 1956 and 1975

| Age Group | Energy Intake Mega Joules (Calories) | | Protein Intake (Grams) | |
|---|---|---|---|---|
| | 1956 | 1975 | 1956 | 1975 |
| Adult Males | 10.44(2485) | 6.08 (1450) | 37.2 | 23.6 |
| Adult Females | 7.30(1740) | 4.44 (1060) | 27.8 | 19.2 |
| 15 - 19 years | 7.30(1735) | 6.22 (1480) | 25.9 | 22.7 |
| 10 - 14 years | 5.64(1340) | 4.22 (1005) | 22.4 | 16.8 |
| 5 - 9 years | 5.13(1220) | 4.17 (990) | 24.3 | 15.2 |
| 3 - 4 years | 3.85 (920) | 2.80 (670) | 16.6 | 11.5 |
| 1 - 2 years* | 3.06 (730) | 3.41 (830) | 10.8 | 15.9 |

* Includes 450 g of breast milk per day

Source: Lambert 1975.

TABLE 10b

MEAN WEIGHTS OF CHILDREN IN CHIMBU DISTRICT, PAPUA NEW GUINEA, 0 to 5 YEARS, SEXES COMBINED

| Age (months) | Number | | | Weight(kg) (Standard Deviation) | | | t 1956 1975 (1) |
|---|---|---|---|---|---|---|---|
| | 1956 | 1975(1) | 1975(2) | 1956 | 1975(1) | 1975(2) | |
| 0-5 | 75 | 15 | 49 | 5.0 (0.85) | $6.4^{+++}$ (1.14) | 6.3 (1.35) | 4.75 |
| 6-11 | 61 | 16 | 24 | 7.1 (1.01) | $8.3^{+++}$ (1.14) | 8.7 (1.15) | 4.21 |
| 12-23 | 24 | 40 | 43 | 8.7 (1.33) | $9.4^{+}$ (1.18) | 9.6 (1.16) | 2.5 |
| 24 35 | 28 | 33 | 32 | 10.1 (1.02) | $11.6^{+++}$ (1.43) | 12.0 (1.51) | 7.58 |
| 36-47 | 35 | 15 | 15 | 11.6 (1.32) | $13.6^{+++}$ (1.39) | 14.0 (1.69) | 5.37 |
| 48-59 | 35 | 21 | 14 | 14.0 (1.40) | $15.5^{+++}$ (1.77) | 16.3 (1.61) | 3.89 |

+ $P < 0.05$ +++ $P < 0.001$ 75 (1) Village children

75 (2) Town children

Source: Lambert 1975.

TABLE 10c

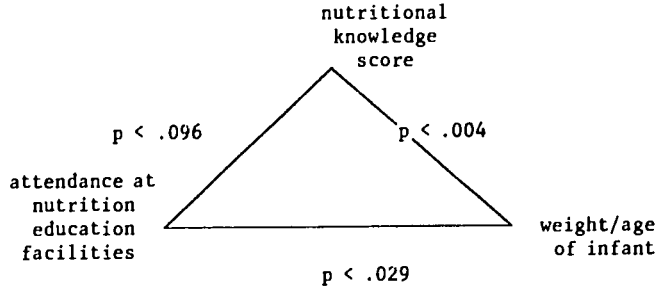
PERCENTAGES OF CHILDREN ATTENDING MCH CLINIC
BELOW 80% WEIGHT FOR AGE
IN EASTERN HIGHLAND PROVINCE PAPUA NEW GUINEA

| | Jan. '75 | N | Jan. '77 | N |
|---|---|---|---|---|
| Total | 27% | 3,055 | 17% | 19,497 |
| Goroko District | 23% | 1,170 | 9% | 4,486 |
| Henganofi District | 29% | 332 | 20% | 2,505 |
| Kainantu District | 29% | 1,398 | 22% | 10,600 |
| Lufa District | 26% | 155 | 17% | 1,906 |

Source: Lambert 1977, unpublished.

Improvements significantly correlated to nutrition education activities were found in the Philippines, in the analysis of the case study survey presented in Chapter Four, although the effects of health care were not removed from these calculations. Nutritional status of the 99 6- to 15-month-old infants examined was positively correlated with the number of health and nutrition programs attended and to the mothers' nutritional knowledge, after controlling for the effects of socioeconomic factors. Infants whose mothers had participated in either no programs or one program only were found to average close to the borderline of second-degree malnutrition, while those having contact with two or more programs averaged low normal in weight for age.

The survey collected a nutritional knowledge score which, also after controlling for socioeconomic correlates (such as education, income, and occupation) was found to be significantly related to the nutritional status of the infant, number of health/nutrition programs attended, and number of knowledge sources mentioned. Although not subjected to path analysis, the relationships summarized in the following diagram (showing significance levels of partial correlations suggest primary effects of nutrition education on nutritional status.




In the absence of nutrition education activities, a positive relationship between results on a nutritional knowledge test given to mothers and nutrient intake of their infants was not found by Walia and Gambhir (1975), who test mothers in a slum area of Chandigarh, India. They found that family feeding habits rather than knowledge of nutrition differentiated between households of well and malnourished infants. Srikantia and Sastry (1972), on the other hand, found that the knowledge and belief scores and the performance on an intelligence test of mothers of children with kwashiorkor were significantly poorer than those of mothers whose children had non-nutritional disorders. The many possible factors involved should warn researchers agains the dangers of oversimplification.

(1) Low health and nutrition budgets and typical allocations of only 3% to 6% of those budgets for prenatal and child care (Fugelsang 1973), (2) population growth that outstrips the growth of health/nutrition programs, and (3) cultural and class differences separating those giving from those receiving nutrition education are contributing factors that explain why the impact of nutrition education to date has not been more substantial in numerous areas of the world.

### 3. Design Factors Influencing the Cost-Effectiveness of Nutrition Education

Possible design parameters and their relative effectiveness were the subject of Chapter Three. Insufficient evaluation data exist to attach comparative cost-effectiveness values to these design elements. Moreover, even under ideal research conditions a large number of interactions between different design elements and aspects of the environment would make quantitative generalizations difficult. The cumulative evidence, however, does support a few basic conclusions concerning design. These are: (1) When the themes being taught by nutrition education oppose the interests of commercial sales, as in the case of bottle feeding, nutrition education will not be able to succeed among groups who need it most until unconstructive, commercial promotion has been eliminated by legislation (this includes promotion through health professionals); (2) Community-level programs operated and funded at least in part by the community can be many times more cost-effective than centrally operated programs; (3) Presentation of the same themes simulataneously via face-to-face programs and the mass media can be more than twice as effective as using either channel alone; and (4) nutrition education will be most effective when the effort is made to educate all of the vertical levels involved, from policy-makers down to the community.

## D. SUMMARY: THE EFFECTIVENESS OF NUTRITION EDUCATION IN IMPROVING NUTRITIONAL STATUS AT REASONABLE COST

Most of the evidence that nutrition education improves nutritional status is indirect because the impact of nutrition education is difficult to separate from that of other services. However, in several cases in which significant nutritional improvement of preschoolers has occurred and has been maintained without increases in real income, nutrition education does appear to be the cause. Such education has been provided at low cost. Exposure to nutrition education, nutritional knowledge, and weight status also have been found to be significantly intercorrelated after controlling for socioeconomic factors. Health care alone probably can be ruled out as the main cause of improvement in these cases because there is no reason to believe that the differences in weight between the intervened and the baseline or control could be maintained without increased intake of supplementary foods.

Major design characteristics associated with cost-effective nutrition education are: (1) absence of commercial promotion that contradicts nutrition education themes; (2) community-level programs; (3) combination of face-to-face and mass-media channels; and (4) education of all the vertical levels involved in nutrition policy and implementation.

## II. TECHNICAL CONSIDERATIONS IN THE EVALUATION OF NUTRITION EDUCATION

### A. The Evaluation Process

#### 1. KEY QUESTIONS

- What is evaluation?
- What procedure should be used to plan for evaluation?
- What are the main types of evaluation and their characteristics?

Evaluation has been defined as a "process for examining certain objects and events in the light of specified value standards for the purpose of making adaptive decisions (Paulson, 1967). Adaptive decisions are necessary at all stages of planning and operating a nutrition intervention. Moreover, different types of decisions must be made by different groups at different levels and for different programs. Figure 21 schematizes the nutrition program decision-makers by levels and by the types of information that they require (Zeitlin and Austin 1980). Time schedules for varying evaluation activities also are suggested.

Because each nutrition education program is unique and because evaluation can rapidly become expensive, an evaluation planning exercise is recommended for the early phases of each project. Expert technical assistance should be used to help define the specific user groups, the minimum amount of data required for decision-making,and the most economical ways to collect and analyze this information on a continuing basis. When funders and project operators reach a well-defined written understanding concerning the nature of evaluation requirements, both sides are protected against an eventual judgment on the funder's side that the implementing agency has defaulted on its contractual agreements. The evaluation plan formulated in the early stages of the project should be subject to mid-course corrections, which should be discussed with the funders or planners.

Generally speaking, evaluations conducted for funding and planning agencies are referred to as summative, or comprehensive. These are presented above the middle horizontal line in Figure 19. The word "evaluation" frequently is used to refer to evaluations of this kind. Most activities that provide information for program operations, presented below the line, fall into the category of formative evaluation of program design elements or of management or information feedback systems. These two levels of evaluation require separate activities with separate scheduling, although they collect many of the same categories of information. (This distinction between levels is useful but is not the only manner in which evaluation can be viewed. For example, summative evaluation at each of the levels B through G in Figure 19 can be considered to provide formative information for the levels above. In this regard, evaluation is a procedure with a fractal structure.)

FIGURE 11

NUTRITION PROGRAM EVALUATION USER INFORMATION NEEDS INVENTORY

| Level | Evaluation Users | Adaptive Decisions | Types of Nutrition Information Required | Form of Data Collection and Preparation | Schedule |
|---|---|---|---|---|---|
| International or Bilateral Agency | A International Assistance Agencies | A* Rankings of countries by need. | A* Malnutrition prevalence by country. | Sample surveys. | Every 3-10 years/country. |
| National/Regional Planning Bodies | B Planners/Funders | A Ranking of development<br>B needs and ranking of cost-effectiveness of nutrition programs relative to development needs. | A Development benefits to be<br>B gained from investment in nutrition relative to other sectors, synergies, etc. | Intersectoral analyses of evaluation results of related development activities measured against development needs. | Every 1-5 years |
| National/Regional Ministries of Health, Agriculture etc., Nutrition Institutes | C Sectoral Policy Makers/Administrators | A Ranking cost-effective-<br>B ness of nutrition programs<br>C relative to nutritional needs/Determining optimal mix of nutrition strategies together with other sectoral activities/ Making administrative adaptations to seasonal fluctuations in need. | A In-depth cost-effectiveness<br>B analysis and evaluation of<br>C program impact related to project goals, design, and operation and to socio-economic, behavioral and environmental factors. | Sample survey plus longitudinal program records. Base line and control group and computerized analysis, if financially feasible. | Every 3-10 year/program. |
| Program Headquarters | D Program Administrators | D Determining optimal mix of program activities and goods and services provided to recipients/Day-to-day supervisory decisions. | A Annual reports of operations<br>B and of nutritional status<br>C<br>C Malnutrition prevalence by region by season. | Report of review teams. Program records, weight chart summaries by hand tabulation.<br>Master weight charts. | Annually.<br>Quarterly. |
| Field Offices | E Program Administrators Field Workers | D Determining most effec-<br>E tive use of time and resources/Supervisory decisions. | D Staff reports, discussions, regular conversations with field workers and beneficiaries. Accounting measures of delivery effectiveness, nutrition status records, performance of individual workers and activities. | Scheduled meetings, interviews and site visits, refresher seminars, accounting records, weight chart records, written reports, dietary surveys, planning sessions. | Quarterly to daily. |
| Community | F Community Level Workers | D Determining most effec-<br>E tive time and resource<br>F use and forms of interaction. | D Meetings and discussions<br>E between community-level and<br>F higher level program staff to determine response to programming efforts, growth chart records. | Scheduled meetings, interviews and site visits, weight charts. | Monthly to daily. |
| Community | F Beneficiaries | D Deciding best ways of<br>E using opportunities,<br>F information and goods<br>G provided by the program. | D Discussion with community<br>E level workers, nutritional<br>F status records, occasional<br>G discussion with higher program staff. | Scheduled meetings, informal home visits, growth charts. | Monthly to daily. |

Universities, Research Institutes, Researchers, and Technical Experts

* User groups are indicated by letters beside the decision and information columns

2. Summative or Comprehensive Evaluation

Funding agencies have to answer the following summative questions:

(1) Whether to continue to fund a given project.

(2) Whether to continue to channel funds through a particular government agency or contracting firm.

(3) Whether to continue funding a variety of different approaches to solving the problems of malnutrition.

(4) Whether to continue to fund nutrition as a priority area of development intervention in a given country or region.

(5) Whether to continue funding nutrition education in a particular country or region.

Although it may seem unreasonable to ask the individual nutrition education program to provide answers to questions 3 through 5, these are more important to the development process than 1 and 2. Evidence on which to base these policy decisions must be derived from evaluations of nutrition interventions and from nutrition surveys. If good evaluations are not available, the decisions will be made on the basis of speculation and personal opinion.

Hornik (1978) has phrased question 3 in a form that clarifies the range of information for ongoing planning purposes that the funding/planning agency needs to derive from the experience of each individual project. The question is: "Will a class of treatments similar to this one - implemented in a range of settings and maintained over a range of times - produce a set of desirable effects (and not a set of undesirable effects) at an acceptable cost?"

The answers to this question require a comprehensive evaluation rather than a summative outcome of the form: either yes, the program improved nutritional status; or no, the program did not improve nutritional status.

For this reason good evaluations frequently involve one or more sample survey exercises that look at a wide range of factors. These include variation in program design elements (a class of treatments similar to this one); administrative, geographical, agricultural and demographic factors (implemented in a range of settings); a longitudinal measure (over a range of times); sex, age, socioeconomic and behavioral variables (for a range of potential participants); and a range of outcome effects, and costs. Process analyses based on less structured interviews and observations are essential for interpreting the findings of a survey exercise and are sufficient for evaluating projects such as training programs that have not provided consistent treatment to large populations. Process analyses may be written up as review team reports or in more formal case study format.

The desire to measure the effects and costs of a single program in isolation, uncontaminated by exposure to other programs, should be balanced against the planners' need to understand the total picture. Funding and planning agencies need to know as much possible about all programs available, singly and in combination, in a range of natural settings. As pointed out by Hornik (1978) from the funder's point of view, it may be desirable to evaluate more than one intervention in the same exercise in order to be able to make comparisons and projections based on the same indicators and to reduce evaluation costs. When a number of educational programs are studied together and when some of the participants are exposed to several programs, statistical methods may be used to separate the effects of each program in the analysis. Although precision may be lost in measurement of individual effects, this precision may be less useful to the planner than the broader assessment.

3. Information for Program Operations

a. Timing of the Comprehensive Exercise to be Useful for Program Operations

Whether or not the comprehensive evaluation is useful for program operations depends on the duration and flexibility of the program. The comprehensive evaluations of projects of 1 to 3 years duration, for example, generally come too late to be useful in modifying program operations (Hornik 1978). These evaluations are more useful to the next project down the line. Ongoing projects may not have the flexibility, for political reasons, to change program design in response to comprehensive evaluation results.. In the ideal case, the project being evaluated is integrated with the provision of basic services and has ongoing funding that will be re-allocated periodically in response to evaluation. There is no theoretical reason, however, why evaluations of shorter programs cannot be planned to serve both for mid-course modification of project operations and to provide comprehensive and summative information for funding agencies. Methods for achieving both goals simultaneously are suggested in this section.

To the extent that the nutrition education project can afford to collect baseline information, this should serve both for planning project operations and for summative evaluation. Thus, if a comprehensive baseline survey is to be conducted at all, it should be scheduled several months before the production of mass media materials, for example, so that the results can be analyzed and used in project design. If the project has little lead time and must produce materials to meet a deadline that does not permit prior analysis of a comprehenisve survey, a major survey exercise should not be scheduled just before the campaign opens. This exercise will fall between the cracks - too late to be used for planning and too early for the large amounts of information that it contains to be useful for mid-course correction.

In this case, unless funding is generous, it may be most useful to wait and to conduct a comprehensive survey three or four months after the beginning of the project. This survey of households who have and have

not been reached by the program should then be rapidly and thoroughly analyzed, and findings should be applied to mid-course corrections. The majority of questions asked in any large survey only need to be asked once in the lifetime of the project because they turn out in the analysis to be unrelated to program impact, although they may be of interest in describing the population. Additional survey activities at the end of the project or at periodic subsequent stages can therefore be much simpler than the initial comprehensive exercise.

b. Formative Evaluation of Message Content and Materials Pretesting

The formative evaluation and pretesting procedures described in Chapter Two must be an ongoing process in order to keep fresh media messages and materials coming down the supply pipeline. This process should be combined with some evaluation of response to current messages and materials. Short feedback cycles attempting to incorporate feedback from all radio messages into the creation of new message content were found workable in a radio-mathematics program in primary schools so long as a high level of funding and expertise were available (McAnany, 1979) but were judged too intensive and intrusive for long-term use.

If a sufficient number of themes, messages and materials are developed from each formative evaluation field exercise, it should be possible to pace ongoing formative evaluation in sufficiently long feedback cycles that different themes, such as breast-feeding and diarrheal infection, for example, can be reviewed in turn by a limited number of expert staff working together with field staff in a variety of locations. Some of this investigation may be done in tracking wave format (see Section II.B.2.f.).

c. Management Information Systems

Much of the information recorded on a regular basis falls into the category of management or accounting. This will include expenditures, materials distributed, enrollment, attendance, numbers and locations of nutrition education talks, home visits, records of broadcast schedules, themes of messages presented, minutes of staff meetings, numbers of radio sets broken, numbers of home gardens planted, and so on depending on the focus of the program. If the program is health-related, field staff also should keep weight charts which may have printed on them space for recording morbidity, breast-feeding, supplementary feeding, and family planning, they should also keep birth and death records in the community.

Illiterate community-level workers have been able to dispense medicines by picture from color-coded containers and to record amounts dispensed with x's under small pictorial representations of eyes, ears, mosquitos, and persons with wounds, diarrhea, and headache, for example, in Upper Volta (Lemasson 1978). They may also be able to keep circumference growth charts (Zeitlin et al. in press).

To the extent that this routinely recorded information is reliable and complete, it can be used as the basis for comprehensive evaluation and can greatly reduce the amount of additional effort required for data gathering. The information's main purpose, though, is to maintain the delivery of educational services in response to need.

Management and supervisory skills cannot be assumed. In cultures with hierarchichal social structures and well-defined procedures there may not have been a need before the modern era to develop skills for discussion and feedback between decision-makers and those working under their supervision. Basic management skills, such as how to run a committee meeting, are not taught in some developing country school systems. For these reasons local management experts should be consulted if possible during the evaluation design exercise to determine supervisory, record keeping, and other feedback methods appropriate for the project and how these methods should be taught to project staff.

d. Participant Evaluation

Whenever learning experiences are structured to literate participants, it may be useful to request these participants to fill in an evaluation form at the end of the learning cycle. Such a cycle may range from several days, for a seminar on mass media techniques, for example, to several months for a course to literate mothers on child care and home economics. The form should ask the participants to rate the usefulness of the experience; to state what portions of the experience they found most helpful, and why; what portions or units were least interesting and why; and what additional topics or experiences they wished to see included.

## 4. SUMMARY:

## THE EVALUATION PROCESS

Evaluation activities measure the program and its components against specified objectives in order to provide information for decision making to two main user groups: funding and planning agencies, and program operators. Each project should engage expert assistance to design a cost evaluation plan that satisfies its own and its funding and planning agencies' information needs.

Summative or comprehensive evaluation for funding agencies is designed not only to judge the individual project's success but to provide information concerning the potential feasibility and cost effectiveness of a range of similar programming initiatives. For this reason review team reports, sample surveys, and case studies prepared for summative evaluation should examine administrative, environmental, socioeconomic and cultural factors in addition to cost effectiveness.

Summative evaluation of programs that provide consistent treatment to large populations should ideally involve a comprehensive sample survey. Computerized analysis of this survey can identify variables that are correlated to project outcome, so that the majority of nonoutcome-related descriptive variables may be eliminated from subsequent small-scale survey rounds or other information gathering. If the comprehensive survey is to function as a baseline, it should be conducted early enough to be used for project planning. If an early baseline exercise cannot be scheduled, a comprehensive survey during the early months of implementation is desirable from both formative and summative points of view.

Most activities that provide information for program operations fall into the category of formative evaluation of program design elements or of management or information feedback systems. Participant evaluation forms are useful for seminars, classroom teaching, and other learning activities involving literate groups.

B. Technical Methods and Requirements

1. KEY QUESTIONS

- How should costs be calculated?
- What are the effectiveness indicators?
- How should these indicators be measured?
- What are the intervening variables and how should they be measured?
- Should evaluation be cross-sectional or longitudinal?
- Who should conduct evaluation?

Nutrition education generally is considered within the framework of a broader evaluation because education usually is one component in a package of intergrated services.

Evaluators of an integrated program may not consider it worth the effort to break out the cost effectiveness of the education component because this involves gathering additional information or speculating concerning the use of staff time, and because the quality of nutrition

education given varies greatly from one field worker to another. In reality, the converse is true. When money and effort are spent to gather cost and effectiveness data for the program as a whole the marginal effort required to analyze the nutrition education component is small compared to the amount of valuable information gained from the analysis.

Techniques for calculating costs and for estimating effectiveness will be essentially the same whether the exercise is independent or part of a more general evaluation. Similarly the majority of techniques will be applied both in comprehensive evaluations for planning agencies and in smaller scale feedback and evaluation activities designed to assist program operations.

Imperfect data should not discourage cost-effectiveness estimation. Costs and effectiveness indicators may both have to be presented as ranges, from lowest to highest, where different project locations have different service mixes or are achieving a range of results for a range of costs. In the case of costs, it generally is possible to estimate a range, using market prices and limited program records, where it is not possible to reconstruct actual expenditures or time use. Knowledge of the range may be as useful for planning purposes as knowledge of average values.

## 2. How to Calculate Costs

The costs of the nutrition education component of integrated programs are difficult to estimate theoretically for a number of reasons (e.g., mothers frequently receive medical treatment for their infants and dietary advice in the same 10-minute visit). Existing cost analyses rarely take into account program planning and administration, materials preparation, and the value of alternate time uses of nutrition educators and target group members. The indirect effects of nutrition education on nontarget-group members and its effects in producing permanent or long-term changes in dietary behavior are difficult to estimate.

The start-up costs of nutrition education which initiates behavior change will be higher than the recurring costs which reinforce that change. To the extent that the change is effective, it may benefit all the children in a family over time. Thus, the cost per child benefited will be reduced. Benefits increase while costs decrease. Evaluation must therefore look at costs and impact over a multiyear period. This does not imply that nutrition education ever will enter a maintenance phase where no new messages are introduced. Scientific research on the relationships between nutrition, health, and child development will continue to generate new messages. After a catch-up phase, during which major dysfunctional practices are modified, however, the rate of change may be reduced and the channels for transmitting new information should have been established.

Costs can be collected relatively independently of the rest of an evaluation exercise but will be meaningless without effectiveness indicators. Costs of reaching target individuals with an educational message, for example, are very different from costs of producing behavior

change and from costs of producing change in nutritional status (see cost-effectiveness section). In the case of the Manoff mass media program in the Philippines, costs of creating are very different from costs of producing behavior change and from costs of producing change in nutrition status (see cost-effectiveness section). In the case of the Manoff mass media program in the Philippines, for example, cost of creating awareness in target families of a message to enrich infants' rice porridge with oil, vegetables, and fish was $2.06 per family. Cost of producing favorable attitude change was about $0.90 to $2.80 per family, depending on number of attitudes used in the calculation. But cost of producing behavior change ranged from $15 to $29 per infant, depending on behaviors included in the denominator (Cooke and Romweber 1977a).

The main costs to be calculated in nutrition education are for time, materials, travel, distribution, and broadcasting. Buildings and other physical facilities need not be included in the cost calculation unless nutrition education was one of the expressed reasons for which they were constructed or are being maintained. For cost-effectiveness evaluation each cost element must be calculated at all applicable vertical levels, from planning agency to the field. In the case of an integrated program the marginal value of each cost category which should be attributed to nutrition education may be calculated by multiplying the total cost by the ratio of time spent in nutrition education over total time or nutrition education content over total content.

When component costs can only be stated in terms of a range, from a minimum of $1 to a maximum of $8 per clinic per year, for example, the difference between total costs calculated using minimum versus maximum values will indicate the sensitivity of program costs to changes in each category considered.

Time poses costing problems because the calculation should in theory adjust the monetary value of time spent in nutrition education activities by considering the opportunity costs of alternative time use. What this means is that the time a mother spends participating in educational activities should be assigned a value equal to the amount she could earn by using this time differently. Similarly the cost of the time an administrator spends in supervising the program should be increased to take into account the loss to the program or to society incurred by this particular investment of time as opposed to some other use such as providing curative health care for example.

Careful estimation of the opportunity costs of time use requires attaching a monetary value to the benefits to society over time of alternative uses. This procedure becomes highly hypothetical and involves arbitrary judgments concerning the value of human life. Therefore, in practice, the opportunity costs of alternate time use should be considered in each case, but should be entered into a cost-effectiveness calculation or formally reported only if (a) such use has an obvious monetary value, as when a mother must actually lose two hours' worth of cash income in order to attend a clinic, or (b) when alternate time use

has an obvious value to society, as when the same understaffed planning body is requested to consider nutrition education as opposed to agricultural policy, for example.

Time for the following activities should be considered in the calculation: program planning, administration, and evaluation; staff training at all levels; materials preparation and dissemination; and staff, broadcast, and learner time for communication to all segments of the target group. When several activities are carried out more or less simultaneously, the marginal value of the amount of time given specifically to nutrition education should be estimated and may be stated in terms of a range, from a minimum of one hour to a maximum of seven hours a week, for example.

3. Estimation of Effectiveness

a. Need for Technical Assistance

Informal review and evaluation techniques, such as group discussion, for example, may be relatively simple to learn and to apply. It may still be useful to teach these skills in seminar format (Odenyo 1977). Survey evaluations and growth monitoring of groups over time are based on statistical procedures. Just as a project should consult an architect before constructing a building, so it should consult a statistician or person experienced in statistical methods for help in designing evaluation procedures. The definition of field methods for collecting anthropometric, dietary, and attitudinal data for the evaluation of nutrition education similarly requires technical consultation with professional nutritionists and social scientists or market researchers.

b. The Effectiveness Indicators: Knowledge, Attitudes, Behavior, Nutritional Status

From the family planners we have inherited the KAP model, which assumes that changes in K (knowledge - concerning the body's need for foods and the consequences of inadequate feeding practices, for example) lead to changes in A (attitudes and belief systems, such as food beliefs that prohibit certain foods for vulnerable groups), which in turn result in changes in P (practices). Although as discussed in Chapter Two the progression from K to A to P depends on a complicated set of other conditions, measurements of KAP landmarks provide one objective basis for evaluating less tangible programming elements.

While K and A are applicable to nutrition education, P is incomplete. Contraception can be achieved by a limited number of practices which either keep sperm from reaching the ovum or prevent implantation. A couple need use only one of these practices regularly in order to prevent conception. In nutrition education, on the other hand, we are concerned not with preventing a single substance from entering the body, but with

trying to make sure that a large number of substances, foods, do enter the body in the right proportions. Thus, we are interested not in a single practice but in a whole system of practices - a chain of food-related activities which we will refer to as behavior (B). Because the food-behavior chain is long and complex, a large variety of KAB questions may be applicable. The questions asked will differ by project.

Changing KAP to KAB still leaves the model incomplete because the effectiveness of the behavior change is not guaranteed. Any behaviors we teach, such as prolonged breast-feeding or adding cooking oil to rice porridge, for example, modify only a limited number of events in an individual's total feeding day. When infants are treated as inpatients in rehabilitation units, where their entire nutrient intake is supervised, we can guarantee that their nutritional condition will improve. But when mothers are taught to add two or three new behaviors to their habitual ways of feeding a child, we usually are not in a position to stand by and direct these behaviors, or to discover, for example, whether a learned good practice displaces other good behaviors that the mother was previously practicing. This brings us to the need to check on the effects of our programs as measured by improvement in nutritional status.

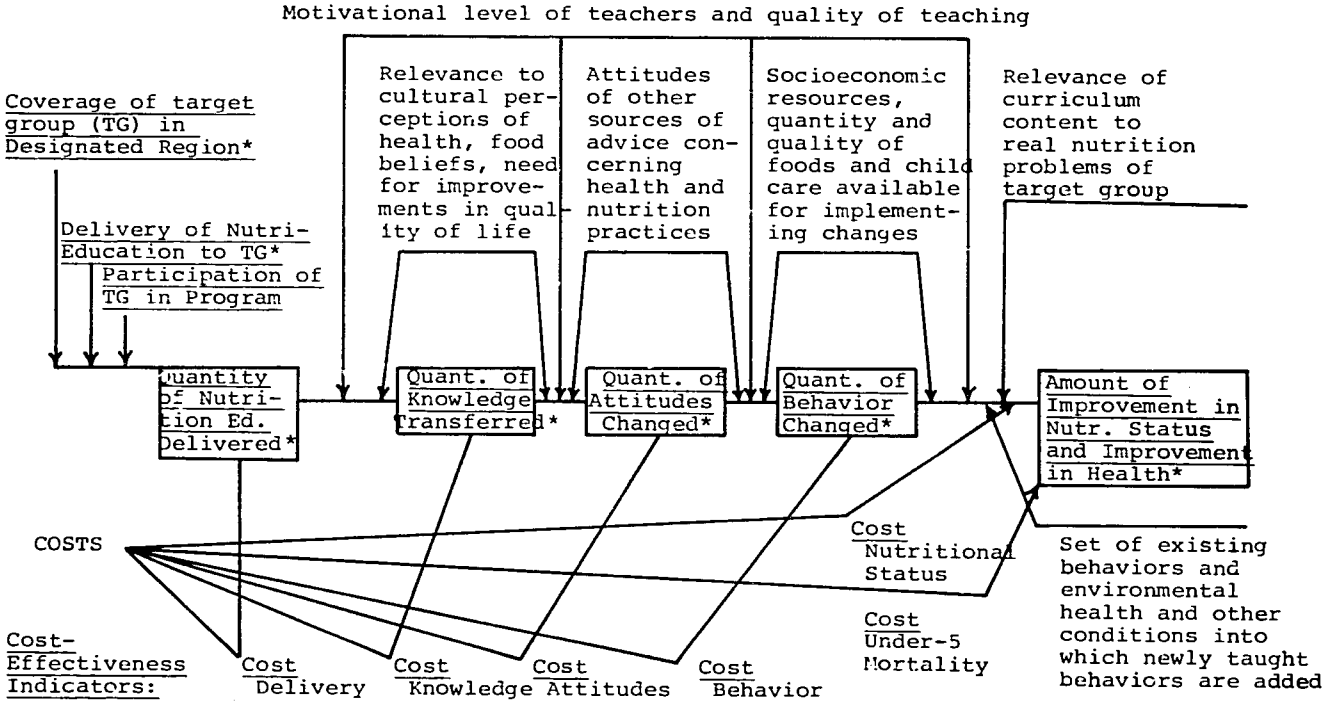
If our education is effective, the results will be reflected in improved nutritional status and, as a direct result, in reduced mortality rates among the target group. If no such results appear, we should examine the situation critically. No matter how impressive our successes are in changing reported knowledge, attitudes, and behavior, if these changes do not improve these and other physiological indicators of effectiveness (such as increasing hemoglobin, for example), we have failed to achieve our final objective, at least in the short term.

The KABNS (Knowledge, Attitudes, Behavior, Nutritional Status) model of outcome and intervening variables for evaluating nutrition education is presented in Figure 22. This diagram has been partially adapted from Stanfield (1976). The variables on the left - Outreach (Coverage), Delivery, Participation and Costs - are necessary indicators for estimating program coverage and efficiency relative to need, and for calculating cost-effectiveness measures used for comparing alternative programming efforts.

The intervening variables above the central line all are useful for explaining why the desired changes do or do not occur.

The majority of nutrition education evaluations to date have measured some combination of knowledge, attitude, and/or behavior change without examining growth or other physiological measures of improvement in nutritional status. Reasons for this are: (1) KAB changes do directly reflect the effectiveness of the teaching effort designed to produce such changes, although they do not measure the appropriateness of the content nor the effectiveness in improving nutritional status; (2) other types of development education do not measure outcome at this level because they lack comparable indicators. Thus communications specialists who are not

Model of Outcome and Intervening Variables for Evaluating Nutrition Education




*These variables can be used to calculate amount of KABNS change achieved relative to need.

Source: Zeitlin 1977b.

nutritionists may advise the program that measurement of behavior change is sufficient; and (3) differences in growth status or other physiological outcomes, as mentioned previously may reflect not only changes in dietary behavior but many other factors - such as morbidity, income, educational level, age, and birth order - so that legitimate attempts to interpret physiological differences may require a capacity for methodological design and data analysis that appears beyond the resources of many programs.

Difficulties in interpreting the meaning of improvement or lack of improvement in nutritional status invariably exist, whether or not sophisticated computerized data analysis is used. However, some variables that reflect nutritional status - weight and circumferences in particular - are so easy to collect and provide so much information relevant to program formulation that it makes sense to collect them, extract as much useful information from them as possible, and continue the search for better methodologists and more meaningful interpretations.

The strategy of measuring nutritional status alone is equally incomplete, because without the KAB information and intervening variables measuring socioeconomic resources, behavior patterns, and cultural perceptions of health and nutrition, it is extremely difficult to interpret why improvement in nutritional status does or does not occur and to modify the program accordingly.

Tables 11 and 12, from an evaluation by Yankauer (1975) of a program in Madras, India, teaching mothers to feed their infants roasted Bengal gram powder mixed with brown sugar illustrate the types of explanatory relationships that it is useful to discover between behavioral and attitudinal information and changes in nutritional status. Infants whose mothers have implemented the advice are shown to have gained nearly twice as much over a three-month period as those whose mothers have not. Fear of diarrhea and poverty are the two most common reasons for lack of implementation.

c. Variables Measuring KABNS

i. Knowledge and Attitudes

Although questions concerning knowledge and attitudes should be reviewed by a researcher familiar with survey techniques, they are easy to formulate from the nutrition education curriculum. For example, if you have taught that it is good to feed green vegetables to babies, you ask: "What foods are good for babies?" and "Do you think it is a good idea to feed green vegetables to babies?" Although answers to these questions are not sufficient outcome variables, they do shed light on behavior and improvement in nutritional status. Answers to a number of knowledge questions can be graded together and the test score used as a single variable to assess knowledge change. Attitudes similarly can be combined into a single index or into several indices corresponding to different subject areas.

TABLE 11

MEAN THREE-MONTH WEIGHT GAIN IN OUNCES IN STUDY GROUP BY AGE AND EXTENT TO WHICH BENGAL GRAM FEEDING ADVICE FOLLOWED

| | Advice not Followed | | Advice Partially Followed | | Advice Completely Followed | |
|---|---|---|---|---|---|---|
| | No. | Weight Gain (oz.) | No. | Weight Gain (oz.) | No. | Weight Gain (oz.) |
| r 18 months | 15 | 15.3 | 7 | 21.4 | 0 | |
| onths and | 11 | 32.1 | 13 | 39.5 | 7 | 45.4 |
| l | 26 | 22.4 | 20 | 33.2 | 7 | 45.4 |

ce: Yankauer 1975.

TABLE 12

REASON GIVEN BY MOTHER AS TO WHY BENGAL GRAM FEEDING ADVICE WAS NOT FOLLOWED

| Reason given | Advice partially followed | Advice not followed at all | Total |
|---|---|---|---|
| Unable to afford | 10 | | 10 |
| Child had or "would have" diarrhea | 4 | 14 | 18 |
| Child refused | 2 | 3 | 5 |
| None elicited | 4 | 9 | 13 |
| Total | 20 | 26 | 46 |

Source: Yankauer 1975.

ii. Behavior

Observed behavior change or evidence of behavior change is likely to be more accurate than verbal answers because people generally like to please and may tell the interviewer what they think he or she wants to hear. The presence of foods recommended in the nutrition education program, particularly when prepared according to instructions, as well as the presence of cooking utensils, vegetable plots, and other visible signs of behavior change, should be noted during the 24-hour dietary recall as explained below. Home visits to 378 mothers discharged from a nutrition rehabilitation unit in Uganda (Sneidman et al. 1971) disclosed that 90% had built a child's latrine similar to the ones at the center, 50% were growing vegetables on a separate patch of garden, and 65% were cooking separately for their children, using a bought cooking pot and protein foods as they had been taught. Only 5% had either built chicken runs or started keeping rabbits, which required more initial capital outlay.

Dietary intake is important to estimate but difficult to observe. The 24-hour recall presented in Chapter Two in Worksheets 4 and 5 is the simplest method of measuring eating or feeding behavior, and is generally agreed to be as accurate as most other methods, all of which require more time and equipment (Bowering et al. 1977). In order to reduce falsification, the 24-hour recall and other questions concerning behavior should be placed near the beginning of an interview before asking any knowledge or attitude questions that give away the interviewer's purpose to the respondents.

The investigator conducting a 24-hour recall asks an individual what she ate, or what she fed her baby, beginning with time of waking yesterday morning and proceeding through an entire 24 hours until the morning of the interview and work backwards over 24 hours. Ideally, quantities of all foods and drinks are estimated with measuring containers, photographs, or inexpensive models (such as brown modeling clay, from which the mother can break off an amount of the same size as the amount of meat she ate). Key questions concerning food storage, handling, and preparation should be asked. In order to note evidence of behavior change, the interviewer should tactfully ask the respondent to show and should record the presence or absence of key foods, the cooking utensils used to prepare them, and containers used for storage. If diets are suspected to differ on different days of the week or in different seasons, several recalls may be necessary.

Dietary recalls must be scored for use in analysis. Scoring can be done in several ways. Food or food-group scores note only whether the individual has eaten various foods or food categories such as vegetables, fruits, animal protein foods, etc. A second method calculates quantities of some key foods. These methods are combined in Worksheet 4. Another notes numbers of foods meeting two-thirds of recommended allowances. The most complete procedure consists of scoring total nutrient intake, at least of calories and protein, and treats these data as continuous variables. If computerized analysis is available, all methods can easily be used. If

hand data processing is required, a compromise position may be chosen. If 24-hour recall results must be hand-tabulated, the Synectics Corporation has produced Field Guide for the Evaluation of Nutrition Education (1976) which makes it possible to test statistical significance between groups or between before-and-after measures with a minimum of outside consultation.

When possible it is desirable to calculate total calories and protein, because diets that look good from a food-groups perspective may not contain enough total food to nourish an infant, as was recently found in the Philippines (presented in the case study). If this is the case, it becomes necessary to change the educational message to emphasize quantity. A study in the United States, however, found good agreement between food-group scores, total energy intake, and number of nutrients meeting two-thirds of the recommended daily allowance (RDA) (Bowering et al. 1977).

iii. Nutritional Status

Confinding our interests to the vulnerable preschool and pregnant and lactating groups, we find that the variables most commonly used and most appropriate for measuring are zero to five-year mortality, zero to five-year growth status, and pregnancy weight gain.

While both mortality and morbidity are closely correlated to community nutritional status, recall of illness is unreliable and prospective studies of illness require intensive and expensive data gathering (see methodology from De Sweemer 1973). Therefore, although it may be important to collect morbidity recall as one of many variables in a large survey, it is less useful to use it as an outcome variable. Mortality, on the other hand, may be a particularly sensitive and useful outcome variable, since mortality rates have been found to decrease in young child populations before improvement in nutritional status can be demonstrated (Alderman et al. 1973). A reason for this is that when improved feeding practices keep severely malnourished children alive, their small size pulls down the growth averages. However, since no more than 3 to 30 children per 100 between 0 and 5 years are likely to die, changes in mortality are unlikely to show up as statistically significant in sample sizes of under about 1000.

Growth status can be used to measure change in both large and small samples. The variables usually used are percent of weight for age (weight/age), percent length for age (length/age) and percent weight for length (weight/length). Each of these is calculated by taking the child's actual weight or length as the numerator and dividing it by the median weight or length of normally nourished children of the same sex and age (or sex and length, for weight for length). The median weights and lengths can be taken either from local or from international standards, such as the WHO (World Health Organization 1978).

Standard deviation scores, that also can be calculated from WHO reference materials, are more accurate than percentages and can be entered as outcome variables into regressions, analyses of variance, or other parametric statistical procedures which are easy to perform with packaged

computer programs (weight/height and weight/age are slightly skewed to the right, but sufficiently normally distributed for parametric procedures when obese children are removed from the sample, length/age is normal). The ease of running packaged programs such as the SPSS (Nie et al. 1975) is such that if access to these programs is available, it is frequently cost effective to gather more interview information than could possibly be processed by hand. A first inexpensive computer run can then be used to eliminate variables not related to outcome (though the analysis must be based on defined hypotheses and not be a fishing expedition).

When data are being hand-processed, the slope of the infant's weight gain over time compared to the slopes of the upper and lower lines on the weight chart are very useful indexes, and have been employed in Guatemala (Emrich 1977). A sign test can be used for comparing groups, by scoring a child with a steeper slope than the upper line with a plus and one with a less steep slope with a minus.

For infants below the age of 2 years, weight/age alone is a sufficient indicator of total growth achievement, although length/age and weight/length provide interesting corroborative and diagnostic information. Between 2 and 5 years, however, low weight/age usually reflects the previous malnutrition of a child who is stunted in height but is currently in good health. Such a child would exhibit catch-up growth in height if given a truly adequate diet. During this period height/age and weight/height are more accurate descriptors of nutritional status than weight/age. If a separate evaluation survey is being conducted by literate field workers, it is useful to collect both weights and lengths. Weights alone, however, can be used to assess older samples of children by comparison with other groups. Children can be weighed using a light but inexpensive and accurate balance or spring scale which can easily be carried by a field worker. Weighing a child takes no more than three minutes.

d. Intervening Variables

All of the socioeconomic, cultural, psychological, and other factors listed above the central line of Figure 20 must be considered in formative evaluation and in the interpretation of summative KABNS results. Small sample interviews and observations focusing on process can be used to investigate these factors as well as less conventional methods. Stanfield (1976) admired the strategy of one nutrition educator who placed a tape recorder behind a mirror where mothers of malnourished children gathered to tidy up and comb their hair. An observation assessment form such as the one presented in Worksheet 12 should be used periodically to judge teaching quality. This form is adapted from Srinivasan (1977). Groups of teachers may use such a form to assess each other during training or refresher seminars.

These variables are given the name intervening because they exert their effects in the causal sequence that occurs between the treatment, e.g., exposure to a nutritional message, and the impact of the treatment, e.g., improvement or lack of improvement in child growth. Factors that are commonly investigated in sample surveys are referred to as correlates of

WORKSHEET 12

OBSERVATION ASSESSMENT FORM FOR

NONFORMAL NUTRITION EDUCATION

1. Priority messages taught | How illustrated | Accuracy level

_____ | _____ | _____

_____ | _____ | _____

_____ | _____ | _____

_____ | _____ | _____

Misconceptions: _____

_____ Total length of lesson:

_____ minutes

2. What role does the teacher play?

(Check for each quarter-time period)

| | Time Period I | Time Period II | Time Period III | Time Period IV |
|---|---|---|---|---|
| lecturing | | | | |
| discussion | | | | |
| other learning activities | | | | |
| what were they? | | | | |

WORKSHEET 12 (continued)

3. How many people were present during the learning experience?

| | Time Period I | Time Period II | Time Period III | Time Period IV |
|---|---|---|---|---|
| Women | | | | |
| Men | | | | |
| Children | | | | |
| Infants | | | | |

4. How many of the same women stay from beginning to end?

Reasons for leaving, if any:

| | Time Period I | Time Period II | Time Period III | Time Period IV |
|---|---|---|---|---|
| All | | | | |
| Many | | | | |
| Few | | | | |
| None | | | | |

6. How many people participated verbally in the learning experience?

| | Time Period I | Time Period II | Time Period III | Time Period IV |
|---|---|---|---|---|
| Women | | | | |
| Men | | | | |
| Children | | | | |

Types of participation: responding to questions ☐

volunteering information ☐

asking questions ☐

WORKSHEET 12 (continued)

7. Number of women who participated

   0 Times

   1 - 2 Times

   3 - 5 Times

   over 5 Times

8. Number of women assisting in preparing the demonstration or in other learning activities_____

9. Who ate the food?

| | Received portion | Ate more than ½ | ate less ½ | gave away | threw away |
|---|---|---|---|---|---|
| infants | | | | | |
| children | | | | | |
| women | | | | | |

10. Number of women contributing food for the demonstration_____

    Number of women contributing monetary fee or donation ____amt:____

11. Examples of striking change in individual behavior during learning experience.

    How determined?

12. Examples of striking changes in individual attitudes toward the problem.

    How determined?

WORKSHEET 12 (continued)

13. Any learner comments relating to nutritional problems in economy and society?

    Examples?

14. Any learner comments relating to the learning experience?

    Examples:

15. Other Observations - Other Comments:

    Examples: knowledge gain?

    diffusion of interest?

    applies experience?

nutritional status (Balweg 1976). When variables measuring these correlates are investigated together with KABNS indicators, they serve to explain why impact did or did not occur as a result of a given intervention. They also provide the basis for predicting whether or not similar interventions would succeed under a variety of circumstances.

Commonly measured correlates of malnutrition are:

family income and family wealth, including land holdings, agricultural production, livestock, quality of housing, vehicles, facilities and appliances

water supply

sewage system

maternal characteristics, including age, height, weight, marital status, education, occupation, time use, caretaker for child, source of child-care advice

paternal characteristics, including education, occupation, residence with family, number of wives

family size, including number of adults, number of children, number of children under five, birth order of index child, birth intervals, family planning practices

mortality, e.g., number of children of mother who died

morbidity recall for index child

family participation in health care and other programs

exposure to the media, including radio, TV, newspapers, etc.

food availability, including seasonal cropping patterns, food storage, meal patterns, food purchasing behavior

feeding of vulnerable groups, including food beliefs and practices specific to infancy, pregnancy and lactation, introduction and preparation of weaning foods, breast-feeding behavior, intrafamily food distribution

The most relevant set of correlates and the questions used will be situation-specific. These questions should be decided with the help of professional nutritionists and social scientists and should be revised after an initial field testing.

e. Longitudinal Versus Cross-Sectional Survey Evaluation

Cross-sectional evaluation is the cheaper alternative and is far better than none at all. However, nutrition education program participants and acceptors of nutrition education messages are self-selected groups who generally fall under the left-hand side of the bell shape curve of adopters of innovation pictured in Figure 4. It has been shown to be unreliable to compare the nutritional status of their children with the status of a control group of children whose mothers do not attend the education program or do not follow the advice given in the nutrition education message. The children of program participants may be better or worse nourished to start with than children randomly selected from the general population. On the other hand, mothers with enough awareness and initiative to attend a program may already be feeding their children more adequately than mothers who do not attend. Or, on the other hand, mothers may deliverately choose to attend a program or to adopt new behavior because they have noticed that their children are sickly or are not growing well.

Because of the element of self-selection, a longitudinal study of nutritional impact on children of program participants or message adopters is preferrable to a cross-sectional study using a control group, or to a study using as a baseline a high percentage of children who do not continue in the program (although the 24-hour recall survey used in message design may be used as a baseline for estimating behavior change in the population as a whole). Weight charts provide the simplest method of collecting longitudinal growth data. Growth rates can then be compared with averages for the region or with international norms. The nutritional status of newly enrolled children can also be compared to that of longer-term program participants of the same age, providing that most mothers become long-term participants, so that self-selection does not distinguish those who remain from the newcomers.

If, as suggested in Section 2A, a comprehensive sample survey is conducted either in the planning or early implementation phases, so that the results can be used both for summative and formative purposes, a subsample of children surveyed can be selected for longitudinal follow-up. As explained earlier, subsequent surveys can be much simplified on the basis of the analysis of the first survey, which will serve to eliminate many irrelevant variables.

f. Tracking Waves

"Effectiveness tracking" is advertising language for simple longitudinal evaluation used both for feedback for program operations and for summative evaluation. The words "base" or "benchmark" refer to baseline data, and "marginals" and "banner points" are the words applied to frequency distributions and cross-tabulations, which are the commonest forms of data analysis in commercial market research.

Effectiveness tracking studies are conducted routinely to: (1) measure the speed of success; (2) make adjustments in the campaign to increase this speed or velocity; and (3) develop expectations about future plans for expanding the program or implementing new campaigns among similar target audiences. Tracking uses a series of interviews which are called "waves." The first benchmark wave, conducted prior to or at the start of the campaign, establishes the zero on the velocity scale of effectiveness. Additional waves are conducted at 1-month, 2-months, 6-months, etc. intervals, the frequency depending on the likelihood of the campaign's changing behavior within a certain time period.

Because of problems that may arise with short feedback cycles providing data that requires highly technical processing, mass media nutrition education campaigns in developing countries probably should not routinely track all themes and messages, as explained in Section II.A.2.b. It may make sense to focus on tracking one theme at a time, with a limited sample as a part of ongoing formative evaluation procedures for designing new messages and materials. The tracking procedure then becomes a small subsurvey probing one topic, and capable of rapid hand tabulation.

The tracking wave per se should not be a comprehensive evaluation survey because of the time and expense required to collect and analyze a comprehensive data set. However, the first comprehensive survey, whether conducted in the planning or early implementation phase should contain as many tracking questions as appear likely to serve future message and materials design purposes. Subsequent smaller surveys should also have tracking as one of their purposes, if the project has a mass media component. Evaluation of the Manoff nutrition education campaigns in the Philippines and Nicaragua indicated that little additional change occurred after six months, suggesting that the adoption curve for new behavior started to level off after three to four months of radio spot broadcasting. This is one reason why the early implementation phase is suggested as an appropriate time for a comprehensive survey which would provide information for new message development.

Although a mass campaign may be managed by an advertising agency, nutrition field workers should make up the majority of the personnel conducting tracking interviews. Nutrition field workers will be knowledgeable in the subject matter of the campaign, and the survey experience will help them to understand their client group better. The interview load should be distributed among a sufficient number of workers to prevent it from reducing the work effectiveness of any given worker.

In addition to results of the tracking interviews, field workers' reactions to the media campaign should be considered in formulating modifications of the messages. The workers, who are teaching the messages face-to-face, who hear mothers informally discussing the campaign, and who observe the behavior of the target audiences daily, are in a well-informed position to make suggestions for new message content in circumstances where full-scale formative evaluation is impractical.

One relatively simple questionnaire can be used to track the same theme at periodic intervals during the campaign, but should be modified to reflect message changes. Some of the questions that may be investigated by tracking are problem awareness, or awareness of shortcomings in present behavior; solution awareness, or awareness of one or more alternative behavior patterns that could solve or contribute to the solution of the known problem; solution trial, which can be actual experimentation with solution alternatives or the intention to experiment with a one-time behavior, such as a measles vaccination; satisfaction, or whether the new alternative behavior is judged to contribute significantly to solving the problem without creating any new problems; and changed behavior - whether the new behavior is adopted on an ongoing or a one-time basis, and if not, why not. Weighing of infants or other measurements of nutritional status should be included in the tracking exercise because these measurements of nutritional status should be included in the tracking exercise because these measurements are as easy, if not easier, to collect than answers to attitude questions and represent the bottom line outcome indicator.

C. Who Should Conduct Evaluation?

The choice of personnel to conduct the various aspects of evaluation will depend on the agency requesting the information and on the financial and institutional resources available. A few general rules should be considered in making the decision.

- The benefits gained from the evaluation must justify the costs incurred.

- In-house resources should generally be used. More than a minimal amount of data gathering, however, is likely to detract from the quality and quantity of the work the field staff will have time to perform.

- If the jobs or payment of field workers depend on the data they hand in, this data is very likely to be unreliable, unless workers' performance and records are closely supervised.

- Statistical and other technical consultants should be procurred from the nearest reliable institutions in order to minimize error caused by cultural and physical distance.

- Institutional complementarities should be cultivated for the benefit of all concerned. Remember that the same study that evaluates the nutrition education project qualifies as research from the point of view of the nutrition or social science departments of nearby academic institutions. These institutions may therefore be willing to provide consulting expertise and even to conduct much of the survey free of charge, as part of their own departmental or graduate research programs. The quality of this expertise

frequently is higher than that which can be purchased commercially. Data gathering may also qualify as a field training activity for student dieticians or paramedical health workers. Free computer analysis may sometimes be obtained through academic institutions.

- When coordination between face-to-face mass media nutrition education has been achieved, survey evaluation of the face-to-face component should be combined with longitudinal mass media tracking described in Section 7a.

- Computerized data analysis should be used for comprehensive evaluation whenever possible. A first reason for this is that planners need to understand as many of the environmental and other circumstances that affect program impact as possible. The second reason is that nutrition educators are attempting to change a total feeding behavior package - too many variables to analyze easily by hand calculation. While hand calculation is better than no calculations, the computer can produce a cheaper product per item of information than can the individual at most salary scales.

- Academic institutions can conduct a higher quality of computerized data analysis than commercial market research agencies, in which the analysis is mainly limited to cross-tabulations without calculation of levels of statistical significance. Academic researchers with backgrounds in social science statistics are best suited to handle the analysis of nutrition education data.

1. SUMMARY:

TECHNICAL METHODS AND REQUIREMENTS

When nutrition education is investigated in the context of an integrated program evaluation, the costs and effectiveness attributable to education should be estimated even when resources used specifically for education cannot be known precisely.

Major cost categories are time, materials, travel, distribution, and broadcasting. In each category the marginal costs of nutrition education should be calculated at each vertical level from the planning agency to the community. Opportunity costs of alternate time use should be considered at each level but should be calculated only when such use has obvious monetary value or value to society.

The main effectiveness indicators for nutrition education can be abbreviated with the letters KABNS, for Knowledge, Attitude, Behavior, and Nutritional Status. Change in NS measures the impact of a nutrition education program on the problem of malnutrition. KAB measure the impact of the program on cultural changes in indicators factors associated with malnutrition. A large number of environmental, sociodemographic, and cultural correlates of nutritional status also are helpful in program design and in the interpretation of evaluation results. KAB questions are based on the themes presented in the educational program. Direct observation and the 24-hour dietary recall also are necessary to measure behavior change. Mortality rates, weights, and circumferences measure NS.

If statistical methods of evaluation are used, some longitudinal data gathering is desirable in conjunction with a comprehensive cross-sectional survey exercise because participants in nutrition education activities tend to be self-selected groups who cannot be adequately compared with randomly selected baselines or controls. However, a cross-sectional study alone will yield useful information at a fraction of the cost of a series of longitudinal surveys. Effectiveness tracking of individual themes should be integrated into ongoing formative evaluation procedures.

Project staff should conduct evaluation except where they lack the objectivity to produce credible results. Technical consultants should be recruited from nearby institutions. Institutional complementarities should be cultivated. Computerized data analysis conducted through academic channels yields most useful results, although hand calculation will be more practical for some exercises.

## D. Cost-Effectiveness Indicators

### 1. KEY QUESTIONS

- How and why is cost effectiveness measured?
- What indicators are most useful for evaluating nutritional status?

Cost-effectiveness indicators describe the costs spent to achieve given program objectives. Cost-effectiveness and operating indicators are the common currency by which programs can be compared with predefined goals, previous performance, and with other program alternatives. Similar indicators from different programs will not have identical meanings because the target populations and the methods of estimating effectiveness will inevitably differ to some extent. However, information concerning research methods, project design and the correlates of nutritional status in each program generally is sufficient to permit similar indicators to be reasonably compared, with certain caveats and interpretive adjustments. Similar comparisons can theoretically be made using cost-benefit analysis which attaches a monetary value to all of the benefits to society achieved by each program. In practice, the attempt to attach values to benefits achieved by nutrition programs becomes speculative and controversial and thus is less meaningful than discussion of effectiveness units.

The four main types of cost-effectiveness or performance indicators listed in Worksheet 13 have been adapted from Austin (1977). Different evaluation methodologies will produce different combinations of these indicators. Although not all evaluations will be able to produce all of them, the more that can be derived the more comparable the results will be. A fundamental indicator is cost per recipient because this figure will indicate whether the program is inexpensive enough to be extended to the population as a whole. Total cost figures should be further broken into fiscal costs payable by the central government and community costs payable by local government or by the community. Total costs may be relatively high, but if the government's share of the total is low and the community is benefiting, central government planners need not worry unduly about the costs paid locally.

Generally speaking in the early stages of a program, the cost-effectiveness figure will rise progressively as the calculation moves from a. through c. on Worksheet 13, because the cost numerator remains the same while the denominator grows progressively smaller as shown in Figure 23.

In evaluating any of the previously listed effectiveness indicators, time frame should be considered. Different types of intervention strategies produce improvement in nutritional status within different time frames. Treatment in a nutrition rehabilitation unit obviously will produce rapid improvement in the individual child, although the condition of the child may deteriorate following discharge from the center. Nutrition education which seeks to change behavior typically takes longer than supervised feeding programs to produce results. The results, however, may be longer lasting.

WORKSHEET 13

COST-EFFECTIVENESS AND OPERATING INDICATORS

a. Delivery Cost-Effectiveness Measures

- $/Recipient of nutrition education/time or curriculum unit
- $/TG recipient (not all recipients may be target-group [TG] members)
- $/TG recipient participating in program regularly (more than 50% of the time)

b. KAB Cost-Effectiveness Measures

- $/Number TG changing knowledge
- $/Number TG changing attitudes
- $/Number TG changing behavior
- $/Change in nutrients received by TG members including $/reduction in nutrient deficit

c. NS (Nutritional Status) Cost-Effectiveness Measures

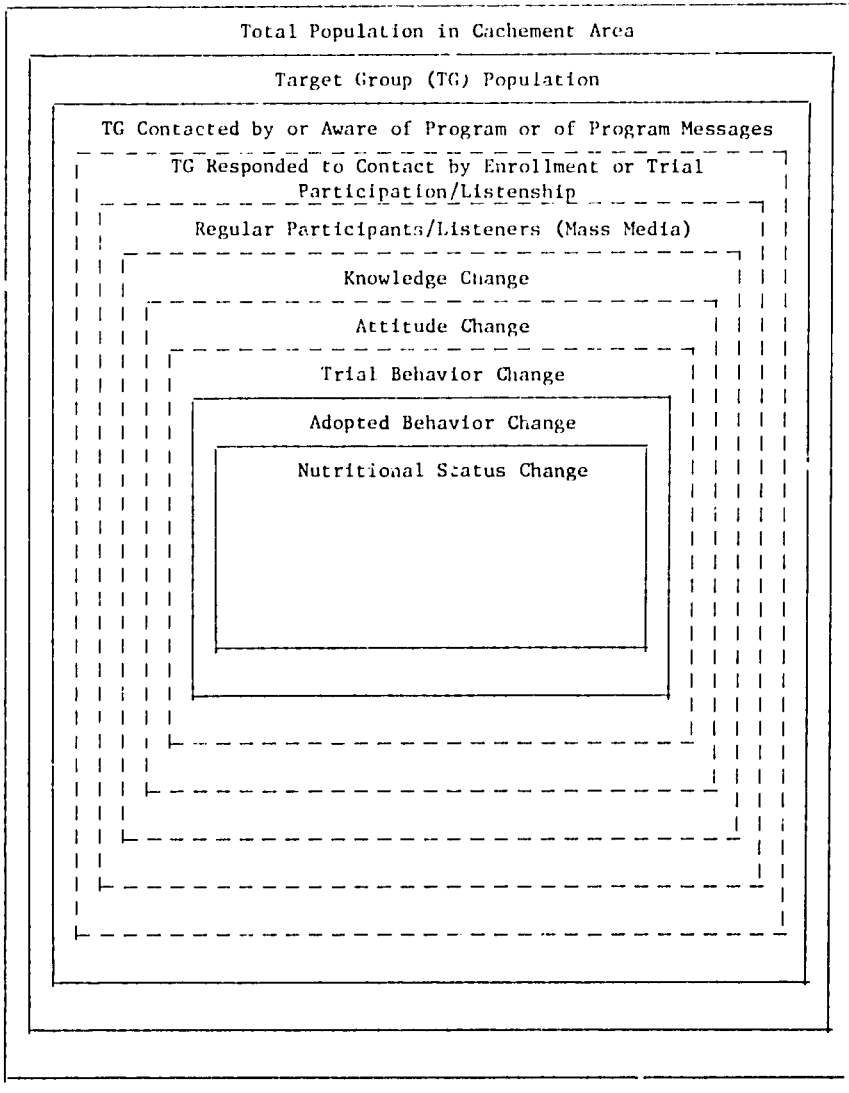
- $/Change in infant mortality rate
- $/Change in 1-4 or 1-5 year mortality rate
- $/Change in degree of malnutrition (weight/age or weight/length)
- $/Change in pregnancy weight gain

d. Operating Indicators

- Number of TG geographically accessible to the program
- % geographically accessible TG aware of program
- % geographically accessible TG reached by or enrolled in program
- % reached or enrolled TG participating regularly
- % RDA delivered by following nutrition education recommendations
- % nutrient deficit covered by following nutrition education for other nutrients received previously
- % substitution of nutrients recommended by nutrition education for other nutrients received previously
- % children discharged from program relapsing or deteriorating in nutritional status
- % behavioral change relapse rate for mothers discharged from program
- Sibling nutritional status (or other measure of carryover effect of nutrition education from one specific situation)
- Community-level workers/TG
- Professionals/TG

FIGURE 23

APPROXIMATE SUBSET RELATIONSHIPS BETWEEN PROPORTIONS OF POPULATION USED IN CALCULATION COST EFFECTIVENESS INDICATORS
(dashed lines indicate overlap across subsets that occurs with diffusion, peer pressure, and vigorous promotion)



2. SUMMARY:

COST-EFFECTIVENESS INDICATORS

The cost-effectiveness indicators listed in Worksheet 13 detail the costs spent to achieve given program objectives. Operating indicators in the same list quantify other important program dimensions without incorporating a cost numerator. These indicators provide the means for comparing programs, both with their own objectives and previous performance and with each other. No single evaluation is expected to provide sufficient data to generate each entry on the list, because certain indicators are more relevant to some programs than to others. The more indicators generated, however, the more comparable and hence useful the evaluation results will be.

# CHAPTER FOUR

## CASE STUDY: USING RADIO TO TEACH ENRICHMENT OF RICE PORRIDGE IN THE PHILIPPINES*

### I. INTRODUCTION

Ofelia had blown out the lamp for the night by 8 p.m. She and her husband were lying in their bamboo and nipa house, listening to the nightly radio drama playing on station DYRP, the most popular station in Iloilo Province in Visayas, the central region of the Philippines. The younger children were asleep. During a commercial break in the evening's episode, the following familiar 60-second public service spot was played.

MUSIC IN BACKGROUND

ANNOUNCER: Listen and learn - another drama of Lita and her mother.

MUSIC UP AND OUT

LITA: Mama, why are you putting a drop of cooking oil in my baby's lugaw (rice porridge)? Where did you get this strange idea?

MOTHER: From the doctor on the radio. Listen -

DOCTOR: (RADIO VOICE RECORDED) Oil is the best energy food for babies when they are six months old.

LITA: Mama, better than sugar, rice, camote, and - ?

MOTHER: Sh-h. Listen to the doctor.

DOCTOR: (CONTINUES AS BEFORE) Oil has twice the energy of sugar, rice, camote. Every baby needs all these energy foods - especially oil. The first day mix a drop with rice, mongo, fish, vegetables, everything. Then every day a little more. Gradually a teaspoon.

LITA: But Mama, you didn't do that with me.

MOTHER: How could I know? I didn't even have a radio. Now you can listen and learn.

---

*This chapter was written by Marian F. Zeitlin and Candelaria S. Formacion.

MUSIC UP IN BACKGROUND AND UNDER

ANNOUNCER: For help with your baby see the doctor, home management technician, or community worker in your area. Listen and learn a better way.

MUSIC UP AND OUT

"I tried adding oil to the baby's lugaw, and she didn't get diarrhea," Ofelia commented. "Please be quite, Mama," said her oldest boy as the drama continued.

Ofelia and her family were part of the target audience of a radio nutrition education campaign designed by the National Nutrition Council and the National Media Production Center of the Philippines and the service-oriented affiliate of a New York advertising agency, Manoff International, Inc. The campaign was designed to test radio alone as a medium for teaching mothers to enrich their infants' rice porridge with oil, fish, and green vegetables. This problem was chosen to be the subject of a case study because it illustrates major considerations in both the design and evaluation of nutrition education programs using mass media. Accordingly, HIID and the University College of the Philippines (UPCI) collaborated with the previously mentioned agencies in conducting a small-scale independent evaluation survey of the program.

Iloilo Province has a population of amillion and a half, and is known for its rose gardens and for the poetic and hospital temperament of the Ilongo people. The province, one of the earliest in the Philippines to be colonized (first by Spain and later by the United States), possesses some of the country's most fertile rice- and sugar-producing lands. About 25% of the world's export sugar crop passes through the deep water port of its capital, Iloilo City. With 17 educational institutions offering university-level programs, about 70% of the rural population graduated from primary school, and about 75% radio listenership among farm families, Ilongos are highly sophisticated compared to the peoples of many developing areas of the world. Weaning-age children of the province, however, suffer from endemic protein-calorie malnutrition, which is typical of the country as a whole. The lifestyle of the typical rural family remains simple.

Ofelia gets up at four a.m. and lights a wood fire to prepare a breakfast of rice, dried mud fish, and home-grown coffee for her husband before he goes off to the rice fields, where he works as a tenant farmer, or to the sugar fields, where he harvests cane for about $.80 per day. Before waking the older children for school, she fixes eight-month-old Jeanibelle's one bottle-feed of the day, made with sweetened condensed milk. Her morning is spent cleaning house, washing clothes by a well near the tidy vegetable and flower garden surrounding the house, cooking rice porridge for the baby, and cooking rice, mongo beans, and vegetable soup for lunch, for which the whole family returns home. In the afternoon she mends clothes, tends the garden, and pounds home-grown dried coffee to remove the husks from this cash crop, which brings up to $3.00

a kilo in the local market. (One woman in the barrio earned enough by selling two sacks of coffee to buy a caraboo.) When the baby can walk well enough not to fall down stairs, Ofelia will go back to weaving patadyong cloth on a loom set up in the shade underneath the house, which is raised on stilts. The radio plays music or drama most of the day and frequently is loud enough to be heard by the family next door. The lugaw spot, or one of six variations on this message, plays three or four times a day.

In the late afternoon Ofelia takes the baby to visit an elder friend named Clara. Clara persuaded Ofelia to try following the radio's advice to add oil to Jeanie's lugaw, after she had observed the good effects that oil had on the health of her own granddaughter, whose mother attended a rural health class in which she was reassured that oil would not give her baby diarrhea. Oily foods usually are not given to children under the age of two years because they are believed to be hard to digest.

Like most infants of the region, Jeanibelle has not gained weight normally since the age of five months because the diet she receives is low in calories. Although she breast-feeds on demand and receives a supplementary bottle of watery sweetened condensed milk, the breast milk and small quantity of supplement given do not fill the dietary requirements of most Ilongo infants past the age of six months. Ofelia is pleased that the baby sleeps through breakfast, when the older children are rushing off to school. Jeanie gets about a tablespoon of rice with clear soup and a taste of greens at lunch, and rice with a taste of fish at supper. She also eats about a tablespoon of rice porridge, or lugaw, two or three days a week when Ofelia takes time to cook it. To make lugaw, more water is added to cooked rice and the mixture is put back to boil until it becomes a thick porridge. Lugaw has the disadvantage of having less than half as many calories by volume as rice, because of the added water.

Now that Ofelia has started adding half a teaspoon or so of coconut oil to the lugaw, following the radio advice, she reduces the baby's caloric deficit by 25% to 50% on "lugaw days" when there is oil in the house. A coconut tree grows in the garden, but except for special occasions Ofelia buys oil on a weekly market day, rather than grating and boiling a coconut to make the oil herself. The bottle used to buy oil usually is empty halfway through the week.

If the radio message were changed to advise that oil also be added to the baby's daily rice and soup, the number of extra calories could in fact make a difference to her growth. As it is, the nutrition education campaign has not improved the baby's nutritional status but has had the valuable side-effects of teaching the positive nutritional value of oil and eroding the mistaken fear that it will give an infant diarrhea or an upset stomach.

Ofelia has already started to give fish to the baby with rice at the evening meal, but it reassures her to hear from the radio message that the fish is good for the child, because of a folk belief tht babies will get worms if they eat fish. The lunch soup usually has green vegetables in it. Though Ofelia was not in the habit of giving green vegetables to Jeanie previously, she has now started to mash one or two spinach or sweet potato leaves for her daily.

The baby is small for her age by Western standards, but is lively - a quality valued by mothers in Iloilo - and not much smaller than Ofelia's other children were at her age. If she escapes severe bouts of childhood illness, she will avoid severe malnutrition and grow into a short but normal schoolchild, possibly with slightly less intellectual potential than she would have had if she had been well nourished. Although a national weighing team (Operation Timbang or weight survey) passed through the barrio several months before this study, Ofelia doesn't know that the baby is mildly malnourished, because at that earlier time, when breast milk was sufficient to meet the baby's needs, Jeanibelle was growing normally.

## II. CAMPAIGN DESIGN AND DEVELOPMENT

### A. Background of the Campaign

The radio pilot in Iloilo was part of an initiative by Dr. Martin Forman, Director of the AID Office of Nutrition, to test new approaches to education as a nutrition intervention that would merit support by donor agencies and national governments. On the Philippines side, Dr. Forentino Solon, the Executive Director of the National Nutrition Council, who led an ongoing campaign backed by First Lady Imelda Rommaldez Marcos to mobilize available agencies and resources to combat preschool malnutrition, was using the project to test home development of nutrient-dense supplementary foods for the 6- to 12-month-old child.

In 1974, Manoff International, Inc., which already had begun testing the application of spot advertising techniques to nutrition education in Ecuador, was awarded a contract to test this method further in two other countries, the Philippines and Nicaragua. The Philippines government information agency, the National Media Production Center (NMPC), was charged with working with Manoff International in conducting the campaign, which remained on the air from November 1975 to November 1976.

### B. Problem Diagnosis and Target Group Selection

Identification of the problem as undernutrition and the choice of 6- to 12-month-old children as the primary target for dietary change and their mothers as the target for nutrition education were already well supported by previous research (Caedo et al. 1972; Guzman 1976; Jelliffe 1968). The extent of the nutrition problem, defined as the decline in nutritional status after the age of six months, for the group of target

children reached by the radio campaign is given in Table 13. These results are from HIID/UPCI evaluation survey, which weighed children of the 75% of target mothers who had heard the radio message. While these infants may in fact be slightly better off than children of the 25% of rural mothers who had not heard the message, they represent the operational target group reached by the project. As can be seen, average nutritional status drops from low normal by U.S. standards (Stuart and Stevenson 1959) (83% of weight for age is about the third percentile) to just above the cut-off point of 75% for second-degree malnutrition (Gomez et al. 1956).

The central Philippines was chosen for the test area by elimination, because almost all of Luzon Island in the north was within listening range of the capital city, Manila, and the distance to Mindanao in the south would have strained the project's travel budget. Iloilo Province was chosen in particular because it had (1) fairly typical coverage by nutrition and health outreach programs, (2) good media coverage from the capital city, (3) a language distinct enough from most of the rest of the Visayan Island chain so that the diffusion of the message could be confined to the province, (4) ecological and seasonal characteristics common to several other islands in the Visayas, (5) promise of excellent local support through the NMPC, the Governor's Office, and the regional organizations, and (6) recommendations from several market research firms as a good test site to pair with Cebu Island as a control.

Southern Cebu, chosen as a control, was similar in radio ownership to Iloilo and in percentage of rural versus urban population. Although Cebu had lower levels of education and home ownership, a different dietary staple (corn in Cebu versus rice in Iloilo), and a less favorable harvest in the test year, it served the control function in that knowledge changes produced by the radio campaign, which were observed over three tracking waves in Iloilo, failed to occur in Cebu in absence of the campaign. Cebu was the home province of Dr. Solon, who had established an extensive public health-nutrition program which stressed consumption of green leafy vegetables. Although the area selected as a control was not the target of intensive nutrition programming, consumption of these vegetables by target group infants was consistently higher in Cebu than in Iloilo, suggesting a diffusion effect.

C. Message Formulation

The development of specific messages from the list of priority themes for nutrition education in the Philippines was determined by the limitations of the radio spot technique as a medium and by criteria laid down by the pilot project. An experiment looking at the effectiveness of radio alone required a message that could be acted upon by families without provision of additional goods or services. It also required a message that could be communicated in short radio spots, not, e.g., how to build a latrine. An additional criterion of the pilot project was that it deal with a problem affecting rural areas, that was not seasonal and that was

TABLE 13

WEIGHT FOR AGE OF SAMPLE INFANTS*

| | Harvard Standards | | Philippines Standards | | |
|---|---|---|---|---|---|
| | Mean | Std. Dev. | Mean | Std. Dev. | N |
| 6-9 months | 83.90 | 11.29 | 90.40 | 13.92 | 50 |
| 10-12 months | 77.00 | 12.43 | 87.29 | 14.56 | 28 |
| 13-15 months | 76.50 | 8.35 | 83.77 | 9.21 | 22 |
| | 80.30 | 12.52 | 88.07 | 13.37 | 100 |
| | (F=4.28) | | (F=1.98) NS | | |

(T-test between 1st & 3rd sig P<.01)

*Weight for age (wt/age) is calculated by dividing the actual weight of a child by the median or expected weight for children of the same age and sex, according to previously established growth norms or standards.

common to other developing countries. Promotion of breast-feeding was rejected for the campaign because the decline of breast-feeding was predominantly urban, with most rural mothers continuing the traditional practice of nursing their babies for 12 months or longer.

Considering all of these factors, Dr. Solon recommended a campaign to encourage increased consumption by weaning-age infants of calorie- and protein-dense foods, specifically of a mixture which he had successfully evaluated on Palawan Island of lugaw, mashed fish, and green vegetables, with up to a teaspoon of oil added per day. The decision was made that the theme of the campaign would be to teach mothers to begin to feed the enriched lugaw by the age of six months.

Before drafting the scripts, the practicality of the proposed messages was tested by a series of interviews with both national and provincial nutritionists, shopkeepers, and mothers in rural areas of Iloilo. Information gathered confirmed that rural families had rice, fish, and some variety of green vegetables throughout the year, and that cooking oil - which was invariably coconut oil, except when families ate pork and rendered lard - was available in the village sari-sari stores, and was customarily used in modest quantities.

The draft scripts were first presented in Iloilo City as working documents to provincial directors of social welfare, education, health, and agricultural extension, representatives of the broadcasting industry, and local university nutrition departments. On the basis of comments given in a review meeting, the messages were modified in the direction of caution: urging mothers to start by adding a drop of oil and a small amount of the other ingredients and to work up slowly in quantity, in order to allay common fears of diarrhea and to avoid adverse reactions or rejection by the infants; and also adding a tag line encouraging mothers to consult with doctors, home management technicians, and other community health or nutrition workers.

In the three days following this meeting, the team of Manoff International and NMPC personnel, accompanied by a member of the governor's staff, visited the countryside, tested the message, and again asked the following questions:

- What did babies older than six months eat?
- Did the family have rice, oil, fish, and vegetables in the house?
- Did they have measuring cups and spoons?
- How did they prepare the family food and how was it prepared for the babies and young children?
- What did they think of the idea of giving six-month-old infants fish, oil, and vegetables in the lugaw?

- Who did they turn to for advice about feeding their infant?
- What radio station did they listen to?
- What programs did they like best?
- What were the availability and prices of oil, fish, and vegetables throughout the year?
- In what quantities were these foods usually sold?
- What did mothers buy to feed their infants?

A crucial omission occurred at this stage, however, in that no 24-hour recall of the diets of target children were performed. When such a recall was conducted at the end of the project in the HIID/UPCI survey, it disclosed that while 80% were eating rice daily and about 60% were receiving soup, only 30% received lugaw daily, so that a message to enrich lugaw only could not affect most children on a daily basis. Low consumption of lugaw was not apparent from general questioning because 97% of mothers claimed to feed their children lugaw, but not daily. The lesson learned by the Manoff team from this experience, according to Manoff Vice President Dr. Thomas Cooke, was never to accept any aspect of a theme or message on the basis of expert authority alone.

The scriptwriters in the investigation team focused on the language used, the reactions of the mothers to the proposed ideas of the messages, and the personal relationships in the homes - the roles of mother, father, and grandmother, and who was the most respected for advice about child care. The media planners probed for program preferences to help in the development of scheduling, while the nutritionists focused on constraints such as high prices, lack of measuring devices, and the comparability of nutrition and health programs in the test and control areas. The scripts were again rewritten after these interviews.

1. Scriptwriting

Scriptwriters Richard K. Manoff and Lawrence Grossman, president of the Public Broadcasting System, hired especially to work on this contract, determined with Manila radio writers and members of the NMPC that the novella or soap opera format would be well accepted, since it responded to a traditional love of drama in the Philippines.

The novella is an excellent format for presenting discussion of a new idea, which is one of the factors listed earlier favoring attitude and behavior change. The mini-drama also permits use of an authoritative change agent, the doctor, and of an opinion leader, the grandmother, and motivates change by appealing to concern for the child's health and to the desire for social approval - all factors known to promote change. The novella format also provides the chance to present the psychological

truths of the situation: the mother's concern for her baby, her reluctance to accept the new idea, her emotional retreat before the inevitable, her guilt for not knowing what was right, and the reassurance that feelings of guilt should be assuaged by the willingness to learn.

The goal of the novella was to help the target mother to loosen the grip of custom that her mother and her mother's mother before had passed on to her. This was accomplished by the ingenious method of turning the traditional conflict between the generations around - making the grandmother the sponsor of the idea and her daughter the opposer. The role reversal releases the audience from pre-established allegiances. Everybody becomes a free agent. However, something unusual must happen to make the role reversal believable. This something is the voice of higher authority, provided by the "doctor on the radio." The grandmother confesses she heard the new idea from the doctor and invites her daughter - and the radio audience - to listen while the doctor presents and underscores the message. The association of these two sources of authority, the grandmother and the doctor, in the radio spot brings an additional benefit: age is disassociated from cultural antiquity; and the idea that even old people keep learning new ideas is presented. (Further discussion of the dramatic elements of the radio spots are presented in the Manoff draft final report on this project [Cooke and Romweber 1977a].)

The potential effects on popular perceptions of the use of an authority figure in the media are also of interest. The doctor's voice lends authority to the radio spot, and the radio in turn reinforces the social image of the doctor. In answer to the question in the HIID/UPCI survey, posed at the end of the year of broadcasting, "What would you like your baby to become?" 45% of mothers replied, a doctor or a nurse or a medical technician.

Behavioral objectives of the scripts were defined to:

- Increase the number of women who begin supplemental feeding to infants by the sixth month of age.

- Increase the number of women who add chopped fish, green vegetables, and cooking oil to lugaw and introduce it by the sixth month.

The scriptwriters were faced with the problem (presented in Chapter Two) of breaking down a complicated set of directions into a simple enough form to present in 60-second spots. Since all of the instructions were supposed to be followed at the same time in preparing lugaw, they did not wish to touch on only one element of the message in each of the scripts. The compromise employed was to mention all elements of the message in each of six spots, but to focus each spot on a separate instructional element. It was also expected that the variety provided by the six different versions would slow down the process of message fatigue. (The five remaining spots are presented as Appendix B.)

2. Message Testing

After recording the messages, using actors who were regular performers in local radio dramas, the messages were played for two and a half days from tape recorders to rural families with target-age children who had been selected for the tests by the barrio captains or the mayors. In this test, it was discovered that only half of the infants were being fed lugaw by six months of age. A refinement of the messages stressed the importance of giving lugaw (a food which, though inferior to rice, is far better than no supplement), and specified that the vegetables must be green and that oil should be started with one drop. The scripts were then rerecorded and put on the air.

D. Media Plan

With full cooperation of the governor's office and the regional office of the NMPC, and with time donated by the stations in Iloilo City and Bacolod City for the entire test period of a year, the remaining task of media planning was to place the messages at the best times during the day and to obtain the highest exposure possible. Dr. Patron, the Philippine project manager, investigated the programming, popularity with rural mothers, and reach or broadcasting range of each station, primarily from the knowledge of the station managers and from advertising, since no media data were available. Together with broadcasting association chapter presidents in Bacolod and Iloilo, she worked out a rotation schedule for the individual spots, giving a constant rotation of the different versions of the script, with a total exposure of nine spots per day.

III. EVALUATION

A. The Surveys

The evaluation findings presented in the case study draw on both the large (700 women) sample three-wave tracking study conducted by the Manoff/NMPC team and the small (100 mothers of target-age children) cross-sectional study of nutritional status of infants and attitudes and other factors relating to acceptance, or adoption conducted by HIID and UPCI. The same market research firm, Consumer Pulse, Inc., of Manila, supervised the interviews and handled the data coding and keypunching for both of these studies, and the home economist conducting the interviews for the smaller study traveled with the Manoff/NMPC interviewers in the third and final wave survey, selecting a different but comparably random sample from the same rural locations. The Manoff evaluation also followed a control group of families on the island of Cebu, where the message was not played. The control group results will not be included because they reveal no changes from wave to wave and provide no further revealing comparisons.

Qualified respondents for the Manoff evaluation were women who were female heads or co-heads of household 30 years or younger, or of any age and pregnant, or of any age and the mother of a child 12 months old or younger. (The Manoff/NMPC tracking wave households were selected randomly

by barrio and by cluster sampling within each barrio.) The survey questionnaire investigated media habits, message recall, and knowledge, attitudes, and behavior regarding infant feeding. The dietary questions in the survey asked in the normative form: "How do you usually feed a baby of 6 to 12 months?" and investigated the ages at which weaning foods were usually introduced, the number of mothers who had tried the radio advice, and the frequency and quantity levels at which these women stated that they usually carried out the advice.

The HIID/UPCI study built on the Manoff/NMPC Wave II findings concerning numbers of women who had tried the innovation, and went on to define a specialized sample equally balanced between 50 infants of mothers who had heard and rejected the radio message and 60 infants whose mothers adopted the oil message. Oil was chosen as a focus of the nutritional impact evaluation because the main nutrition deficiency was known to be caloric. Equal-sized samples of acceptors and nonacceptors were chosen in order to study the factors determining acceptance, using a limited total sample. The acceptor group was initially defined as all mothers who had ever tried adding oil to lugaw, but was redefined for the analysis to include only those mothers who had continued to add oil to lugaw at least once a week and who thus had become adopters of the innovation.

The age range chosen for sample infants was from 6 to 15 months. As the message had been playing for a full year at the time of the HIID/UPCI evaluation survey, it was assumed that many of the children whose mothers had started to implement the message during the course of the year and who were still in the lugaw-eating age range would now be 12 to 15 months old, an age of generally poor nutritional status when the results of successful nutrition interventions have been measurable (National Nutrition Program, Philippines 1975; Rajagopalan et al. 1973) in better than average weights for age.

The HIID/UPCI study conducted a carefully quantified 24-hour recall (see Chapter Three), weighed the infants, and complemented the Manoff attitude survey by further questions concerning the mothers' cultural concepts regarding health and food and concerning the decision-making process. The nutritional knowledge of each mother was tested by asking her to name six foods good for babies and three foods bad for babies and her reasons for naming these foods. Each mother's understanding of nutrition was assigned a score from 0 to 10 by the senior nutritionist and principal project investigator from UPCI. Each mother was also assigned a nutritional practice score from 1 to 3, based on the variety of foods recorded in the 24-hour recall. One point each was assigned for staple starches such as rice or lugaw; animal-protein foods such as egg, fish, or meat; and vitamin-rich vegetables or fruits. A score of 3 meant the child had foods from all three groups in addition to milk; 1 meant the child had received the staple only; and 2, the staple plus one other group.

Weight values were transformed for the purpose of the analysis to percentages of the median weights for age and sex according to both the Harvard and Philippines standards (Stuart and Stevenson 1959; Food and Nutrition Research Center 1974). The Harvard standards were found to be more useful for statistical testing because they score boys and girls against different standard values, whereas the Philippines tables are simplified for screening purposes to a single standard for both sexes. Dietary constituents were calculated using Philippine food composition tables (Food and Nutrition Research Institute 1976). Food values for the different preparations of supplementary milk fed to infants were calculated from the amount of undiluted tinned milk product (sweetened condensed, condensed, filled, or powder) used. Volume of milk consumed was coded for analysis on the basis of milk protein content, at a value of one ounce milk per gram protein, as found in whole cow's milk - a necessary standardization procedure when many milk preparations are considered together. Dietary adequacy was measured against the FAO/WHO standards (1973), which corresponded to the Philippines standards over the target age range. Median body weights for age and sex according to the Harvard standards were used to calculate ideal caloric and protein requirements, while actual body weight was used to derive a lower estimate of actual requirement. Both studies were analyzed using the SPSS statistical packaged programs (Nie et al. 1975).

1. Baseline Estimates of Nutrient Deficits of the Target Group

Comparison of the individual quantities of nutrients ingested with individual requirements is the most technically demanding and complete type of analysis of 24-hour recall survey information. This thorough analysis makes it possible to estimate the size and distribution of nutrient deficits, which should serve as baseline information. The entire sample of 100 infants in the HIID/UPCI survey was used in the estimation of nutritional status and dietary deficits of the target group, because no significant differences were found between the diets of adopter and nonadopter infants.

Table 14 presents the main supplements to breast milk received by the children, taken from results of the 24-hour dietary recall. Dietary and nutrient intakes of all foods, presented in Tables A-1 through A-3 of Appendix A, show that almost all infants did eat some other foods and that a fair variety of foods were eaten by a few children each.

Although the largest single calorie source was cow's milk (averaging 140 calories per child), this weaning diet contained an average of only 13.6% of calories from fat or oil, compared to 40% to 50% calories from fat in breast milk, cow's milk, and in the diets of preschool children in industrialized countries. It was low in total quantity of food, and specifically in calories, iron, and green leafy vegetables, which are natural sources of Vitamin A. Thus, messages to supplement this diet with oil and green leafy vegetables were entirely appropriate. Possibly since 51% of the children were receiving at least a taste of fish, meat, or egg, and all but five were receiving some form of milk, protein deficiency appeared on the average less severe. Severe protein deficiency did exist, however, in the diets of some children.

TABLE 14

MAIN SUPPLEMENTS TO BREAST MILK RECEIVED BY 100 INFANTS AGED 6-15 MONTHS IN RURAL ILOILO

| | Percent of Children Receiving Supplementary Food | Average Amt. Consumed by Those Children Receiving Supplement | Standard Deviation |
|---|---|---|---|
| Animal protein food (fish or meat or egg totaled together) | 51% | 1.4 tsp. | 1.1 |
| Rice | 80% | 1.8 Tbsp. | 1.0 |
| Clear soup | 62% | 2.8 oz. | 6.7 |
| Cow's milk | 54% | | |
| | (31% mixed breast/ bottle) | 8.2 oz. | 9.4 |
| | (23% cow's milk without breast feeding) | 19.8 oz | 11.0 |
| Biscuit | 45% | 10.1 gm. | 9.8 |
| Vegetables | 33% | | |
| | (6% green leafy) | 2.9 tsp. | 3.7 |
| | (27% other) | 2.8 tsp. | 3.3 |
| Lugaw | 30% | 1.5 Tbsp. | 0.7 |
| Bread | 28% | 21.9 gm. | 23.1 |

An average calorie deficit for all sample children was very roughly estimated at 50 calories per day (standard deviation = 397).[3] Protein deficit was similarly estimated at -0.7 gm. (standard deviation = 12 gm.). This would imply that roughly 16% of the children (the percentage falling below one standard deviation from the mean) had a caloric deficit exceeding 400 calories and a protein deficit of more than 11 grams on any given day. To determine the percent of children consistently in deficit would require repeated dietary recalls from each child, since the child in deficit today may compensate by eating more of his or her requirement tomorrow.

Even with larger sample sizes and better estimation techniques, these figures would be extremely approximate because of wide variability in the requirements of individual infants and of the same infants under different health conditions. (An obviously well-nourished infant whose dietary intake falls below average cannot normally be said to be incurring a deficit, and vice versa.)

The averages above fail to take into account the fact that the majority of younger infants, aged 6 to 8 months, were not malnourished. Again basing dietary calculations on nonbreast-fed infants, and defining as malnourished those children who fall below 80% weight for age on the Harvard scale (below the third percentile), which is equivalent to 88% to 90% weight/age according to the Philippines standards, we found 52% of the infants, averaging 11 months in age, with an estimated daily caloric deficit of 134 calories (standard deviation = 408) and .13 grams protein (standard deviation = 13.2). Although this estimate was based on a sample size of only 12 cow's milk-fed infants, these 12 had the same average age and weight/age (71%) as the malnourished group in the entire sample, and similarly made up 52% of the total subsample of cow's milk fed infants on which the previous deficit figures were calculated.

If this malnourished group of 12 cow's milk fed infants is expanded to include the five infants who received no milk at all (all malnourished), we have a total of 17 infants with the same average age, an average weight/age of 68%, and average deficits of 276 calories (standard deviation = 415) and 5.3 grams protein (standard deviation = 13.8).

Deficit estimates based on dietary intake are of practical use here only for making sure that there is a deficit and that the amounts of supplementary nutrients made available to individual infants by the nutrition intervention do not fall far outside the range of the estimated amount required (e.g., as low as 1/10 of deficit). They can be used only very approximately to estimate the degree to which a supplement that appears satisfactory in quantity can potentially fill the deficit for an individual or for a group, unless costly individual longitudinal energy intake and expenditure studies are conducted, which would not be practical in the course of a routine evaluation. Instead, changes in growth status, measurable by weight/age in the under-two age group, provide reliable indirect evidence capable of proving whether the available supplements actually do reduce the dietary deficits. Growth rates can increase only if an infant's dietary deficits diminish, so that he or she has more calories and protein to spare for growth after the amounts required for body maintenance have been deducted.

## IV. SUMMARY OF THE HIID/UPCI AND MANOFF/NMPC FINDINGS

### A. Extent of Behavioral Change and Projected Nutritional Significance of the Project

Table 15 presents findings from the HIID/UPCI survey which were used in the calculations in Table 16. Table 17 summarizes those results of the survey that concern percentage incidence of behavior change in response to the message; approximate or potential percent of caloric deficit covered by the addition of oil to lugaw; percentage levels of consumption of lugaw and of other rice foods to which oil could also have been added; and projection of the percentage incidence of change and the amount of caloric deficit which could potentially have been covered if (1) the message had been expanded to include all rice foods consumed as vehicles for adding oil, (2) formative evaluation had been conducted at three months and messages had been modified accordingly. Incidence figures for initial trying of the advice are taken from the Manoff survey results. The rest are taken from our 24-hour dietary recall. No projections are made for fish or vegetables for reasons to be explained later.

Rates of adoption could also undoubtedly have been improved if the project had enlisted more participation from face-to-face nutrition educators, if oil had been more universally available, if tracking exercises had taken place at more frequent intervals, and if a misunderstanding concerning the type of oil to be used had been clarified. Apparently mothers were so used to brand name advertising that they wondered if they had missed the name of the oil. The HIID/UPCI interviewer reported that a majority of mothers had asked what kind of oil was specified by the radio spot.

### B. Maximum Potential

Potential caloric significance of oil added to lugaw is relatively low, as indicated by the 17% of deficit covered shown in Table 16. However, when total feedings of rice, lugaw, and a porridge made with rice flour called binokbok are averaged, the mean number of rice product feedings is about four times the average number of lugaw feedings. Thus it was projected that if the message were expanded to include not only lugaw but rice and binokbok, the amount of oil consumed by acceptor infants might be multiplied by the factor of four. Although most of this oil would presumably reach a different set of infants from the lugaw-eaters now listed as acceptors, most infants who received oil in lugaw in the 24-hour recall also ate rice and so might also expect to receive as much as three times the amount of oil presently consumed. On this assumption, it is projected optimistically that a change in the message could lead to a coverage of 50% to 75% of the present caloric deficit of malnourished adopter children at current acceptance rates.

According to a personal communication from Dr. Oswaldo Kreimer, AID media consultant assigned to assess the project, the leveling off of acceptance rates probably occurred after three months rather than six months, when the midpoint survey was conducted. Potential acceptance rates are listed as triple the actual rates, although after the early adopters had changed their behavior, the rest could be expected to change more slowly.

TABLE 15

RESULTS FROM HIID/UPCI SURVEY

USED IN CALCULATIONS IN SUMMARY TABLE D

| | Numbers of Mothers/ Infants |
|---|---|
| Tried adding oil to lugaw | 49 |
| Didn't try adding oil to lugaw | 51 |
| Added oil to lugaw regularly at least once a week (new definition of adopter mothers) | 41 |
| Discontinued adding oil to lugaw | 8 |
| Adopter infants who received lugaw yesterday | 14 |
| Nonadopter infants who received lugaw yesterday | 16 |
| Received oil in lugaw yesterday | 9 |

TABLE 16

RESULTS OF HIID/UPCI SURVEY CONCERNING DEGREE TO WHICH MESSAGE TO ADD OIL TO LUGAW IS PRACTICED IN RURAL ILOILO, AND ITS POTENTIAL NUTRITIONAL SIGNIFIGANCE

| | 6-15 months | 6-12 months | 13-15 months |
|---|---|---|---|
| % Ever put oil in lugaw (from Manoff survey) | 26% | 26% | 27% |
| % Adding at least once a week (41/49 X 26) | 22% | 22% | 22% |
| % Discontinuing (8/49 X 26) | 4% | 4% | 4% |
| % Feeding oil in lugaw yesterday (9/41 X 22) | 5% | 5% | 5% |
| % Adopter infants receiving lugaw yesterday also receiving oil (9/14) | 64% | --- | --- |
| % Infants receiving lugaw yesterday | | | |
| combined sample | 30% | 31% | 24% |
| adopters | 34% | --- | --- |
| nonadopters | 27% | --- | --- |
| % Infants receiving rice yesterday | | | |
| combined sample | 81% | 78% | 92% |
| adopters | 88% | --- | --- |
| nonadopters | 73% | --- | --- |
| % All infants receiving lugaw yesterday whose mothers are adopters (.34 X 22 + .27 X 78) | 26% | --- | --- |
| % All infants who received lugaw yesterday who also received oil (.64 X 26) | 17% | --- | --- |

TABLE 16 (continued)

Estimated adopters if message were generalized to include rice and binokbok (over 90% of infants get some form of rice) = 15% ($3^{+}$ X 4.8).

Estimated adopters if message had been modified after formative evaluation at three months = 30% (15 X 2). This is a difficult figure to estimate because after the early adopters, the remaining population can be expected to be more resistant to change.

Average amount of oil received yesterday by 9 infants receiving oil in Lugaw = .54 tsp.

Calories in .54 tsp. oil = 23 $\approx$ 2.4% of daily caloric requirement for 6-to 11-month infant $\approx$ 1"% of caloric deficit of infants with weights below Harvard 3rd percentile.

Estimated average number of calories per adopter child if message were generalized = 50-75 calories/day $\approx$ 50% of average caloric deficit of malnourished children.

TABLE 17

SUMMARY OF FINDINGS OF THE MANOFF/NMPC SURVEY

During the 12-month radio education experiment, statistically significant numbers of mothers in the test area adopted the recommendations of the messages by enriching their infants' rice porridge with cooking oil, fish, and green vegetables. Data from interviews with doctors, nurses, rural schoolteachers, and others working in the target group communities confirmed that mothers were indeed changing the ways that they fed their infants. (Cooke and Romweber 1977a, p. 80.)

Changes in behavior were accompanied by large-scale shifts in attitude and knowledge about the values of adding these foods to the infant diet.

Specifically, at the end of 12 months:

Oil

- 24% of mothers of infants 6 to 12 months of age were adding oil, where none had added it before. The amount and frequency of oil added was, on the average, 27% of the maximum recommended.
- 74% of mothers believed that oil added to the infant's lugaw was "good for the baby," where 15% had believed this before the campaign.
- 6% believed that oil would only make the infant sick, where 48% had believed this before.

Fish

- 27% of mothers were adding fish, where 17% had added it before. The adopting mothers, on the average, added 47% of the expected amount and frequency.
- 80% of mothers believed that fish added to the infant's lugaw was "good for the baby," where 48% believed this before.
- 13% of mothers believed that fish causes worms, where 32% believed this before.

Vegetables

- 17% of mothers were adding vegetables, where 5% claimed to be adding it before.
- 80% of mothers believed that vegetables added to the infant's lugaw was "good for the baby," where 47% believed this before.
- 3% believed that vegetables cause stomach trouble for the infant, where 20% had believed this before.

Major findings of the Manoff/NMPC survey concerning behavior, attitude and knowledge changes are summarized in Table 17. Most of these changes occurred within the first six months of the campaign, with the last six months showing only marginal statistically insignificant increases, a leveling-off that was probably due in part to a drop in the frequency of broadcasts and in part to message fatigue, as the same messages were played for the entire year.

C. Consistency of the Surveys

No reasons exist to question the Manoff/NMPC findings of incidence of adoption of the message to add oil to lugaw on the basis of the HIID/UPCI study, although the latter study depends on the former to define the percentage of mothers who tried the new behavior. Of those who claimed to be adopters of the message and who also fed lugaw to the infant on the day preceding the survey (total of 14), nine, or 64%, claimed to have added oil, which is a fair percentage considering that not all families had oil in the house.

The Manoff/NMPC findings concerning the incidence of mothers' adding fish and green vegetables to lugaw, however, probably reflect the unclear position of the mother who gives her child both fish and lugaw, maybe even at the same meal, but does not cook them together, and who then is requested to say whether she fed her child fish in lugaw. From our 24-hour recall, 30% of mothers had given their infants fresh fish, 10% dried fish, and a total of 51% some form of fish, meat, or egg on the day preceding the survey. However, only 2% of mothers had added any form of animal protein to lugaw (in both cases, fish). Dividing two by 30 infants who ate lugaw gives a 7% estimate for accepting the message to add fish to lugaw. Since so many of our mothers were adopters of the oil messages, their rate of acceptance for the other messages should have been higher than that of the general population. Fish and greens were also more likely than oil to be available daily in every household. In the case of green leafy vegetables, 6% of infants had received them during the previous 24 hours, but in no case had they been added to lugaw. In other words, mothers may have given fish and greens in response to the radio message, but not have added these to lugaw.

The three ingredients promoted for addition to lugaw by the radio message are qualitatively different, in that fish and vegetables are commonly eaten without being mixed with other foods, while oil is not palatable alone. None of the infants had received a measurable quantity of oil or fat, except in lugaw. For this reason, the fish and vegetable messages probably should have been redrafted to advise mothers simply to feed their infants more fish and greens. Although the messages used in the campaign were not fully on target, they still served the highly valuable function of teaching the positive value of fish and greens for the child's health and of dispelling incorrect beliefs that these foods would cause worms or stomach trouble.

The fish and vegetable messages probably did lead to an increase in total consumption of fish and vegetables by the target group, but since no quantitative measurement of this increase was made by either survey, we will not attempt to make projections of the impact of the fish and vegetable messages on nutritional status.

## V. THE EVALUATION RESULTS IN DETAIL

### A. Background Information Concerning the Availability and Cultural Uses of Oil and Lugaw

#### 1. Oil

A more detailed look at the results of evaluation should start with a statement of the gaps in our knowledge concerning the use of oil by the target population. In the HIID/UPCI survey, only 46% of the acceptor mothers who claimed to add oil to lugaw at least once a week (vs. 42% of nonacceptors) and only five of the nine who claimed to have added oil to lugaw in the 24-hour recall, were able to show the interviewer that they had cooking oil in the home. In almost all homes where there was no oil, there was an empty (usually small) oil bottle. Since 31% of the women said they had to travel into town to buy oil and since, according to the Manoff survey, 83% of mothers aware of the message bought oil once a week or less frequently, it was reasonable to expect that oil, which was not considered essential to daily meal preparation, was used up before the next purchase.

Low use of oil persisted although the market price per calorie of oil was less than half of the cost per calorie of rice. Seven percent of respondents claimed oil was expensive, although the cost of oil in Iloilo City at the time of the survey was Pesos 1.20 (U.S.$0.16) for a two-cup quantity versus Pesos 2.20 (U.S.$0.30) per kg. for rice. This works out to 36 calories per centavo for oil, versus 16.7 calories per centavo for rice. Rice, however, is a staple, which people perceive as essential, while oil, according to a number of well-educated informants in Iloilo, tends to be perceived as a luxury. Thus, the price elasticity of oil apparently differs from that of rice.

Many families own coconut trees which produce coconuts year round. It was claimed that one woman can easily prepare a cup of oil from one coconut with an hour's work, by grating and boiling. Attitudes and behavior surrounding the purchasing, preparation, and use of oil need to be examined more closely.

#### 2. Acceptability and Use of Lugaw

Mothers in the HIID/UPCI study claimed to feed lugaw to their infants over the age range shown in Table 18, but not on a daily basis. A probable reason that less than a third of the infants surveyed received lugaw in the preceding 24 hours is that this porridge takes time and fuel to cook, and adults in the family don't like it.

TABLE 18

AGE RANGE OF INFANTS RECEIVING LUGAW
(INFORMATION FROM SAMPLE OF 50 ACCEPTOR MOTHERS)

| Age in Months | Percent Having Started Lugaw | Percent Having Stopped Lugaw | Percent Starting or Stopping at Specified Month |
|---|---|---|---|
| 3 | 24% | --- | --- |
| 4 | 40% | --- | --- |
| 5 | 92% | --- | 52% (starting) |
| 8 | 100% | 6% | --- |
| 12 | --- | 52% | 42% (stopping) |
| 15 | --- | 56% | --- |
| 18 | --- | 64% | --- |
| 24 | --- | 94% | 28% (scopping) |
| 72 | --- | 98% | --- |

Tables 19 and 20, listing answers to the questions, "When do adults eat lugaw in your family?" and "Why wouldn't you like to eat lugaw more often?", show that lugaw is a food associated with illness and poverty, and is not liked by adults for the same reason that it is a poor food for infants - because of its low calorie content, which was subjectively recognized in answers such as "I feel hungry an hour after eating it." On the other hand, lugaw is believed to be good for babies for the reasons listed in Table 21.

B. Frequency of Broadcasting

Knowledge of the frequency with which messages were broadcast over time also is important for the interpretation of changes produced by the project. Although a media monitoring system staffed by students in Iloilo City and Bacolod City monitored about 7% of total broadcast time of the 15 participating stations, and although personal visits were made to the station managers, the frequency of broadcasting dropped from the planned nine spots per station per day to about one per day during the month of October, when the final wave of interviews was taking place. The single remaining spot tended to be aired during popular listening time in the evening. This degree of fall-off in broadcasting has been shown in advertising to produce rapid fall-off in message recall, knowledge, attitude and behavior changes and is thus probably partially responsible for the fact that little change occurred between Waves II and III. Had the time been purchased and prescheduled, instead of public service time scheduled at the discretion of the station manager, prior commitments probably could have been more closely honored and monitoring could have proceeded more accurately. Average frequency over the year was about three spots per day.

C. Knowledge Change

1. Message Recall

Message recall continued to increase throughout the year, from 62% of respondents having heard the spots at Wave II, to 75% by Wave III. Table 22 presents percentages of total respondents in Wave II and III of the Manoff/NMPC surveys mentioning specific message elements. These and other comparisons, which create a scale of message elements, also indicate continued improvement of recall over time. The two highest spontaneous recall mentions were of key ideas: "Child should be fed lugaw at six months to one year" (23% in Wave III), and "Six months is not too young for oil, vegetables, and fish" (16% in Wave III). The more complicated instructions were not mentioned voluntarily.

At all three waves, self-administered questionnaires were distributed to doctors, nurses, and other health and nutrition workers in the rural areas. Before the campaign started, a letter from Dr. Solon explaining the importance of the messages and the goals of the campaign had been sent to many of these workers. The percentage who had heard the messages and could recall specific items increased from wave to wave. By Wave II,

TABLE 19

ANSWERS TO QUESTION: "UNDER WHAT CIRCUMSTANCES DO GROWN PEOPLE EAT LUGAW IN YOUR FAMILY?"

(100 mothers)

| Reason | N = % |
|---|---|
| Sick | 28 |
| Occasionally for breakfast or for snack | 25 |
| No viand (no food in house to eat with rice - rice isn't normally eaten plain, but lugaw is) | 15 |
| Don't eat lugaw | 13 |
| Not enough rice | 10 |
| Fever | 7 |
| Leftover lugaw | 6 |
| Indigestion | 5 |
| Toothache, headache | 2 (each) |
| Loose bowel, stomach trouble, not choosy, weakness, after child-birth, eats every day | 1 (each) |

TABLE 20

ANSWERS TO QUESTION:

"WHY WOULDN'T YOU LIKE TO EAT LUGAW MORE OFTEN?"

(100 mothers)

| Reason | N = % |
|---|---|
| Become hungry soon after eating | 37 |
| Cloying, not satiating | 17 (each) |
| Causes hyperacidity | 15 |
| Doesn't stay in stomach | 11 |
| Causes sour burps | 10 |
| Too soft | 8 |
| No energy | 7 |
| Feel like vomiting, digests too easily | 5 (each) |
| Get pale, feel lazy or inactive, body weak, cannot breathe | 2 (each) |
| Loose bowel, stomach trouble, feels cold taste flat, hard | 1 (each) |

TABLE 21

ANSWERS TO QUESTION:
"WHY IS LUGAW GOOD FOR BABIES?"
(100 mothers)

| Reason | N = % |
|---|---|
| Soft | 57 |
| Easy to digest | 22 |
| Makes child lively | 16 |
| Makes child stout | 15 |
| Keeps child from feeling hungry | 12 |
| Adds appetite | 11 |
| Makes child strong | 7 |
| Prevents loose bowel, makes child gain weight, provides food nutrients | 4 (each) |
| Substitute for milk | 3 |
| Makes child healthy, makes child tall | 2 (each) |
| Lowers fever, child's body weak -- helps growth, strengthens teeth, tastes good | 1 (each) |

TABLE 22

MENTIONS OF MESSAGE ELEMENTS, EXPRESSED AS A PERCENTAGE OF TOTAL RESPONDENTS, COMPARING WAVE II AND WAVE III OF THE TEST GROUP

| | WAVE III (N = 660) | WAVE II (N = 674) |
|---|---|---|
| Complete recipe | 18% | 13% |
| Oil mentions | 57% | 39% |
| Vegetables mentions | 50% | 37% |
| Fish mentions | 40% | 15% |
| Child should be fed lugaw at 6 months to 1 year | 17% | 16% |
| Correct quantity of oil | 8% | 18% |

Source: Manoff et al. 1977, p. 17.

74% of these professionals had heard the message and could name one element. As in the case of the mothers, advice about adding oil was most memorable. By Wave III, 71% mentioned oil, 42% vegetables, and 40% fish. Radio ownership was 95% for these workers, as compared with about 45% for the rural families.

Knowledge change also was analyzed in the Manoff/NMPC survey by comparing changes in the accuracy of reasons given in answer to questions asking why oil, fish, or green vegetables given in lugaw to a six-month-old baby was either good or bad. Table 23 shows changes in percentages of correct and incorrect answers given over the three interviewing waves. Although awareness of the messages increased from Wave II to Wave III, average percentages of correct responses for the three ingredients, looked at separately, decreased marginally. Moreover, when the sample size used in determining the averages was limited to only those mothers who had heard messages for all of the three ingredients, the decrease of accuracy of message recall from Wave II to Wave III was statistically significant.

The Manoff team suggests the explanation that the mothers who first heard the advice between Waves II and III were less sophisticated than those who had heard it by Wave II. This theory is supported by evidence in other communications projects that first adopters are the innovators in the community and may learn new advice not only faster but better (Rogers and Shoemaker 1971). Knowledge changes of doctors and other professionals, particularly with regard to the value and safety of oil in infant feeding, continued to increase from Wave II to Wave III.

D. Attitude Change

In the Manoff/NMPC survey, women who had heard the message were asked whether they thought it was good or not to add oil, fish, and mashed vegetables to the lugaw for a six-month-old baby. Table 24 shows the changes in attitude as measured by responses to this question. As will be seen, these high percentages of positive attitudes were not consistent with fears expressed by the majority of mothers who did not change their behavior. It is possible to have a highly positive attitude toward an action in the abstract and still be afraid to take the risk of applying that action to one's own particular case. Positive attitude changes did not increase but were maintained in spite of the drop in frequency of broadcasts between Waves II and III.

Table 25 shows that positive attitude change did continue to occur among the professional worker group, where each worker presumably had the opportunity to observe the results of feeding oil, fish, and vegetables to a number of infants in the six months between Waves II and III. As can be seen, a major achievement of the campaign was to change the attitudes of these workers toward feeding oil to infants. Since nearly 50% of mothers reported that they turned to these workers for child-care advice, their changes in opinion are especially important.

TABLE 23

KNOWLEDGE ABOUT ADDING OIL TO LUGAW EXPRESSED AS A PERCENTAGE OF TOTAL RESPONDENTS

| | TEST | | |
|---|---|---|---|
| | WAVE III | WAVE II | WAVE I |
| N = | (660) | (674) | (700) |
| Correct Answers | | | |
| Makes Baby Fatter | 15% | 18% | 3% |
| Makes Baby Livelier | 22% | 26% | 4% |
| Gives Heat and Energy | 3% | 1% | 1% |
| Incorrect Answers | | | |
| Causes loose bowels | 6% | 12% | 48% |
| Causes Stomach Upset | 6% | 6% | 36% |

Source: Manoff et al. 1977.

TABLE 24

ATTITUDE CHANGE: WHETHER PUTTING OIL, FISH, VEGETABLES IS GOOD; ALL RESPONDENTS

| | | TEST | |
|---|---|---|---|
| N = | WAVE III (660) | WAVE II (674) | WAVE I (700) |
| Oil is good | 74% | 74%* | 15% |
| Fish is good | 81 | 80* | 48 |
| Vegetables are good | 79 | 82* | 49 |

*$p < 0.05$.

Source: Manoff et al. 1977.

TABLE 25

ATTITUDE CHANGE AMONG COMMUNITY WORKERS AS EXPRESSED AS A PERCENTAGE OF TOTAL RESPONDENTS, COMPARING WAVE I, WAVE II, AND WAVE III, TEST AREA ONLY

| | WAVE III $n = 162$ | WAVE II $n = 130$ | WAVE I $n = 99$ |
|---|---|---|---|
| Oil | | | |
| negative | 7.4% | 3.1% | 30.3% |
| positive | 84.0% | 75.4% | 42.4% |
| no answer | 8.6% | 20.0% | 25.3% |
| Fish | | | |
| negative | 1.9% | 1.5% | 6.1% |
| positive | 92.0% | 87.7% | 81.8% |
| no answer | 7.1% | 10.8% | 13.1% |
| Vegetables | | | |
| negative | 1.2% | 1.5% | 3.0% |
| positive | 93.2% | 86.2% | 87.9% |
| no answer | 5.6% | 10.8% | 10.1% |

Source: Cooke and Romweber 1977a.

## E. Behavior Change

### 1. Adoption Rate

The HIID/UPCI study found that nine mothers, or 22% of the total claiming to be message adopters, had actually added oil to their infant's lugaw in the previous 24 hours. These nine children made up 64% of adopter infants who received lugaw during the previous day. Projecting this percentage to the entire target population, as already presented in Table 16, gives an estimate of 5% of mothers of target children implementing the changed behavior on any given day, as compared to the 22% who claim to be implementing at least once a week.

The 5% implementing daily is in striking contrast to the 74% of the population expressing the attitude that it is good to add oil to a baby's lugaw, implying that only about 7% of those expressing the attitude that the behavior is good were implementing it daily, and that less than one third (30%) were implementing it weekly or more often. If, as suggested earlier, the message had been extended to include rice, binokbok, and soup as vehicles for adding oil, the 5% implementing the behavior change daily might have been increased to 15%, which would have been 20% of those expressing the attitude that the behavior is good. Additional contact with a health worker who explained the message personally to the 43% of the population who heard it from the radio only would have increased the total percentage of adopters from 22% to 33%, according to projections to be presented in Table 35, or to 44% of the 75% of the population who heard the message. This 33% in turn is 79% of the 56% of the population who both heard the message and expressed a positive attitude toward it.

This jumble of figures is presented deliberately to remind the reader of the maze of legitimate alternative calculations which occur in any statistical study and of the wide variations in the figures they produce. The conclusions emerging from these calculations are that some of the target population probably are obliging enough to express attitudes they believe the interviewer wants to hear, that important rates of behavior changes were in fact achieved, but that perceived risk probably kept rates of behavior change significantly below rates of attitude change.

### 2. The Decision to Adopt

The HIID/UPCI study asked four questions concerning the decision-making process for adopting oil. Tables 26 to 29 present answers to the questions, "Why did you decide to add oil to lugaw?" (asked of 41 adopters); "Why didn't you try adding oil to lugaw?" (asked of 51 nonadopters); "Why did you stop adding oil to lugaw?" (asked of nine who tried and stopped); and "Why do you think many women still are not adding oil to lugaw?" (asked of 41 adopters).

TABLE 26

ANSWERS TO QUESTION:
"HOW DID YOU HAPPEN TO DECIDE TO PUT OIL IN THE CHILD'S LUGAW?"
(41 mothers)

| Reason | N | % |
|---|---|---|
| Heard from radio | 16 | 39 |
| Told by friends | 8 | 20 |
| Told by doctor, BAEX, RTC, seminars | 4 | 10 |
| Told by mother, told by husband, read in magazines | 1 (each) | 2 (each) |
| To make baby gain weight | 10 | 24 |
| To make baby lively | 8 | 20 |
| To make baby fat/stout, to make baby strong | 6 (each) | 15 (each) |
| To make food tasty | 5 | 12 |
| To give baby nutrients, to make baby taller | 2 (each) | 5 (each) |
| To keep baby from getting hungry, to make baby healthy, to give baby appetite, to give baby smooth skin | 1 (each) | 2 (each) |

TABLE 27

ANSWERS TO QUESTION:
"WHY DIDN'T YOU TRY ADDING OIL TO LUGAW?"
(50 mothers)

| Reason | N | % |
|---|---|---|
| ose bowels | 30 | 60 |
| omach trouble | 26 | 52 |
| digestion | 25 | 50 |
| s | 23 | 46 |
| ew about putting oil in lugaw only recently - not used to doing it | 12 | 24 |
| l is too expensive | 11 | 22 |
| zy, busy at farm, forgot to add | 7 | 14 |
| ild young, has not yet fed lugaw | 6 | 12 |
| n't give lugaw - add rice flour (binokbok) to baby's milk, might cause skin rashes | 2 (each) | 4 (each) |
| ts oil in vegetables instead, seldom cooks lugaw | 2 (each) | 4 (each) |
| ther/husband/father/ other disapproved | 0 | 0 |

TABLE 28

ANSWERS TO QUESTION:

"WHY DID YOU STOP ADDING OIL TO LUGAW?"

(8 mothers)

| Reason | N | % |
|---|---|---|
| Caused loose bowels | 3 (each) | 38 (each) |
| oil expensive | | |
| Child stopped eating lugaw, don't buy oil often, forgot to buy oil | 2 (each) | 25 (each) |
| Mother not always in house, child feels like vomiting if add oil to lugaw | 1 (each) | 13 (each) |

TABLE 29

ANSWERS TO QUESTION:

"WHY DO YOU THINK MANY WOMEN STILL ARE NOT ADDING OIL TO LUGAW?"

(48 Mothers)

| Reason | N | % |
|---|---|---|
| Don't know about it yet/ heard only recently | 17 | 35 |
| Afraid of loose bowels | 15 | 31 |
| Afraid of stomach trouble | 7 | 15 |
| Lazy | 4 | 8 |
| Afraid it might cause indigestion, pallor, worms, hyperacidity | 2 (each) | 4 (each) |
| No money | 1 | 2 |

If the percentages of negative responses of those who never tried the message are projected to the 74% of the total population who never tried it, we would have 44% of the total population not trying to give oil for fear of loose bowels, 38% not trying it for fear of stomach trouble, and 37% for fear of indigestion. These responses contrast strongly with the Wave III attitude responses collected at the same time, which indicate that only 6% of respondents believed that oil would cause loose bowels and only 6% believed it would cause indigestion.

The likelihood is that both surveys are correct on this issue, but that respondents assign a probability to their beliefs, so that a mother saying she does not believe that adding oil to lugaw would give her baby diarrhea would be reporting her belief that there is a large chance that the baby would not get sick versus a small chance that it would get loose bowels. But since diarrhea is perceived as very dangerous, even the small chance might be too high a risk for her to try the new behavior. This apparent discrepancy between the two sets of findings supports the contention that the media are not able to produce high rates of behavior change in high-risk situations without face-to-face interaction with a trusted person who can provide personal reassurance. The reasons given by adopters to explain why other women were not adopting the behavior reinforce this conclusion. Adopters are less likely than nonadopters (31% versus 60%) to mention fear of loose bowels, and more likely (35%) to conclude that nonadopters have insufficient knowledge of or contact with the message.

3. Behavior Changes Reported by Doctors and Other Community Workers

In response to the self-administered questionnaires sent to nutrition and health workers, 54% reported that some mothers in their area were adding oil to lugaw by Wave II and 56% by Wave III. About a third of the positive respondents in both waves estimated significant percentages of adopter mothers, ranging from 11% to 40% of the population. By the end of Wave III, 15% of workers estimated that the correct quantity of one teaspoon was being given in a bowl of lugaw, compared to 11% in Wave II.

At the end of each radio spot, mothers were urged to consult with the "home management technician, community worker, or local "doctor" for additional information. This advice was taken more seriously than expected by the pilot project team. In Wave I, 24% of professional respondents reported that no families visited them for advice, versus only 6.2% in Wave III. Over the same time period respondents reporting that 1 to 10 families had come to them increased from 33% to 50%, and those reporting 11 to 20 families increased from 9% to 14%. The data on consultations probably represent a greater increase in consultations than indicated by the numbers alone because of the shifting composition of the field worker respondent group. In Wave I, 46% were doctors, nurses, or midwives persons to whom mothers traditionally turn for advice about child care. In Wave III, these professions were represented by only 10% of the respondents, with the remaining 90% made up of rural teachers, who are not traditional sources of nutrition information but who have been effectively enlisted by the Philippine National Nutrition Program.

4. Amount of Oil Added to Lugaw

The Manoff/NMPC study arrives at an estimate of total amount of oil received per receptor child which is about twice the amount estimated by the HIID/UPCI study.

The Manoff/NMPC analysis created the following index for amounts of oil received:

Amount and Frequency Index

Points were given for the following combinations of answers (Cooke and Romweber 1977, p. 120):

| Amount and Frequency | Number of Points Given |
|---|---|
| 1 tsp. oil given once, twice, or three times a day | 4 points |
| 1/2-1 tsp. oil given three, four, or five times a week | 3 points |
| < 1/4 tsp.-1/2 tsp. one-two times a day, five times a week | 2 points |
| 1 tsp. twice a week | 1 point |
| < 1/8-1/4 tsp. once a week | 0 points |

By the end of Waves II and III, target-age children were receiving an average index score of .22 and .23 respectively. This means that each of the total of 32 children each receiving oil in Wave II and in Wave III received an average score of about 1, or the rough equivalent of one teaspoon twice a week. Reported behavior changes for amounts of oil, fish, and vegetables added to lugaw did not increase from Waves II to III. The HIID/UPCI study calculated nine receiving oil (in the 24-hour recall) times an average of .54 tsp. received times 7 days divided by 41 adopter infants equals .83 tsp. per week.

5. Changes in Regular Diets

Changes from Wave I to II in regular diets given in answer to the question in the Manoff/NMPC survey, "What do you usually feed babies who are from six months to a year old?" are given in Table 30, which presents the answers of women who actually had children in this age range. The apparent decrease in oil versus the reported increases in fish and vegetables are unexplained, but could be because some respondents perceived in the later waves that the interviewers were referring to oil in lugaw rather than oil used in cooking generally.

6. Possible Danger of Negative Behavior Change

When presenting a message through the mass media with little opportunity for two-way, face-to-face communication, there always is the danger that the message may be misunderstood or that inaccurate deductions may be made from it.

TABLE 30

REGULAR DIETS FOR INFANTS 6 TO 12 MONTHS OF AGE AS REPORTED ON AIDED AND UNAIDED BASES BY MOTHERS WITH INFANTS 6 TO 12 MONTHS OF AGE, WAVES I, II, & III

| | TEST | | |
|---|---|---|---|
| | III | II | I |
| N = | (136) | (142) | (157) |
| Breast milk | 86.6% | 86.6% | 84.7% |
| Milk (net) | 73.5% | 67.6% | 73.2% |
| Rice | 100.0% | 97.9% | 95.5% |
| Lugaw | 97.8% | 97.2% | 98.1% |
| Oil/lard (net) | 41.2% | 49.3% | 56.1% |
| Green vegetables (net) | 53.7% | 58.5%* | 43.3% |
| Fish | 94.9% | 95.1%* | 86.6% |

*p = .95 Wave I-II

Source: Cooke and Romweber 1977a.

Only five infants out of the HIID/UPCI sample of 100 received no breast or cow's milk according to the 24-hour dietary recall. All five of these children belonged to the oil acceptor group, and all five were severely malnourished (average 61% weight/age and receiving less than 50% of calorie and protein requirements). This raises the possibility that some mothers, hearing from the radio that oil will make their baby healthy, may conclude that a drop of oil now and then can substitute for other important foods, and for milk in particular. The Manoff survey found no evidence of this effect. The parents of these five were significantly less well educated than the rest of the sample. (Table A-5 in Appendix A shows the nutritional parameters of the five receiving no milk.)

F. Factors Influencing Adoption

Who are the adopters? A look at characteristics associated with adoption gives us a picture of the groups who have been convinced by the campaign and those who may require a different mix of educational approaches. As noted in Chapter Two, early adopters have been found in many studies to have different characteristics from later adopters. The following list of expected characteristics of early adopters is from Rogers and Shoemaker (1971), but includes only variables in the two surveys. Characteristic patterns confirmed by the present surveys are underlined. Early adopters: are the same age as later adopters; have more years of education than later adopters; are of higher socioeconomic class; have a more favorable attitude toward change; have a more favorable attitude toward risk; exhibit more social participation; have more change agent contact; have greater exposure to mass-media communication; have greater exposure to interpersonal communication channels; and have greater knowledge of innovations than later adopters (higher nutritional knowledge and practice scores).

Evidence of these characteristics from the HIID/UPCI survey are presented in Tables 31 and 32, which give factors significantly related to adoption. Positive relationships between adoption and radio ownership ($P < .001$), radio listenership ($P > .0015$), and a positive attitude toward oil for infants were found in the Manoff/NMPC study. A nonsignificant trend toward higher income and higher education of the father in adopter families in the Manoff/NMPC study was entirely unapparent in the HIID/UPCI study, and probably arose from the fact that only radio listeners were included in the HIID/UPCI evaluation, whereas a presumably less affluent group who had heard the message were a part of the other study.

The reason that adopters were not found to be of higher socioeconomic class or to have more years of education and higher aspirations for their children than nonadopters probably lies in the nature of the innovation, as mentioned in Chapter Two. Adoption of the innovation does not confer status, because lugaw, as mentioned earlier, is a food with a generally poor image, sometimes associated with poverty, and coconut oil, while a bit of a luxury, is used in ordinary cooking and hairdressing. Adoption of another major innovation in infant feeding in Iloilo, bottle feeding was found to be associated with higher education and socioeconomic class, as is shown in Tables 33 and 34. (Adoption of bottle feeding generally is perceived to confer higher social status in developing countries.)

TABLE 31

FACTORS SIGNIFICANTLY RELATED TO ADOPTION OF RADIO MESSAGE TO ADD OIL TO LUGAW

(Adding Oil Once a Week or More)

Nonparametric Correlations

| Variable | Direction of Correlation | Significance Level |
|---|---|---|
| Heard message from extension worker | + | .001 |
| Heard message from friends | + | .029 |
| Total number of sources of hearing message | + | .006 |
| Number of children 0-15 years | + | .004 |
| One or more children 10-15 years | + | .061 |
| Mother's age | + | .034 |
| Number of foods child refuses or dislikes | + | .059 |
| Number of foods baby has not tried | - | .025 |
| Nutritional Knowledge Score | + | .068 |
| Nutritional Practice Score | + | .077 |
| Knowledge Score + Practice Score | + | .037 |

TABLE 32

FACTORS SIGNIFICANTLY RELATED TO
ADDING OIL TO LUGAW IN PAST 24 HOURS

Nonparametric Correlations

| Variable | Direction of Correlation | Significance Level |
|---|---|---|
| Number of sources given | + | .052 |
| Heard from friends | + | .096 |
| Number of children 0-15 years | + | .089 |
| One or more children 10-15 years | + | .090 |
| Number of lugaw feedings in last 24 hours | + | .001* |
| Total amount lugaw eaten in last 24 hours | + | .002* |
| Percent calories from fat | + | .074* |

*These are circumstantial correlations -- to eat oil in lugaw the baby must eat lugaw, and if it has oil in it, he is receiving extra calories from fat.

TABLE 33

AVERAGE EDUCATIONAL LEVEL* OF PARENTS OF 99 6 TO 15 MONTH INFANTS IN RURAL ILOILO, GROUPED BY MILK FEEDING METHOD

| | Mother | | Father | | |
|---|---|---|---|---|---|
| | Mean | Std. Dev. | Mean | Std. Dev. | N |
| | 4.14 | 1.94 | 3.73 | 1.79 | 99 |
| Breast milk only --- | 3.78 | 1.64 | 3.12 | 1.10 | 41 |
| Mixed ---------- | 4.30 | 2.05 | 4.30 | 2.12 | 30 |
| Cow's milk only ---- | 4.87 | 2.22 | 4.36 | 2.06 | 23 |
| No milk ---------- | 2.80 | 0.84 | 2.60 | 0.89 | 5 |
| | (sig. = .06) | | (sig. = .005) | | |

* Educational level scored as follows:

1 = No schooling.
2 = Some elementary school.
3 = Completed elementary school.
4 = Some high school.
5 = Completed high school.
6 = Vocational.
7 = Some college.
8 = College degree.
9 = Completed some master's level.

TABLE 34

REPORTED MONTHLY INCOMES* OF FATHERS OF 95 6 TO 15 MONTH INFANTS IN RURAL ILOILO, GROUPED BY MILK FEEDING METHOD

| | Mean | Std. Dev. | N |
|---|---|---|---|
| | 1.82 | 1.37 | 95 |
| Breast milk only ----- | 1.30 | 0.56 | 40 |
| Mixed ---------- | 2.39 | 1.73 | 28 |
| Cow's milk only ------ | 2.09 | 1.66 | 22 |
| No milk ---------- | 1.60 | 0.89 | 5 |

(Sig. = .007)

* Incomes scored as follows

| | Pesos | $ US |
|---|---|---|
| 1 = | 200 or less | 27 or less |
| 2 = | 201 - 300 | 28 - 41 |
| 3 = | 301 - 400 | 42 - 54 |
| 4 = | 401 - 600 | 55 - 82 |
| 5 = | 601 - 800 | 83 - 109 |
| 6 = | 801 - 1000 | 110 - 136 |
| 7 = | 1001 and over | 137 and over |

A look at a profile of the population as a whole is useful in order to develop a sense of perspective for the contrasts between those who did and those who did not change their behavior. The sociodemographic and dietary characteristics of the total population of acceptors and nonacceptors, together with the characteristics of eight children receiving oil yesterday (the ninth was disqualified because he belonged to the group who received no milk and presented a very different picture from the others) are presented in Table A-10 of Appendix A.

The decision to combine the nonacceptor and acceptor groups into one population for this and most of the calculations was made because the two groups were so similar that they did not appear to differ suggestively, much less statistically, on a series of about 100 discrete variables, with the exception of those presented in Tables 31 and 32. The average amount of lugaw consumed by adopter children was .51 tbsp., which was not significantly more than the .45 tbsp. eaten by nonadopter children. Adopter mothers were nonsignificantly more likely (34% vs. 27% of nonadopter mothers) to have given a negative answer to the question, "Do you think &name of infant* is growing and developing nicely?"

Of note in this profile is the study population's high level of aspiration for their children's careers. Although 52% of the group were farm families, only 2% desired that their children become farmers, while 45% hoped their infants would become doctors, nurses, or medical technicians. The rate of 88% of mothers having graduated from primary school is higher than the 74% found by the Manoff teams, who were also interviewing families without access to radio. The figure of 81% of mothers unemployed is deceptive, according to the interviewer, who explained that most "unemployed" farm wives worked in agriculture, and that approximately 20% of the interviews had been conducted by the side of the paddy fields.

Hearing the message from both the radio and a health extention worker clearly increased the rates of adopter. Adopters had heard the message from an average of 2.9 (standard deviation = 1.4) sources, as compared to 2.2 (standard deviation = 1.3) for nonadopters. Among these sources, friends significantly influenced adoptions, while relatives did not. This suggests that relatives are not acknowledged as opinion leaders by the housewives surveyed. Advice of friends was a reason given for trial of the innovation by 20% of mothers in Table 36, versus 10% mentioning health workers, and 4%, relatives. Disapproval of relatives was not given as a reason for not trying the innovation in Table 37.

The fact that health worker contact is more highly correlated with adoption than is hearing the message from friends, but that more mothers mention persuasion by friends as the reason for deciding to adopt, suggests a two-phase process, some mothers may first hear the message from the health worker and then seek approval of their friends before taking the risk of adoption. Hearing the message from friends also is marginally significantly correlated to actually feeding oil in the past 24 hours, whereas health worker contact is not.

TABLE 35

PERCENTAGES OF ACCEPTORS AND NONACCEPTORS IN GENERAL POPULATION HEARING THE MESSAGE FROM HEALTH OR NUTRITION EXTENSION WORKERS

| | Radio Only | Extension and Radio | Extension & Friends Only | Total |
|---|---|---|---|---|
| Acceptors | 6% | 12% | 4% | 22% |
| Non-Acceptors | 37% | 20% | 21% | 78% |
| Total | 43% | 32% | 25% | 100% |

The range of foods the mother offered to her baby was explored in the interview by asking about the infant's response to almost all foods normally eaten by adults. The number of foods the infant disliked and the number the infant had not tried were then calculated as two indicators of the mother's attitude toward risk, or her adventurousness in introducing her baby to new foods. Since both adopter and nonadopter infants averaged 9.8 months of age, the difference in the scores between these groups was unrelated to age and thus genuinely reflected the fact that adopter mothers were more willing than nonadopters to add new items to the child's diet.

The adopter mothers, who had an average of 3.8 (standard deviation = 1.9) children versus the 2.8 (standard deviation = 1.8) children of nonadopters, were also slightly older. The fact that the presence of 10- to 15-year-old children in the family is significant, raised the possibility that older siblings might act as opinion leaders to influence the mother to try the radio message.

Discriminant function analysis using other variables to sort individual cases into acceptor and nonadopter groups showed that whether the mother heard the message from an extension worker in addition to the radio or not is the most important predictive factor. Sixty-six percent of the cases are correctly classified if those who did hear it from a health worker are assumed to be acceptors and those who didn't are assumed to be nonadopters. Using other simply measured indicators brings the prediction rate no higher than 70%. A long list of additional complicated variables, such as nonmilk protein as percent of requirement, which are not directly correlated with acceptance, improve prediction by only another 8%.

Number of children emerged as a significant variable which appeared to explain several of the others. Mother's age, for example, was no longer significant when number of children was partialed out. Mothers with more children automatically have a higher average age. Mothers with more children can be expected to have had more contacts with child health and nutrition workers. Mothers with more children may be increasingly easygoing in experimenting with new foods.

The fact that adopter mothers remain significantly older than nonadopter mothers can still be expected to affect the mean nutritional status of acceptor infants. Similarly, the other variables that don't have strong independent predictive value - because they are colinear with the most effective predictor, which is personal contact with an informed health worker - still describe significant differences between the adopter and nonadopter groups.

An additional factor which impeded adoption was the misunderstanding mentioned earlier. The interviewer reported that she was frequently asked by the mothers, "What kind of oil do they mean on the radio?" The women, who were used to the advertising of brand-name products, may not have understood the nature of public service advertising, and therefore assumed that a special brand of oil that was good for babies was being advertised without being mentioned clearly by name.

1. Extent to which Face-to-Face Communication of Radio Message by Extension Worker Increases Acceptance Rates Achieved by Radio Alone

The HIID/UPCI study found that 65.9% of adopters versus 35.6% of nonadopters had heard the oil enrichment message both from the radio and from an extension worker, and correspondingly that 34.1% of adopters versus 64.4% of nonadopters had heard the message from the radio only. The Manoff/NMPC findings suggest that about 16% of those who did not hear the radio were adopters of the oil message (29% of those who had not heard the radio were adopters of one or more of the three messages). Assuming the ratio of oil adopters to be 22% of all adopters, 40% holds for this group (22 X .29/40 = 16). From these figures we can estimate the extent to which informed extension services appeared to have increased the rates of acceptance achieved by the radio alone. The following cross-tabulation presents a projection to the population as a whole.

By dividing 12% by 32%, we get a 38% rate of adoption among mothers who heard the message both from the radio and from the extension services. Similarly, dividing 6% by 43% yields an adoption rate of 14% among mothers hearing the message from the radio alone and dividing 4% by 25% gives 16% for extension services alone. Division of 38% by 14% and by 16% reveals that the rate of adoption among mothers hearing the message from both sources is 2.7 times the acceptance rate of mothers hearing the message from the mass media alone and 2.4 times the rate for face-to-face alone. Face-to-face instruction alone, even when the field workers were informed by a single letter in addition to their own radio listening, appears marginally more effective than radio alone.

In interpreting these figures, it should be realized that none can be assumed to be generalizable from this campaign to another. If, for example, radio messages had been modified through formative evaluation, or if field workers had received a training seminar, an identical calculation might have yielded quite different numbers. Some ratios or proportions (like the 50% of recipient children regularly reached by take-home feeding programs), have appeared repeatedly in evaluations of programs with similar management techniques and country locations. When such figures recur frequently enough, it may be assumed that this recurrence indicates the existence of some common underlying distribution. These figures gain some credibility for use in cost-effectiveness calculations applicable to planning purposes. At this stage, we have no proof that the figures in this study can be used in this manner. At the same time, they do strongly support previous conclusions that mass-media and face-to-face activities together more than double effect in this case by instructing and encouraging both the mothers and the field workers.

As mentioned earlier, the Manoff pilot project was intended to test the effectiveness of radio alone. The project designers had found themselves required to inform the community extension workers of the campaign mainly for public relations purposes by sending a letter from Dr. Solon to each worker at the beginning of the campaign, rather than by holding seminars and training courses or designing special radio broadcasts

for nutrition educators. These workers, however, had a high rate of radio ownership (95%) and were understandably receptive to new information to teach in their mothers' class. The large numbers of them who subsequently taught or explained the message was a tribute to the power of the mass media to create a sense of institutional authority and solidarity, as noted in Chapter Two.

G. Impact of Adoption on Nutritional Status

At current levels of oil intake from lugaw, estimated in Table 16, no significant differences would be expected between the nutritional status of adopter and nonadopter infants. Table 36, showing nutritional status of adopters and nonadopters by age group, confirms that this is in fact the case.

Oil adopter children in general appeared to be marginally more malnourished than nonadopter children (P F .1). This lower nutritional status would be expected because these were infants of older mothers, and increased age of the mother had been shown (not only in this study, but previously by Guzman) to increase the incidence of malnutrition. A second reason for lower nutritional status of adopters may be self-selection, as 34% of adopter mothers judged their infants not to be developing well (and thus may be in need of the oil), as compared with 27% of nonadopter mothers. Children judged to be growing poorly were significantly less well-nourished than children judged to be growing well. If weights of adopter children had been followed from Wave II to Wave III, more definite conclusions could be drawn.

No attempt to project potential impact will be made here beyond a confident statement that with adequate modification of radio messages in response to formative evaluation and increased participation of field workers, impact should be positive and measurable in terms of significant weight/age differences. Measurability of significant weight/age differences related to nutrition education at this sample size will be demonstrated by the fact that two variables - contact with health and nutrition extension services, and nutritional knowledge of the mother - both have positive statistically significant relationships to weight/age after the effects of educational and other socioeconomic factors have been removed from the calculations by subtraction of cases or by partialing.

H. Other Factors Correlated to Nutritional Status

The examination of sociodemographic and dietary variables significantly related to nutritional status is essential for message verification and formulation. These relationships inform us whether the message delivered really is directed toward the root causes of malnutrition, or whether other causes or additional factors not yet clarified are more important in determining the conditions in which children become malnourished. They also provide guidelines toward the ways in which themes and messages should be changed to affect these conditions.

TABLE 36

NUTRITIONAL STATUS IN WT./AGE (PHILIPPINE STANDARDS) OF INFANTS GROUPED BY AGE AND BY WHETHER OIL IS ADDED TO LUGAW AT LEAST ONCE A WEEK

| | | | |
|---|---|---|---|
| Total | 88.07 | 13.37 | 100 |
| 5-9 months | 90.40 | 13.92 | 50 |
| Oil | 87.27 | 12.27 | 22 |
| No oil | 92.86 | 14.85 | 28 |
| 10-12 months | 87.29 | 14.56 | 28 |
| Oil | 86.10 | 16.76 | 10 |
| No oil | 87.94 | 13.67 | 18 |
| 13-15 months | 83.77 | 9.20 | 22 |
| Oil | 80.22 | 10.16 | 9 |
| No oil | 86.23 | 7.90 | 13 |

Mean wt./age of 8 children receiving oil in lugaw during past 24 hours, and receiving milk = 91.8%.

.1 acceptor infants less well-nourished than nonacceptors at .1 level.

Messages designed to produce improvement in nutritional status must single out and attempt to change those environmental factors most highly correlated to nutritional status, when possible, and should consider secondary effects relating to these factors when it is not possible to affect them directly. Thus, any additional light shed on the causality of malnutrition helps future formulation and evaluation of the message content of nutrition education.

The following section deliberately enters into greater technical detail than some previous portions of the presentation. There are no simple, nonstatistical methods quantifying for the interrelationships between the large number of factors that affect nutritional status. Anthropological and common sense descriptions can identify the nature of many of the relationships individually and together, but cannot estimate to what extent they affect a population group or a region.

1. Drawbacks of Small Sample Size for Calculation of Factors Relating to Nutritional Status

Use of the present sample of 100 infants has four major drawbacks, which should prevent the reader from attaching a sense of finality to any conclusions presented. (1) In order to achieve a sample of 100, oil adopter and nonadopter groups were combined, as explained earlier, because it appeared that they did not differ with respect to the majority of variables. (2) The sample is too small to test whether a number of the variables are normally distributed. Thus, use of parametric techniques such as partial correlations may introduce error. At the same time, subsamples are too small to investigate the relationships involved by methods other than partial correlation. (3) High standard deviations for dietary variables imply that small samples will fail to pick up differences which are significant. (4) Most of the dietary intake information had to be analyzed separately for groups of children differing in milk feeding method because estimation of breast-milk intake is difficult and was not attempted. Thus, for example, it was reasonable to average the caloric intake of all children who received only breast milk as a source of milk, and likewise to average the intake of infants who received only cow's milk as a source of milk; but it would not have been meaningful to average the intakes of a mixed group of children, some of whom were receiving most of their caloric requirement from breast milk, which could not be included in the calculation. Analyzing dietary variables within each group categorized by milk feeding method is entirely reasonable, but again has the disadvantage of reducing the sizes of the subsamples considered. A major potential source of error is that children belonging to the different milk feeding groups differ in socioeconomic factors which change over the age range. Thus, the group of infants who receive breast milk only as a source of milk at 6 to 8 months may be of a higher socioeconomic status than the group who still are receiving breast milk and no cow's milk supplement at 11 to 15 months. The effects of the foods fed to the infant will be similar regardless of socioeconomic class, but the mothers' reasons for feeding or not feeding these foods may differ. Other relevant aspects of the home environment may also differ.

## B. Significant Relationships

Given the above caveats, it is well to remember that levels of statistical significance are based on sample size and cannot be ignored on the grounds that the sample sizes are small. Moreover, relationships that are significant in small samples can usually be expected to be many times more significant in large samples.

Table 37 presents variables significantly correlated to nutritional status by Spearman's nonparametric correlations. The relationships discovered between weight/age, socioeconomic variables, age of child, and morbidity confirm those discovered by similar studies. A high degree of interrelationship or colinearity would clearly be expected between the socioeconomic factors. The fact that hearing about the radio message from relatives and number of adults living in the house both correlate positively with nutritional status could suggest that the intactness of the extended family and the presence of relatives in the house to help with child care were important, because it was known that many of the mothers spent several hours a day working in the fields.

The fact that of all the foods measured and nutrients calculated only the quantities of cow's milk (consumed by 54% of the sample), of meat (eaten by 13%), and of banana (eaten by 16%) were significantly related to nutritional status over the entire sample was extremely interesting and will be illuminated by the tables to follow. Intake of cow's milk, meat, and banana are all positively correlated to income; however, while milk and meat are positively related to nutritional status, the relationship of banana is negative. This raises the possibility that banana, which was the food most commonly mentioned by mothers as good for babies (22% of mothers), from Table A-4 in Appendix A, has been oversold by nutrition educationists or is otherwise overvalued and therefore is substituted for more nutritious foods. The negative relationship between nutritional status and the age to which the child is fed lugaw could reflect socioeconomic factors as well as the poor caloric density of lugaw.

Amount of cow's milk consumed is significantly related to nutritional status, both across the board in the nonparametric correlations and in the separate correlations performed on the subsamples of children receiving mixed breast plus cow's milk and those receiving cow's milk only. When the effects of parents' educational and occupational levels, mother's nutritional knowledge, and monthly income are removed by partialing, however, amount of cow's milk no longer appears correlated to weight/age. A larger sample size probably would be needed to confirm this relationship. There is less doubt that the presence of some form of milk - either breast or cow's - in the diet is important to nutritional status, as implied by the low nutritional status of all the infants receiving no milk.

Hypothetically, it should be expected that supplementary food intake, as measured by percentage of caloric requirement satisfied by nonmilk foods (solids), should be positively correlated to nutritional status over the entire sample. If it is true that supplementation of breast

TABLE 37

VARIABLES SIGNIFICANTLY CORRELATED WITH NUTRITIONAL STATUS, % WEIGHT FOR AGE, BY NONPARAMETRIC CORRELATIONS

(Spearman's Rank Order)

| Socioeconomic Variables | Direction of Correlation | Significance Level |
|---|---|---|
| Mother's age | - | .058 |
| Mother's education | + | .056 |
| Number of health/nutrition programs attended with child | + | .026 |
| Mother's nutritional knowledge | + | .001 |
| Mother's occupational level | + | .093 |
| Mother heard radio message from relatives | + | .047 |
| Number of adults living in house | + | .068 |
| Mother judges child is growing and developing well | + | .019 |
| Mother has high career aspirations for child | + | .030 |
| Father's education | + | .018 |
| Father's occupational level | + | .089 |
| Economic class (a composite income, occupation, and household property and facilities score) | + | .004 |
| Running water | + | .081 |

TABLE 37 (continued)

| Status of Child Variables | Direction of Correlation | Significance Level |
|---|---|---|
| Age of child | - | .001 |
| Whether child is sick today | - | .027 |
| **General Dietary Variables** | | |
| Presence of oil in household | + | .080 |
| Child receives oil in lugaw at least once a week | - | .098 |
| Age to which child is fed lugaw | - | .095 |
| **24-hour Recall Variables** | | |
| Quantity cow's milk received | + | .045 |
| Quantity meat eaten | + | .049 |
| Quantity bananas eaten | - | .038 |
| Percent calories from fat | + | .003 |
| Percent calories from fat in supplementary foods (when milk is removed from calculation) | + | .067 |

milk with sufficient quantities of solid food from the age of six months is what is required to prevent malnutrition, then the amount of supplementary calories actually received by children in the 6- to 15-month age range should be positively related to the infants' weight/age score. In fact, this is not the case across the board, and the intake-to-weight/age relationships remain complicated even after partialing for the negative effects of age (amount of solids increasing with age, while weight/age decreases with age).

Table 38 presents both zero-order correlations and partial correlations, from which the effects of age have been removed, between dietary intake and nutritional status within milk-feeding groups. Table 39 presents relationships between milk feeding groups and dietary intake, of solid (nonmilk) foods and of all foods.

The concept of a package of learned feeding behavior which departs from traditional breast-feeding norms may be useful in understanding these tables. It was found (see Tables A and F in Appendix A) that the amount of solid foods given increased with the amount of cow's milk given, so that the average percentage of caloric requirement filled by solid foods ranged from 13% for the traditional breast-feeders to 54% for the bottle-feeders coming in at 26%. A recheck of the original questionnaire forms listing all food items eaten by every child confirmed that children in the three groups were fed the same inexpensive foods but in different quantities. Mean ages of the three groups do not differ significantly.

Apparently, the message to feed adequate amounts of solid foods has in fact been taught relatively successfully to some mothers, but as part of a package of learned behavior that includes complete or at least partial bottle-feeding. The total package has had one possible good effect on nutritional status, as noted in Tables 38 and 39, which is that the nutritional status of the 24 bottle-feeders in our sample, though marginal at best, does not decrease significantly with age between 6 and 15 months. (In this case, the observation that the bottle-feeders are fed a much larger quantity of solid foods should probably be considered significant, while the relationship between nutritional status and age within the bottle-feeding group should be verified with a larger sample.)

Within the bottle-fed group, the quantities and percentage measurements of all important nutrients are positively correlated to nutritional status, as would be expected in a marginally nourished infant population. (Among well-nourished infants, as noted by Huenneman, the correlations between weight and dietary intake tend to disappear. For as diets become adequate, wide variations in individual requirements account for most, if not all, of the variance in nutrient intake.)

By contrast, in the breast-fed group nutritional status is negatively correlated with total caloric intake, with percents of ideal and actual caloric requirement fulfilled, and with percent of actual protein requirement fulfilled, even after controlling for the effects of age. In other words, the manner in which supplementary feeding is managed appears to succeed in displacing more calories from breast milk

DIRECTIONS AND SIGNIFICANCE LEVELS OF ZERO-ORDER AND PARTIAL CORRELATIONS, CONTROLLING FOR AGE BETWEEN NUTRITIONAL STATUS (WT./AGE) AND FEEDING VARIABLE FOR 99 6-TO-15-MONTH ILOCOS INFANTS, GROUPED BY MILK-FEEDING METHOD

| Variables | Breast Milk Only (N=41) | Controlling for Age | Mixed Breast/Bottle (N=30) | Controlling for Age | No Breast-Feeding (N=28) | Controlling for Age |
|---|---|---|---|---|---|---|
| Cow's milk | -* | - | - | +(.074) | +(.004) | +(.004) |
| Egg Yolk | - | - | - | | - | +(.059) |
| Meat | - | - | - | - | - | +(.093) |
| Animal prot. food (fish, meat, and egg) | -(.088) | - | - | - | - | +(.091) |
| Green leafy vegetables | - | - | - | +(.094) | -(.066) | -(.072) |
| Soup | - | - | -(.046) | -(.026) | - | - |
| Bananas | -(.059) | - | -(.018) | -(.006) | - | - |
| Total calories | -(.008) | -(.062) | - | - | +(.001) | +(.001) |
| Total calories from solid foods | -(.008) | -(.062) | - | - | +(.008) | +(.005) |
| Total protein | -(.032) | - | - | - | +(.009) | +(.006) |
| Percent of ideal cal.req.from solid foods | -(.009) | -(.044) | - | - | +(.005) | +(.005) |
| Total protein from solid foods | -(.032) | - | - | - | - | - |
| Percent of ideal prot.req.from solid foods | -(.032) | - | - | - | - | - |
| Percent of actual prot.req.from solid food | -(.007) | -(.038) | - | - | - | - |
| Percent of ideal cal.req. - total diet | -(.009) | -(.044) | - | - | +(.001) | +(.001) |
| Percent of actual cal.req. - total diet | -(.002) | -(.010) | - | - | +(.054) | +(.055) |
| Percent of ideal prot.req. - total diet | -(.032) | - | - | - | +(.004) | +(.005) |
| Percent of actual prot.req. - total diet | -(.007) | -(.036) | - | - | +(.094) | +(.093) |
| Age of infant | -(.005) | | -(.014) | | -(.298) = NS | |
| Mother's nutritional knowledge | +(.052) | +(.089) | +(.022) | +(.004) | +(.021) | +(.009) |
| Mother's nutritional practice score | +(.210) NS | +(.488) NS | -(.162) NS | -(.282) NS | +(.495) NS | +(.388) NS |

* = nonsignificant.

TABLE 39

NUTRITIONAL STATUS OF FILIPINO INFANTS

GROUPED BY AGE AND MILK-FEEDING METHOD

| | A. Harvard Standards | | B. Philippines Standards | | |
|---|---|---|---|---|---|
| | Mean | Std. Dev. | Mean | Std. Dev. | N |
| | 80.33 | 12.53 | 88.03 | 13.43 | 99 |
| 6-8 months -------- | 84.72 | 13.31 | 90.13 | 13.75 | 39 |
| breast only ----- | 85.34 | 12.60 | 93.06 | 13.22 | 17 |
| mixed ---------- | 87.33 | 14.84 | 91.08 | 13.99 | 12 |
| bottle ---------- | 81.00 | 12.21 | 85.56 | 13.63 | 9 |
| no milk --------- | 60.00 | 0.0 | 70.00 | 0.0 | 1 |
| 9-11 months ------- | 77.70 | 12.72 | 88.17 | 14.85 | 30 |
| breast only ----- | 77.86 | 6.24 | 88.26 | 8.24 | 14 |
| mixed ---------- | 82.22 | 11.22 | 93.78 | 11.89 | 9 |
| bottle ---------- | 69.80 | 16.99 | 91.00 | 20.77 | 5 |
| no milk --------- | 68.50 | 9.19 | 54.50 | 7.78 | 2 |
| 12-15 months ------ | 77.27 | 9.69 | 85.17 | 11.28 | 30 |
| breast only ----- | 75.60 | 10.57 | 83.80 | 12.59 | 10 |
| mixed ---------- | 77.89 | 9.60 | 86.22 | 11.41 | 9 |
| bottle ---------- | 79.33 | 10.06 | 87.00 | 11.38 | 9 |
| no milk --------- | 72.50 | 7.78 | 79.00 | 7.07 | 2 |

C. Nutritional Status of Total Sample Grouped by Age (Harvard Standards)*

| | Mean | Std. Dev. | N |
|---|---|---|---|
| 6-8 months ---------- | 84.72 | 13.31 | 39 |
| 9-11 months ---------- | 77.70 | 12.72 | 30 |
| 12-15 months ---------- | 77.27 | 9.69 | 30 |
| | 80.33 | 12.14 | 99 |

D. Nutritional Status of Total Sample Grouped by Milk Feeding Method (Harvard Standards)

| | Mean | Std. Dev. | N |
|---|---|---|---|
| breast milk only ---------- | 80.71 | 11.04 | 41 |
| mixed breast/cow's milk --------- | 82.97 | 12.64 | 30 |
| cow's milk only ---------- | 80.30 | 12.01 | 23 |
| no milk ---------- | 91.60 | 13.65 | 5 |
| | 80.33 | 12.53 | 99 |

*Age division differs here from Table 4 and one infant has been removed from sample because of unusually high dietary intake.

than are provided by the food supplements. This indicates a situation which requires supervised feeding for a period long enough that skills learning takes place, and further study into the reasons why solids detrimentally displace breast milk. Otherwise, advice to feed more supplementary foods could be detrimental. A look back at Table 14 shows that the actual amounts of all solids fed to infants appear to be very low, quite apart from the fat or other content of these foods. A situation that could explain the detrimental relationship between solid foods and nutritional status in the entirely breast-fed group could occur if the mother gave insufficient amounts of solid foods to make up for the fact that she was withholding the breast in such a manner that breast milk quantity decreased from lack of stimulation, while the solids offered failed to make up for the breast milk loss. This explanation, however, is pure speculation concerning a situation that requires further investigation.

Many of the factors leading to negative correlations in the breast-fed and to positive correlations in the bottle-fed groups in Table 35 appear to cancel each other out in the mixed-fed group of infants.

I. Measuring the Impact of Nutrition Education on Nutritional Status

The fact that nutritional status is positively correlated with number of health and nutrition programs or facilities attended is an indicator that the combination of health care and nutrition education has had a positive impact on growth. Of all the socioeconomic indicators, occupational level of the mother is the only variable significantly correlated with number of health facilities or programs attended. The effects of this variable are easily removed by looking only at the sample of 81 women who do not have an occupation outside the home or family farm. Table 40 shows that within this sample infants who have attended two or more health or nutrition programs average low-normal in weight/age, while those who have attended one or less average close to the borderline of second-degree malnutrition (75% weight/age).

The survey collected three measures of nutritional knowledge: the knowledge and practices scores described earlier, and the mother's perception of whether or not her child was growing and developing well. To the extent that these knowledge indicators can be shown to be related both to nutritional status and to contact with nutrition education services, after the effects of other socioeconomic factors have been subtracted, it is possible to make a strong surmise that nutrition education programs have had a positive effect in teaching nutritional information to mothers, regardless of the mothers' socioeconomic or educational level. This knowledge of nutrition in turn can be assumed to have had a positive effect on the growth status of the children, although the effects of health care cannot be removed.

The nutritional practice score derived from the 24-hour recall and based on the infant's supplementary food groups did not turn out to be significantly correlated to nutritional status as shown in Table 38. The range of foods in a child's diet on any given day may not be highly representative of the variety in his or her entire diet. Moreover, quantity (which

TABLE 40

WT./AGE (HARVARD STANDARDS) OF INFANTS WHOSE MOTHERS WERE NOT WORKING OUTSIDE THE FAMILY FARM OR HOME, GROUPED BY NUMBER OF HEALTH OR NUTRITION FACILITIES ATTENDED*

| Number of Programs Attended | Mean | Std. Dev. | N |
|---|---|---|---|
| 0 | 77.80 | 7.19 | 5 |
| 1† | 75.35 | 10.51 | 23 |
| 2 | 82.40 | 10.24 | 30 |
| 3-5 | 81.91 | 14.28 | 23 |
| | 80.00 | 11.70 | 81 |

* Difference between those attending 0-1 and those attending 2 or more is significant at .05 level. With this subsample, nonparametric correlation between wt./age and number of programs attended is significant at .029 level.

† The single program has a high probability of being Operation Timbang, the one-time-only weighing campaign which reached 73% of infants, as indicated by Table M.

was not measured by this score) is probably of much greater importance than variety. Both of the other indicators were significantly related to nutritional status - nutritional knowledge at the .00% level, and classification of the child as developing well or poorly at the .005 level. Children judged to be developing well had an average weight/age (Philippines standards) of 90%, compared to 83% for those said to be developing poorly (although a great many children were misclassified)

Table 41 shows that nutritional knowledge is significantly correlated to a wide variety of socioeconomic variables, while Table 42 shows that when the effects of most of these other variables are removed by partialing, the correlations between nutritional knowledge, contact with the health/nutrition extension services, and nutritional status still remain significant. This set of relationships suggests the positive effects of nutrition education on nutritional status of infants in rural Iloilo.

Mothers' ability to judge accurately whether their infants were growing and developing well was calculated in two ways. In the first, all children were divided by whether they fell above or below 80% of weight/age according to the Harvard standards. All mothers classifying children below 80% as not developing well and above 80% as developing well scored as classifying correctly, while all those reversing the classification were scored as judging incorrectly. The educational level and degree of exposure to the health services were identical between those classifying correctly and incorrectly, but the combined nutritional knowledge plus practice score of those classifying correctly was marginally higher ($p < .1$) than that of those classifying incorrectly.

The second scoring method looked at the 68 infants who were either less than or equal to 75% weight/age (Harvard) or greater than or equal to 85% weight/age, and divided these into four groups: malnourished classified as growing well; malnourished classified as growing poorly; well nourished classified as growing well; and well nourished classified as growing poorly.

Table 43 shows that 19 children (19% of the total sample) were suffering from second- or third-degree malnutrition, but were thought by their mothers to be growing well. The mean educational level of these 19 mothers is shown to be lower than that of the rest of the groups combined ($p < .05$). Table 43 also shows significant differences in the nutritional knowledge scores of the groups, but that the knowledge score appears related to the nutritional state of the child rather than to the mother's ability to classify this state correctly. The table also reveals the nutritional practice scores to be high for the 19 mothers who fail to recognize that their infants are malnourished, but low for the eight who fail to recognize that their infants are well nourished (these eight infants could be younger and therefore receiving a less varied diet).

Table 43 further reveals a significant difference between exposure to the health services between the malnourished and well nourished regardless of mothers' ability to classify, but suggests that attendance at health and nutrition programs raises a mother's expectation of her child's growth rate, since those misclassifying their well-nourished infants had had the most exposure to the health services.

TABLE 41

VARIABLES SIGNIFICANTLY CORRELATED
TO MOTHER'S NUTRITIONAL KNOWLEDGE SCORE
BY SPEARMAN'S NONPARAMETRIC CORRELATIONS

| Variable | Direction of Correlation | Significance Level |
|---|---|---|
| Mother's education | + | .024 |
| Father's education | + | .069 |
| Mother's occupational level | + | .052 |
| Number of health/nutrition programs attended | + | .088 |
| Number of sources of hearing radio message | + | .016 |
| Feeds oil in lugaw at least once a week | + | .068 |
| Nutritional practice score | + | .042 |
| Heard radio message from relative | + | .052 |
| Heard radio message from friend | + | .052 |
| Number of adults in household | + | .023 |
| Economic class | + | .021 |
| House ownership | + | .080 |
| Income | + | .015 |
| Had working radio | + | .066 |
| Had electricity | + | .043 |

TABLE 42

PARTIAL CORRELATIONS OF MOTHER'S NUTRITIONAL KNOWLEDGE SCORE WITH VARIABLES REFLECTING HER EXPOSURE TO NUTRITION EDUCATION AND WITH WT./AGE OF HER INFANT, AFTER REMOVING THE EFFECTS OF OCCUPATIONAL LEVEL AND EDUCATIONAL LEVELS OF BOTH PARENTS, WEEKLY INCOME, AND ECONOMIC CLASS

| Variable | Direction of Correlation | Significance Level |
|---|---|---|
| Number of sources of hearing radio message | + | .012 |
| Number of health and nutrition programs attended | + | .096 |
| Wt./age of infant | + | .004 |

TABLE 43

VARIABLES RELATING TO NUTRITIONAL KNOWLEDGE GROUPED BY MOTHERS' ABILITY TO CLASSIFY THEIR INFANTS AS DEVELOPING WELL OR POORLY

| | ≤75% Wt./Age Classified Growing Well | ≤75% Wt./Age Classified Growing Poorly | ≥85% Wt./Age Classified Growing Well | ≥85% Wt./Age Classified Growing Poorly | Significance Level |
|---|---|---|---|---|---|
| N | 19 | 14 | 27 | 6 | |
| A. Education of Mother | 3.5 (1.7) | 4.3 (1.8) | 4.5 (2.2) | 4.5 (2.2) | (t between first and others) .05 |
| B. Nutritional Knowledge Score | 4.4 (1.0) | 4.6 (1.1) | 5.4 (1.2) | 5.0 (0.9) | (F) .025 |
| C. Nutritional Practices | 2.2 (0.8) | 2.1 (1.1) | 2.1 (0.8) | 1.3 (0.7) | (F) .1 |
| D. Number of Health/ Nutrition Programs Attended | 1.8 (0.9) | 1.7 (1.9) | 2.1 (0.9) | 2.6 (0.7) | (F) .05 |

## VI. COST-EFFECTIVENESS CALCULATIONS

Total costs for this pilot project were $76,950, as itemized in Table 44 (Manoff et al. 1977). According to the previous experience of Manoff International, Inc. staff in mounting both experimental and non-experimental campaigns, costs of experimental projects tend to be about two times as high as those of nonexperimental implementation projects. Therefore, a total of $49,750 was considered to be a realistic estimate for nonexperimental costs, and is also itemized in Table 44. Major ways in which costs could be cut in an implemented program would be by increased use of local project management and by local data processing.

Based on the 1970 census of the population, which was increasing at the rate of 2.2% per year, the number of 6- to 12-month-old infants in rural Iloilo was estimated to be 11,960, and the number of 13- to 15-month-old infants at 3,345, for a total of about 15,300 6- to 15-month-old infants. (The decrease in frequency of eating lugaw between 12 and 15 months is considered to be roughly compensated for by the percentage of infants receiving lugaw up to 24 months.)

At a rate of 5% of infants receiving 1/2 teaspoon of oil daily and of 44 calories per 5 ml. tsp., we have 15,300 times .05 equals 765 infants, times 44 calories equals 33,660 total calories per day times 30 days times 9 months equals 6,058,800, divided by $49,750 cost equals 122 calories (a little less than 1 tablespoon) per dollar, or 0.8¢ per calorie, not including the cost to the families of purchasing the oil. Potential nutritional impact of the project was much more cost-effective than these figures imply.

If two sets of message changes described earlier had taken place - extending the foods to which oil was added to include all rice foods and soup and modifying the message after three months through formative evaluation - the acceptance rate and amount consumed could have increased by a maximum total factor of about six (three times for the base foods and two times for message changes), which would bring us to 731 calories per dollar, or about 1¢ per calorie. Again, based on nonexperimental cost estimates, the cost of changing attitudes about oil was about $1.60 per family, and the cost of adoption of oil about $18.00 per family.

The ultimate campaign is potentially more cost effective than this, because the number of calories per dollar can be increased by whatever multiplier effect is expected to take place because children not yet born or not yet six months old will have mothers who have heard the message, or because health and nutrition field workers will continue to teach the message as part of their ongoing repertoire after the campaign is over. Although a large fall-off in knowledge and practice can be expected when the campaign is over, some fraction of what has been taught will permanently affect infant-feeding behavior. These changes can be expected to be more permanent than behavioral change produced by commercial advertising, where one brand name goes off the air and the name of an identical competing product is advertised, helping to erase memory of the first

TABLE 44
ACTUAL PROJECT COSTS AND ESTIMATES FOR A NONEXPERIMENTAL PROJECT

| | ACTUAL COSTS | NONEXPERIMENTAL COSTS |
|---|---|---|
| Project Design and Development (Technical assistance, message testing, travel, per diem, etc.) | $15,750 | $20,000 |
| Project Evaluation (Technical assistance, data collection, processing, analysis, report preparation) | 46,250 | 11,150 |
| Media Time | 4,850 | 10,000 |
| Management by Philippine Government (Salaries, travel) | 10,100 | 8,600 |
| Total Costs | $76,950 | $49,750 |

Source: Manoff et al., 1977.

product. No one is going to come along tomorrow with a competitive jingle saying, "Don't put oil in your baby's lugaw; you must put 'Product X' instead." Moreover, the mistaken beliefs that oil will cause loose bowels or that fish will cause worms have passed on from generation to generation since time immemorial without the benefit of radio campaigns to reinforce them. Real changes in the basic belief structures should theoretically be passed down with the same continuity.

A full-scale cost-effectiveness analysis requires comparisons between the costs of achieving the same effects by different programs or program components. This will not be attempted in the present case study because the costs of face-to-face nutrition education were not investigated. Moreover, improvements in nutritional status were not demonstrated.

## VII. CONCLUSION AND RECOMMENDATIONS

Positive correlations between nutritional status of infants in Iloilo, their mothers' nutritional knolwedge scores, and their contact with the health and nutrition services remain after controlling for parents' educational level, income, and other sociodemographic factors. These correlations affirm a high probability that nutrition education has direct impact on nutritional status as indicated by weight/age. By inference, we conclude that a modified version of this radio advertising, campaign coordinated with face-to-face activities, could have a measurable positive impact on weight/age, in spite of the fact that no impact could be found by this evaluation. Any extension of the present campaign or formulation of a new radio nutrition education campaign should take the following factors into consideration.

### A. Media Programming and Coordination with Face-to-Face Services

A system of regular formative evaluation would be required to correct misunderstandings and to prevent message fatigue. This feedback could probably be gained inexpensively by asking extension workers in regular contact with mothers to form their own informal opinions of the effectiveness or popularity of the radio messages, by holding periodic discussion sessions with these extension workers, and by modifying the messages accordingly.

The present survey showed that participation of extension workers in teaching the radio message face-to-face in addition to radio broadcasting increased the acceptance rates achieved by radio alone by a factor of 2.7 and by face-to-face communication alone 2.4. Although these figures could change if the radio campaign were improved, they still suggest that any existing network of health and nutrition extension workers in the target area should be involved from the beginning in the educational goals of a radio campaign. The 14% acceptance rate for the radio message alone, if doubled in response to message changes evolved through formative evaluation, would amount to 28%, which implies that radio alone could change the behavior of a small but significant segment of the population in inaccessible areas as yet unreached by the health extension services.

The facts that friends also influenced a mother to change her behavior and that total number of sources of hearing the message was positively correlated to acceptance suggest that speakers on nutrition should address women's clubs and other social groups in support of the radio message, and that some mothers should be given comics or photonovellos and be encouraged to share the messages with their friends.

Insofar as number of children in the family and also number of children aged 10 to 15 years appear to be associated with message acceptance, it could be effective to ask health teachers in the schools to teach the radio message to the older children, thus reinforcing their belief in the importance of the message and their tendency to influence their mothers to change infant-feeding practices. The presentation of the radio message might also be made subtly more attractive to the child audience.

B. The Message: Recommendations Specific to this Campaign

Of the three messages - to add oil, green leafy vegetables, and fish to the infant's lugaw - the oil message seemed most relevant, not only because many children had a caloric deficit which could be reduced by addition of oil, but because of the three types of food recommended oil is the only one which cannot be eaten separately and must be added to some other food such as lugaw or rice. As 51% of infants were already receiving some fish, meat, or eggs, and 34% were receiving some kind of vegetables, mothers may have seen little reason to add these foods to lugaw. Thus, the fish and vegetables messages could be improved simply by suggesting that mothers feed their infants more of these foods, and more green leafy vegetables in particular.

Since lugaw was eaten by only 30% of the infants as recorded in the 24-hour dietary recall, the foods to which oil should be added should be expanded in the message formulation to include all rice foods eaten by the child (rice, lugaw, and binokbok), and perhaps also cow's milk, which is commonly fortified with oil in nutrition rehabilitation programs. Since much of the milk fed to the infants is low-fat sweetened condensed milk, an addition of oil could significantly increase its nutritional value. (Sweetened condensed milk is convenient because it can be kept without spoiling for several days after opening the tin, even in a tropical climate.)

There appears to be no particular merit in promoting lugaw as a baby food beyond the 3- to 6-month age range, and possibly not at all, since infants can and do eat soft rice from the age of four and five months on. Lugaw requires extra fuel and time to prepare. It also is a poorer source of calories than rice. As shown in Table 36, continued feeding of lugaw as the infant grows older is negatively correlated to nutritional status. This is not to say that an attempt should be made to discredit lugaw, because it has obvious advantages for conditions, such as toothache and stomach upset, which require a semisolid diet. However, the cultural associations between lugaw, sickness, and weakness of the body do not provide positive images for developing concepts of healthy child growth and development.

The mothers most receptive to the message were those who already had the greatest number of children. These mothers also happen to be a logical target for family planning or child-spacing messages, which are related to nutrition. At a minimum, face-to-face workers could be encouraged to provide family planning information to these mothers. Messages linking nutrition and family planning directly could also be effective with this audience.

Two specific doubts raised by the mothers - whether the oil referred to by the message is regular cooking oil or some special oil and fear that giving oil may cause loose stools - should probably be dealt with directly in any reformulation of the present message possibly even by specifying a brand-name cooking oil. Field workers should investigate whether mothers make an association between the effects of oil and the effects of castor oil, which is locally used as a purgative.

C. Message Formulation Recommendations for Future Nutrition Education Campaigns

The significant differences in amounts of solid foods fed by mothers who breast-feed only, as compared with mothers who mix breast and bottle and mothers who bottle-feed, indicate the presence of different styles or integrated packages of learned infant-feeding behavior patterns.

The specific problem uncovered by this observation is that when the traditional breast-feeders introduce solid foods, they don't seem to succeed in giving large enough quantities of solids to their infants to offset the amount of breast milk displaced by giving the meager supplements. The bottle-feeders and many of the mixed-feeders, on the other hand, have learned to feed up to 50% or more of the child's caloric requirement in the form of solids by using the same range of supplemental foods fed to breast-fed infants but increasing the quantity.

Messages to address this problem should be evolved through formative evaluation conducted by observing mothers attempting to follow the advice in different pretest messages. One approach to the solution might be to focus message content on the quantity of food required by the child in very specific terms, such as "feed two tablespoons of rice with oil in it three times a day, plus two teaspoons of any sort of fish, meat or egg, plus one tablespoon of vegetables, preferably green and leafy," etc. This message would be targeted to the traditional breast-feeders. Another approach might be to use the mass media to support an extension service nutrition education program such as the various nutripak schemes, which teach mothers an integrated and quantified package of feeding practices.

Since the breast-fed-only group manages as well as it does on such a small quantity of solid food, and the bottle-fed-only group manages as well as it does at low-income levels, it should be possible to design a new combined package of infant-feeding behaviors integrating breast-feeding with adequate quantities of supplementary foods. This new package of behaviors could make it possible for all but the lowest income families to have truly well-nourished infants. As mentioned in the results section,

the cost per calorie of oil in Iloilo at the time of the evaluation survey was only half the cost per calorie of rice. Thus the use of oil should, in any calculation, form part of the new behavior package. Teaching families to buy, produce, and consume more oil would probably also be necessary to make sure that oil was on hand for the infant.

Some form of milk, preferably breast milk for all but a very few, should remain part of the feeding package into the second year. Probably a small quantity of cow's milk should be given during the final months and after the termination of breast-feeding. A small quantity of milk can be expected to upgrade the total amino-acid balance and thus improve metabolic utilization of the rest of the diet by the infant. Other animal-protein foods can also serve the same function.

D. Applicability of Market Segmentation Analysis Research Techniques

By dividing mothers into groups according to milk-feeding method, very different behavior patterns were discovered with respect to the quantities of solid foods these mothers introduced to their infants. The division according to milk-feeding method was made for convenience of calculation of dietary intake, and although the methods might be very roughly ranked along a modernity scale (breast-mixed-bottle), they may not provide the most meaningful categorization of mothers according to infant-feeding practices and related attitudes and aspirations. Other segmentations discussed in Chapter Three, should be investigated and applied. Segmentation by attitude in addition to behavioral and socioeconomic variables stratifies on the basis of a large number of variables using Q-type factor analysis. Major studies of this sort cost, commercially, from U.S.$70,000 to U.S.$2,000,000, and therefore probably would not be undertaken lightly by nutrition institutes in developing countries. It would be extremely valuable, however, to conduct at least one such study in a country such as the Philippines.

As commercial advertisers well know, different segments of the market (target groups, in the language of nutrition educators) require different messages and different product formulations. As illustrated above by the differences in supplemental feeding behavior between milk-feeding groups, it is highly possible that distinct groups of mothers in developing countries also should be approached by different infant-feeding messages which take into account important differences in their infant-feeding patterns, work schedules, resources, and attitudes. Initially, a single segmentation study in one (preferably representative) country should provide some indication of the extent to which this type of target-group stratification is relevant or necessary for the purposes of nutrition education in low-income areas of the Third World.

E. Popular Health Concepts

Popular health concepts, when sufficiently accurate, should be included in the wording of nutrition messages. In the series of open-ended questions in the present survey, for example, the Ilonggo word for "lively" was most frequently mentioned as a desirable characteristic or a sign of health in babies. Thus, this would be a good word to use in the formulation of future messages.

Because of the strong interaction between the radio and the extension services, future campaign messages should continue to direct mothers to visit their local health, nutrition, and family-planning workers. This encouragement could be tied to teaching mothers the importance of being able to distinguish accurately whether or not their child is malnourished - which can only be learned by having the baby weighed by a health worker.

The only way to avoid a flaw such as the focus on lugaw (a food that most infants were not eating daily) in the case study campaign is to conduct a 24-hour dietary recall of a representative sample of the target group in the early planning stages of the campaign. Worksheets and instructions for conducting a simplified 24-hour recall are presented in Chapter Two.

Involving target groups directly in the process of message formulation would be highly desirable. In the absence of the types of skills and training required to do this, pretesting of the messages on groups of target mothers by some person in whose presence they feel free to be openly critical should be a "second-best" procedure.

F. The Need for Longitudinal Evaluation of Nutritional Impact of Mass-Media Nutrition Education

As shown in this evaluation, acceptors of a radio message select themselves for reasons that may differentiate them from the general population. Thus, mothers of malnourished children who realize that their infants are not growing well may be more likely to adopt a behavior recommended by the radio campaign than mothers of well-nourished infants. If the acceptors make up a large proportion of the total population, then comparison of a randomly selected sample of acceptor and nonacceptor children from the target area, either with a baseline or a control, should show results measurable by differences in mean weight/age.

But if acceptors make up a small proportion of the population, genuine differences which occur, such as improvement of children who started out more malnourished than average in the first place, may not show up by the above method. Or, improvements occurring in one group who adopted the behavior may be offset by deterioration or lack of improvement in another group who accepted the message for different reasons.

The least costly way of measuring impact in such cases may be to enlist an institution in no known way associated with the campaign to conduct a longitudinal study, ostensibly for some other purpose, of a limited sample of adopter and nonadopter children. The study should be started after the campaign has been going on long enough to provide a pool of acceptors.

Studies of attitude and knowledge change and studies which collect yes/no information concerning behavioral change (e.g., "Did you feed your baby rice with oil in it yesterday?") do not require a longitudinal approach, but also may not be sufficiently quantitative to be useful. The results of the present survey indicate that one of the main problems in teaching mothers to introduce weaning foods is teaching them to feed the baby adequate quantities of the foods. Thus, studies which ask whether the mother gave a food without determining how much she gave may show behavior changes but miss a major part of the real problem.

Quantitative cross-sectional studies of dietary intake, using 24-hour recall or other methods, provide much more information than nonquantitative studies, but still do not overcome the problems posed by self-selection. It is impossible to determine from a single time whether an acceptor infant's diet has improved from a previously poor level of adequacy, or whether the foods consumed as a result of adopting the behavior taught by a radio campaign are now substituting for other foods which the child consumed before the start of the campaign. As in an evaluation of weight/age, if acceptors make up a large proportion of the total population, if their intake appears to be high as a result of the intervention, and particularly if average weight/age also is high, it may be possible to make comparisons with dietary intake of a baseline or control group and to conclude that acceptors benefit from the intervention. If, on the other hand, the acceptor group is small, or if there are different types of acceptor groups showing different trends in nutritional adequacy, the longitudinal approach suggested above probably is the only reliable method of evaluation.

## CHAPTER FOUR FOOTNOTES

[1] The above calculation was made in the following manner. According to Cantor (in Figure 2), 12 months is the age of severest deficiency, when the child is receiving 60% or less of requirement. The recommended caloric allowance at this age, according to the FAO standards (1974) is 1,000 calories. Thus, the child is receiving approximately 600 calories in breast milk and solids. (The amount of breast milk may be about 450 grams - Chavez et al. 1974 - providing 320 calories, while solid foods provide about 280.) The 400 additional calories amount to less than 5% of total family intake.

Approaching the calculation from a slightly different angle, we observe from Figure 2 that by the age of 3, the child receives approximately 74%, 65%, and 57% of caloric requirement in families having total intakes of 80%, 70%, and 60% of requirement, respectively. From FAO (1974) standards we discover that the average caloric requirement of the 3-year-old is about 1,400 kcal., meaning that 3 year olds in the above sets of families are receiving an average of 1,036, 910, and 798 kcal., respectively. All of these figures are higher than the 760 kcal. required by the 1 year old in addition to mother's milk. This arithmetic supports repeated field observations that children below age 2 are not fed substantial amounts of the same available foods that they will be eating a year or two later.

[2] Infants in a traditional village environment tend to be exposed to a sufficient number of sources of infection and to be ill a high enough proportion of the time that illness unrelated to a new food may have its onset when the food is introduced and may lead the community to believe that the food caused the problem. For this reason, a medical referral system is important, as will be discussed later.

[3] Because quantity of breast milk consumed was not estimated in this study, these average deficit figures were derived from the diets of a subsample of 23 infants who did not receive breast milk but did receive a cow's milk supplement. This group did not differ significantly in nutritional status, as measured by weight for age or in age, from the total sample, as will be shown in Table A-2. Therefore, it was assumed that the dietary intake of this group, as measured by 24-hour recall, could be used to estimate deficits in the diet of the group as a whole.

## APPENDIX A

### TABLE A-1

### FOODS EATEN BY 99 6- TO 15-MONTH INFANTS IN RURAL ILOILO, ACCORDING TO 24-HOUR DIETARY RECALL, GROUPED BY MILK FEEDING METHOD, IN ORDER OF FREQUENCY

| | Total | Breast milk only | Mixed | Cow's milk only | No mil |
|---|---|---|---|---|---|
| Animal protein foods total of all fish, meat, e/g in tsp. | | | | | |
| Mean | 0.85 | 0.76 | 1.22 | 0.59 | 0.45 |
| Std. Dev. | 2.22 | 0.99 | 3.71 | 1.17 | 1.01 |
| N | 98 | 40 | 30 | 23 | 5 |
| No. of rice feedings | | | | | |
| Mean | 2.11 | 2.11 | 2.14 | 2.06 | 2.25 |
| Std. Dev. | 0.86 | 0.85 | 0.71 | 1.06 | 0.96 |
| N | 80 | 36 | 22 | 18 | 4 |
| Rice (tbsp.) | | | | | |
| Mean | 1.66 | 1.79 | 1.48 | 1.68 | 1.50 |
| Std. Dev. | 0.90 | 1.01 | 0.79 | 0.89 | 0.58 |
| N | 80 | 34 | 23 | 19 | 4 |
| Soup (oz.) | | | | | |
| Mean | 2.76 | 3.24 | 2.00 | 2.85 | 3.00 |
| Std. Dev. | 6.72 | 10.02 | 3.12 | 3.89 | 2.83 |
| N | 62 | 24 | 18 | 18 | 2 |
| Cow's milk (oz.) | | | | | |
| Mean | 7.09 | 0.0 | 8.20 | 19.83 | 0.0 |
| Std. Dev. | 10.75 | 0.0 | 9.42 | 11.02 | 0.0 |
| N | 54 | 41 | 30 | 24 | 5 |

TABLE A-1 (continued)

| | Total | Breast milk only | Mixed | Cow's milk only | No milk |
|---|---|---|---|---|---|
| Biscuits (gm.) | | | | | |
| Mean | 10.13 | 7.30 | 14.72 | 11.02 | 3.30 |
| Std. Dev. | 9.77 | 6.13 | 14.86 | 7.54 | 0.0 |
| N | 45 | 19 | 12 | 13 | 1 |
| Sugar (tsp.) | | | | | |
| Mean | 3.48 | 1.05 | 0.54 | 8.04 | 6.50 |
| Std. Dev. | 8.45 | 1.25 | 0.25 | 16.33 | 3.46 |
| N | 33 | 14 | 6 | 8 | 5 |
| Fresh fish (tsp.) | | | | | |
| Mean | 1.54 | 1.50 | 2.08 | 0.75 | 0.75 |
| Std. Dev. | 2.70 | 0.88 | 4.49 | 0.39 | 0.0 |
| N | 31 | 13 | 11 | 6 | 1 |
| No. of lugaw feedings | | | | | |
| Mean | 1.60 | 1.57 | 1.83 | 1.00 | 1.00 |
| Std. Dev. | 0.89 | 0.85 | 1.03 | 0.0 | 0.0 |
| N | 30 | 14 | 12 | 3 | 1 |
| Lugaw (tbsp.) | | | | | |
| Mean | 1.52 | 1.46 | 1.78 | 1.40 | 1.00 |
| Std. Dev. | 0.74 | 0.66 | 0.97 | 0.55 | 0.0 |
| N | 29 | 13 | 9 | 5 | 2 |
| Bread (gm.) | | | | | |
| Mean | 21.88 | 23.35 | 15.53 | 27.19 | 22.00 |
| Std Dev. | 23.08 | 14.83 | 21.00 | 34.35 | 0.0 |
| N | 28 | 10 | 9 | 8 | 1 |
| Other vegetables (tsp) | | | | | |
| Mean | 2.75 | 4.00 | 2.00 | 3.09 | 1.50 |
| Std. Dev. | 3.27 | 5.13 | 1.07 | 4.07 | 0.0 |
| N | 27 | 6 | 12 | 8 | 1 |
| Banana (tbsp.) | | | | | |
| Mean | 5.60 | 4.93 | 6.83 | 3.50 | 10.00 |
| Std. Dev. | 5.62 | 3.18 | 8.64 | 2.01 | 0.0 |
| N | 16 | 5 | 6 | 4 | 1 |

TABLE A-1 (continued)

| | Total | Breast milk only | Mixed | Cow's milk only | No milk |
|---|---|---|---|---|---|
| Meat (tsp.) | | | | | |
| Mean | 1.36 | 1.00 | 1.23 | 1.63 | 1.50 |
| Std. Dev. | 1.34 | 0.0 | 1.28 | 1.93 | 0.0 |
| N | 13 | 1 | 7 | 4 | 1 |
| Egg yolk (tsp.) | | | | | |
| Mean | 0.95 | 1.00 | 0.95 | 0.83 | -- |
| Std. Dev. | 0.12 | 0.0 | 0.11 | 0.24 | -- |
| N | 11 | 4 | 5 | 2 | 0 |
| Salt fish (tsp.) | | | | | |
| Mean | 0.63 | 0.85 | 0.13 | 0.33 | -- |
| Std. Dev. | 0.47 | 0.48 | 0.0 | 0.14 | -- |
| N | 10 | 6 | 1 | 3 | 0 |
| Rice water (oz.) | | | | | |
| Mean | 15.55 | 8.00 | 18.00 | 18.92 | -- |
| Std. Dev. | 10.58 | 2.00 | 0.0 | 12.28 | -- |
| N | 10 | 3 | 1 | 6 | 0 |
| Oil in lugaw (tsp.) | | | | | |
| Mean | 0.54 | 0.15 | 1.25 | 0.26 | 0.03 |
| Std. Dev. | 0.94 | 0.14 | 1.52 | 0.24 | 0.0 |
| N | 9 | 2 | 3 | 3 | 1 |
| Green leafy vegetables (tsp.) | | | | | |
| Mean | 2.88 | 6.00 | 2.75 | 0.25 | -- |
| Std. Dev. | 3.71 | 0.0 | 4.17 | 0.0 | -- |
| N | 6 | 1 | 4 | 1 | 0 |
| Sweet potato (tbsp.) | | | | | |
| Mean | 2.00 | 2.00 | 2.00 | -- | -- |
| Std. Dev. | 0.50 | 0.0 | 0.71 | -- | -- |
| N | 3 | 1 | 2 | 0 | 0 |
| Salted wet fish (tsp.) | | | | | |
| Mean | 0.33 | 0.38 | 0.25 | -- | -- |
| Std. Dev. | 0.14 | 0.18 | 0.0 | -- | -- |
| N | 3 | 2 | 1 | 0 | 0 |

TABLE A-2

DIETARY REQUIREMENTS ACHIEVED IN 24-HOUR RECALL, AND MEAN AGES OF INFANTS IN ILOILO BY MILK FEEDING METHOD

| | Total | Breast milk only | Mixed | Cow's milk only | No milk |
|---|---|---|---|---|---|
| | 99 | 41 | 30 | 23 | 5 |
| Ideal Caloric Requirement % | | | | | |
| Mean | 42.4 | 13.4 | 43.1 | 94.7 | 35.0 |
| Std. Dev. | 42.8 | 9.6 | 36.4 | 41.7 | 17.2 |
| Actual Caloric Requirement % | | | | | |
| Mean | 53.4 | 17.4 | 53.0 | 116.7 | 58.2 |
| Std. Dev. | 51.7 | 13.6 | 42.9 | 48.9 | 26.1 |
| Ideal Protein Requirement % | | | | | |
| Mean | 46.6 | 13.0 | 53.7 | 102.2 | 23.8 |
| Std. Dev. | 53.0 | 10.3 | 57.0 | 49.6 | 12.9 |
| Actual Protein Requirement % | | | | | |
| Mean | 58.3 | 16.8 | 65.1 | 126.9 | 40.9 |
| Std. Dev. | 64.0 | 14.0 | 65.6 | 62.0 | 24.2 |
| % Ideal Caloric Requirement Received from Solid Foods | | | | | |
| Mean | 27.7 | 13.4 | 26.3 | 53.6 | 35.0 |
| Std. Dev. | 25.3 | 9.6 | 24.5 | 27.5 | 17.2 |
| Nonmilk Calories (from solids) | | | | | |
| Mean | 267.3 | 131.2 | 249.4 | 518.1 | 337.1 |
| Std. Dev. | 240.8 | 98.3 | 208.8 | 274.9 | 181.3 |

TABLE A-2 (continued)

| | Total | Breast milk only | Mixed | Cow's milk only | No mi |
|---|---|---|---|---|---|
| G. % Ideal Protein Requirement Received from Solid Foods | | | | | |
| Mean | 16.1 | 13.0 | 18.7 | 16.4 | 23.8 |
| Std. Dev. | 19.2 | 10.3 | 28.7 | 16.9 | 12.9 |
| Nonmilk Protein (gm.) (from solids) | | | | | |
| Mean | 3.7 | 3.1 | 4.1 | 4.0 | 5.9 |
| Std. Dev. | 4.0 | 2.5 | 5.5 | 4.2 | 3.0 |
| I. % Calories from Fat (total diet) | | | | | |
| Mean | 13.6 | 12.0 | 16.3 | 15.2 | 2.5 |
| Std. Dev. | 10.8 | 9.2 | 10.9 | 12.8 | 1.8 |
| J. % Calories from Fat (nonmilk foods) | | | | | |
| Mean | 11.9 | 12.0 | 20.3 | 2.9 | 2.4 |
| Std. Dev. | 52.5 | 9.2 | 90.7 | 33.1 | 1.8 |
| K. Age in Months | | | | | |
| Mean | 9.8 | 9.6 | 9.7 | 10.0 | 10.8 |
| Std. Dev. | 2.8 | 2.4 | 2.8 | 3.4 | 3.3 |

TABLE A-3

NUTRIENT INTAKES ACHIEVED IN 24-HOUR RECALL
BY MILK FEEDING METHOD

| | Total | Breast milk only | Mixed | Cow's milk only | No milk |
|---|---|---|---|---|---|
| | 99 | 41 | 30 | 23 | 5 |
| **ories** | | | | | |
| ean | 409.09 | 131.22 | 413.32 | 914.56 | 337.06 |
| td. Dev. | 410.32 | 98.26 | 328.95 | 414.24 | 181.29 |
| **tein (gm.)** | | | | | |
| ean | 10.80 | 3.07 | 12.28 | 23.81 | 5.48 |
| td. Dev. | 12.26 | 2.52 | 12.53 | 12.34 | 3.00 |
| **l fat (gm.)** | | | | | |
| ean | 7.03 | 1.87 | 7.97 | 16.32 | 0.98 |
| td. Dev. | 11.28 | 2.25 | 10.43 | 16.28 | 0.82 |
| **min A (A - Carotene)** | | | | | |
| an | 3458.73 | 4026.25 | 2713.53 | 3370.06 | 3684.14 |
| d. Dev. | 4098.90 | 4363.10 | 3847.46 | 3902.12 | 4755.54 |
| **(mg.)** | | | | | |
| an | 5.39 | 0.92 | 11.23 | 6.56 | 1.58 |
| . Dev. | 17.44 | 0.88 | 26.45 | 18.52 | 1.12 |
| **min C (mg.)** | | | | | |
| n | 50.34 | 60.22 | 42.74 | 48.21 | 24.80 |
| . Dev. | 39.77 | 37.46 | 39.51 | 41.85 | 38.54 |

TABLE A-4

"OTHER FOODS"* RECEIVED BY 100 6- TO 15-MONTH-OLD INFANTS IN ILOILO

| Food | % |
|---|---|
| Binokbok (powdered rice porridge) | 16 |
| Soft drinks (2 Tru Orange, 2 Pepsi, 2 Sprite), cheese snacks | 6 (each) |
| Cerelac, calamansi (small limes) | 5 (each) |
| Chicharon (pork skin crisps) | 4 |
| Cassava, ripe papaya, calamay hati, saba banana, young coconut, pineapple juice, poprice, puto, Cheese Curls | 2 (each) |
| Tomato sauce, popsicle, brown sugar, calcag, arroz ala valenciana, sugarcane juice, macopa, pancit noodles, tiesa, Milo, oatmeal, sotanghon | 1 (each) |

* While all foods consumed were included in the calculation of nutrients, the foods on this table were not on the questionnaire and thus were not tabulated by individual category.

TABLE A-5

NUTRITIONAL AND DIETARY PROFILE OF 5 INFANTS (5% of Sample) RECEIVING NO BREAST OR COW'S MILK

| | Mean | Standard Deviation |
|---|---|---|
| Age in months | 10.8 | 3.7 |
| Wt./age | 61.6 | 13.6 |
| Total calories | 337.1 | 181.3 |
| Percent ideal caloric requirement (based on ideal weight) | 35% | 17 |
| Percent actual caloric requirement (based on actual weight) | 58% | 26 |
| Total protein | 5.5 gm. | 3.0 |
| Percent ideal protein requirement (based on ideal weight) | 23% | 13 |
| Percent actual protein requirement (based on actual weight) | 41% | 24 |
| Vitamin A | 368.41 IU | 475.55 |
| Iron | 1.58 mg. | 1.1 |
| Vitamin C | 24.8 mg. | 38.5 |
| Oil in lugaw yesterday | .034 tsp. | (1 infant only) |
| Percent calories from fat | 2.4% | 1.8 |
| Animal foods (fish, meat, | .45 tsp. | 1.0 |

TABLE A-6

NUMBERS OF WOMEN MENTIONING FOODS GOOD AND BAD FOR BABIES

Project Calories

Foods Good or Best for Babies

lupo ---------- 3
alugbati ---------- 6
kangkong ---------- 2
camote tops ------- 8
squash ----------12
kulitis ---------- 1
eggplant ---------- 2
dagmay ---------- 1
green leafy ------- 2
malungay leaves ---16

gabi ---------- 1
sweet potato ------ 7
potato ---------- 3

banana ----------22
avocado ---------- 8
calamansi --------- 6

tiesa ---------- 1
orange ---------- 5
fruits ---------- 1
papaya ---------- 5

tomato juice ------ 1
calamansi juice --- 4

meat ----------12
chicken ---------- 2
fish ---------- 8
dried fish -------- 1

meat/veg. soup ---- 9

vitamins ---------- 3

milk (with 2 mentioning sustagen) ----------26

eggs ----------19

milo ---------- 2
Gerbers ---------- 5

biscuits ---------- 3
bread ---------- 2

rice ----------11
lugaw ---------- 5

mongo ---------- 3
beans ---------- 2
kadyos ---------- 1

Foods Not Good for Babies

malungay(horseradish) - 1
banana blossoms ------- 1
bamboo shoots --------- 1
camote tops ----------- 1
jute (saluyot) -------- 1
cassava ---------- 2

jackfruit ---------- 5
ripe mango ---------- 2
unripe mango ---------- 4
kaong ---------- 1
avocado ---------- 1

coconut ---------- 1
pineapple ---------- 2
pineapple juice ----- 1
calamansi ---------- 2
batuan ---------- 1
balimbing ---------- 2

fatty foods (pork) -- 1
stale fish ---------- 1
raw fish ---------- 1
dried fish ---------- 7
salted fish --------- 1
fresh fish, fish ---- 2
shrimp ---------- 1
alimasag ---------- 1
bagoong ---------- 1

coconut milk ---------- 2
coconut wine ---------- 1
sweet milk, milk ------ 2
coffee ---------- 1
soft drinks ---------- 3
candies ---------- 5
sweets ---------- 1
rice ---------- 1
rice cake ---------- 1
corn, boiled corn(13) - 2
sour foods ---------- 1
kadyos ---------- 2

TABLE A-7

REASONS FOR SAYING FOODS MENTIONED IN TABLE A-6 ARE GOOD FOR BABIES
(100 Mothers)

| Reasons | N = % |
|---|---|
| Contains vitamins | 55 |
| Makes body lively | 40 |
| Makes baby stout/fat | 27 |
| Has nutrients | 25 |
| Makes body strong | 23 |
| Provides protein | 17 |
| Rich in vitamin C | 12 |
| Makes child grow tall | 7 |
| Makes child heavier | 6 |
| Baby likes food/tastes good/baby feels happy eating food | 5 |
| Strengthens teeth, helps maintain normal vision, food is satiating | 4 (each) |
| Provides carbohydrates, regulates bowels, has elements | 3 (each) |
| Rich in vitamin A, rich in calcium, has minerals, contains fats, prevents sickness | 2 (each) |
| Rich in vitamin B, helps brain development, provides resistance, makes baby healthy, prevents paleness, strengthens bones, helps growth, easily digested, does not cause loose bowels, always available, serves as appetizer, economical, rich in iron | 1 (each) |

TABLE A-8

REASONS GIVEN WHY FOODS ARE NOT GOOD FOR BABIES
(100 Mothers)

| Reason | N = Σ |
|---|---|
| Difficult to digest/causes indigestion/ causes upset stomach/might cause stomachache | 38 |
| Causes/might cause loose bowels | 9 |
| Retards growth | 6 |
| Causes tooth decay | 4 |
| Causes worms, causes itchy throat, causes gas pains, reduces appetite, hard | 3 (each) |
| Causes cough, bitter, weakens body, might cause body itch, baby can't swallow it, baby doesn't like, stomach not used to it, not tasty | 1 (each) |

TABLE A-9

ANSWERS TO QUESTION:

"If You Should Give Birth to Another Child, Would You Prefer It to be Different from _____ in Any of These Ways?"

(100 Mothers)

| | Response | N = % |
|---|---|---|
| A. | Simply "different in any way?" | |
| | Yes | 76 |
| | No | 22 |
| | No reply | 2 |
| B. | Quieter | 9 |
| | More lively | 77 |
| | Same | 12 |
| | No reply | 2 |
| C. | Fatter | 72 |
| | Thinner | 0 |
| | Same | 26 |
| | No reply | 2 |
| D. | Taller | 61 |
| | Shorter | 0 |
| | Same | 37 |
| | No reply | 2 |
| E. | Lighter complexion | 31 |
| | Darker | 16 |
| | Same | 51 |
| | No reply | 2 |
| F. | Other: | |
| | Pretty/beautiful | 3 |
| | Kind | 2 |
| | Tantalizing eyes | 1 |
| | Well-developed legs | 1 |
| | Handsome/healthy | 1 |
| | No other answers given | 92 |

TABLE A-10

SOCIODEMOGRAPHIC AND DIETARY CHARACTERISTICS OF 100 ILONGO FAMILIES WITH INFANTS AGED 6 TO 15 MONTHS, HAVING HEARD RADIO MESSAGE TO ADD OIL TO LUGAW, AND 8 FAMILIES ACTUALLY ADDING OIL TO LUGAW IN PAST 24 HOURS

(Except for mother's age, the following variables do not differ significantly between 41 families adding oil to lugaw at least once a week and 59 families not adding oil to lugaw.)

| Age of Housewife | % Total Sample (N = 100) | % Oil Receivers (N = 8) |
|---|---|---|
| 16-20 years | 4 | 0 |
| 21-25 " | 25 | 13 |
| 26-30 " | 26 | 25 |
| 31-35 " | 22 | 38 |
| 36-40 " | 13 | 13 |
| 41-45 " | 7 | 13 |
| 46-50 " | 1 | 0 |
| 51 or older | 2 | 0 |

| Education | Housewife | | Husband | |
|---|---|---|---|---|
| | % Total Sample (N = 100) | % Oil Receivers (N = 8) | % Total Sample (N = 100) | % Oil Receivers (N = 8) |
| Some elementary | 12 | 0 | 27 | 25 |
| Completed elementary | 40 | 63 | 31 | 25 |
| Some high school | 18 | 13 | 15 | 0 |
| Completed high school | 12 | 13 | 8 | 25 |
| Vocational | 2 | 0 | 8 | 13 |
| Some college | 2 | 0 | 5 | 13 |
| Has a degree | 9 | 13 | 3 | 0 |
| Completed some master's degree | 5 | 0 | 2 | 0 |
| Not known/refused | 0 | 0 | 1 | 0 |

TABLE A-10 (continued)

| Occupation | Housewife | | Househusband | |
|---|---|---|---|---|
| | % Total Sample (N = 100) | % Oil Receivers (N = 8) | % Total Sample (N = 100) | % Oil Receivers (N = 8) |
| Professional, technical & kindred workers | 6 | 0 | 3 | 0 |
| Farmers & farm managers | 10 | 13 | 52 | 50 |
| Managers, officials & proprietors except farm | 0 | 0 | 0 | 0 |
| Clerical & kindred workers | 0 | 0 | 1 | 0 |
| Sales workers | 2 | 0 | 6 | 0 |
| Craftsmen, foremen & kindred workers | 1 | 13 | 7 | 25 |
| Service workers, except private household workers | 0 | 0 | 20 | 13 |
| Private household workers | 0 | 0 | 2 | 0 |
| Laborers | 0 | 0 | 5 | 0 |
| Not gainfully employed | 81 | 75 | 3 | 13 |
| Not know/refused | 0 | 0 | 1 | 0 |

| | Total Sample | | Oil Receivers | |
|---|---|---|---|---|
| | Mean | S.D. | Mean | S.D. |
| No. of adults 16 and over | 2.87 | 1.36 | 3.63 | 0.92 |
| Children 0 to 15 years | 3.26 | 1.86 | 3.88 | 2.17 |
| Total size of household | 5.13 | 2.26 | 5.50 | 1.60 |

| Possession of Facilities in the Home | % Total Sample (N = 100) | % Oil Receivers (N = 8) |
|---|---|---|
| Running water | 3 | 0 |
| Electricity | 8 | 13 |
| Radio | | |
| Working radio | 61 | 88 |
| Not working radio | 6 | 0 |
| Transistor | 64 | 88 |
| Power | 0 | 0 |
| Both T & P | 2 | 0 |
| FM Band | 0 | 0 |
| Television | 3 | 0 |

TABLE A-10 (continued)

| Weekly Income Earned in Pesos | % Total Sample (N = 100) | % Oil Employees (N = 8) |
|---|---|---|
| 10 or less | 6 | 13 |
| 11-20 | 12 | 0 |
| 21-30 | 13 | 13 |
| 31-40 | 9 | 13 |
| 41-50 | 16 | 25 |
| 51-75 | 23 | 25 |
| 76-100 | 8 | 13 |
| 101-150 | 2 | 0 |
| 151 or over | 7 | 0 |
| Not know/refused | 4 | 0 |

| Monthly Income of Husband/Husband in Pesos | % Total Sample (N = 100) | % Oil Employees (N = 8) |
|---|---|---|
| 200 or less | 55 | 63 |
| 201-300 | 23 | 25 |
| 301-400 | 9 | 13 |
| 401-600 | 2 | 0 |
| 601-800 | 1 | 0 |
| 801-1000 | 4 | 0 |
| 1001 & over | 2 | 0 |
| Not know/refused | 4 | 0 |

| House Ownership | % Total Sample (N = 100) | % Oil Employees (N = 8) |
|---|---|---|
| Own house | 84 | 88 |
| Rent house | 16 | 13 |

| Economic Class | % Total Sample (N = 100) | % Oil Employees (N = 8) |
|---|---|---|
| C | 3 | 0 |
| D | 70 | 75 |
| E | 27 | 25 |

TABLE A-10 (continued)

| Test Area | % Total Sample (N = 100) | % Oil Receivers (N = 8) |
|---|---|---|
| Guimbal | 11 | 25 |
| Barotac Nuevo | 11 | 13 |
| Cabatuan | 11 | 13 |
| Janiuay | 35 | 25 |
| Lambunao | 32 | 25 |

| Classification | % Total Sample (N = 100) | % Oil Receivers (N = 8) |
|---|---|---|
| Putting oil | 49 | 100 |
| Not putting oil | 51 | 0 |

| No. of Sources of Message | % Total Sample (N = 100) | % Oil Receivers (N = 8) |
|---|---|---|
| 1 | 32 | 13 |
| 2 | 18 | 25 |
| 3 | 27 | 13 |
| 4 | 17 | 25 |
| 5 | 3 | 0 |
| 6 | 3 | 25 |

| Sources of Advice | % Total Sample (N = 100) | % Oil Receivers |
|---|---|---|
| Radio | 94 | 100 |
| Friends | 44 | 63 |
| Relatives | 43 | 63 |
| Health worker | 20 | 13 |
| Doctors | 6 | 25 |
| Nurses | 5 | 13 |
| Midwife | 10 | 38 |
| Giveaway Magazine | 2 | 0 |
| Nutrition Seminar | 4 | 0 |
| PTA Meeting | 1 | 13 |
| BIC | 7 | 13 |
| Rural Health Center | 1 | 13 |
| BAEX | 2 | 0 |
| Mother's Class | 3 | 0 |
| Home Tech. | 1 | 0 |
| DMCH | 1 | 0 |
| FRS | 1 | 0 |
| RMT | 1 | 0 |
| Seminar OPT | 1 | 0 |
| Seminar INF | 1 | 0 |
| Project Compassion | 1 | 0 |
| Dept. of Ed. & Culture Seminar | 1 | 0 |

TABLE A-[illegible] (continued)

| | Total Sample Mean | Oil Receivers Mean |
|---|---|---|
| From what age give lugaw | 5.4 (52% at 5 mo.) | 4.88 (88% at 5 mo.) |
| To how many months | 17.4 (42% at 12 mo.) (28% at 24 mo.) | 15.0 (75% at 12 mo.) (25% at 24 mo.) |

| | Frequency of Giving Lugaw | | Frequency of Adding Oil to Lugaw | |
|---|---|---|---|---|
| | % Total Sample (N = 41) | % Oil Receivers (N = 8) | % Total Sample (N = 100) | % Oil Receivers (N = 8) |
| Once a week | 4 | 0 | 5 | 0 |
| Twice a week | 6 | 0 | 13 | 25 |
| 3 times a week | 6 | 13 | 7 | 0 |
| 4 times a week | 2 | 0 | 2 | 0 |
| 5 times a week | 2 | 13 | 1 | 13 |
| 6 times a week | 0 | 0 | 0 | 50 |
| Once daily | 28 | 13 | 11 | 13 |
| Twice daily | 26 | 50 | 1 | 0 |
| 3 times daily | 24 | 13 | 1 | 0 |
| 4 times daily | 2 | 0 | 0 | 0 |
| Not adding oil to lugaw | - | - | 59 | - |

| Participation or Exposure to Nutrition or Health Programs[illegible] No. of Programs | % Total Sample (N = 100) | % Oil Receivers (N = 8) |
|---|---|---|
| 0 | 5 | 0 |
| 1 | 27 | 13 |
| 2 | 37 | 63 |
| 3 | 28 | 13 |
| 4 | 2 | 13 |
| 5 | 1 | 0 |

TABLE A-10 (continued)

| | % Total Sample (N = 100) | % Oil Receivers (N = 8) |
|---|---|---|
| Operation Timbang (OPT) - weighing and identifying malnutrition only | 73 | 88 |
| Rural Improvement Clubs/ Bureau of Agricultural Extension | 4 | 13 |
| Targeted Maternal-Child Health | 4 | 0 |
| Nutripak Feeding Programs | 1 | 0 |
| Rural Health | 61 | 88 |
| Peace Corps | 0 | 0 |
| Pediatrician | 53 | 38 |
| Hospital | 1 | 0 |
| Mother's Class | 1 | 0 |

| | Total Sample | | Oil Receivers | |
|---|---|---|---|---|
| | Mean | S.D. | Mean | S.D. |
| Age in months | 9.82 | 2.90 | 9.13 | 3.2 |
| Filipino % weight for age | 88.67 | 13.37 | 91.8 | 14.4 |
| Harvard % weight for age | 80.36 | 12.47 | 83.5 | 9.7 |

| Condition of the Baby | % Total Sample (N = 100) | % Oil Receivers (N = 8) |
|---|---|---|
| Good health | 72 | 50 |
| Cold-cough | 18 | 25 |
| Fever | 5 | 13 |
| Diarrhea | 2 | 0 |
| Cold-cough + fever | 2 | 13 |
| Cold-cough + diarrhea | 0 | 0 |
| Fever + diarrhea | 1 | 0 |
| All of these | 0 | 0 |

| Age Child was Weaned or They Plan to wean [illegible] first | % Total Sample (N = 100) | % Oil Receivers (N = 8) |
|---|---|---|
| month(s) | 1 | 0 |
| " | 2 | 0 |
| " | 1 | 13 |
| " | 1 | 0 |
| " | 1 | 0 |
| " | 1 | 0 |
| " | 1 | 0 |
| " | 1 | 0 |
| " | 1 | 0 |

TABLE A-10 (continued)

| Age Child was Weaned or They Plan to [illegible] from Breast (cont.) | % Total Sample (N = 100) | % Oil Receivers (N = 8) |
|---|---|---|
| 10 months | 1 | 0 |
| 11 " | 1 | 0 |
| 12 " | 20 | 25 |
| 13 " | 2 | 0 |
| 14 " | 3 | 0 |
| 15 " | 2 | 0 |
| 18 " | 20 | 0 |
| 19 " | 1 | 0 |
| 24 " | 11 | 13 |
| 36 " | 1 | 0 |
| Bottle-fed | 20 | 25 |
| Still breast-fed - up to child | 8 | 25 |
| Currently breast-fed | 71 | 50 |

| No. of breast-feedings at Night | % Total Sample (N = 100) | % Oil Receivers (N = 8) |
|---|---|---|
| Once | 4 | 0 |
| Twice | 3 | 0 |
| 3 times | 23 | 25 |
| 4 " | 6 | 13 |
| 5 " | 17 | 13 |
| 6 " | 6 | 0 |
| 10 " | 2 | 0 |
| Didn't breast-feed at night | 13 | 25 |
| All night | 6 | 0 |
| Missing value, bottle-fed only | 20 | 25 |

| Type of Milk Feeding | % Total Sample (N = 100) | % Oil Receivers (N = 8) |
|---|---|---|
| Breast-feeding only | 41 | 25 |
| Mixed feeding | 30 | 38 |
| Cow's milk-feeding | 23 | 25 |
| No milk | 5 | 13 |

TABLE A-10 (continued)

| No. of Feedings in Past 24 Hours | Rice | | Lugaw | |
|---|---|---|---|---|
| | % Total Sample (N = 100) | % Oil Receivers (N = 8) | % Total Sample (N = 100) | % Oil Receivers (N = 8) |
| Once | 23 | 25 | 19 | 63 |
| Twice | 27 | 38 | 5 | 13 |
| 3 times | 28 | 25 | 5 | 13 |
| 4 times | 2 | 0 | 2 | 0 |
| None | 20 | 13 | 70 | 13 |

| | Total Sample Mean | Oil Receivers Mean |
|---|---|---|
| Total amount rice | 1.66 tbsp. | 1.50 |
| Total amount lugaw | 1.52 tbsp. | .875 |
| Total green leafy vegetables | 2.88 tsp. | 0 |
| Total other vegetables | 2.75 tsp. | .50 |
| | | (see Table A-1) |

| Career Aspirations for Child | % Total Sample (N = 100) |
|---|---|
| To become a doctor | 23 |
| To become a nurse | 20 |
| To become a teacher | 8 |
| To become a commerce graduate | 3 |
| To become a secretary | 3 |
| To finish agricultural school | 3 |
| To become an engineer | 2 |
| To become a priest | 2 |
| To become a mechanical engineer | 2 |
| To become a farmer | 2 |
| To finish high school | 2 |
| To finish Voc. Tech. | 2 |
| To become a president | 1 |
| To finish elementary school | 1 |
| To become a treasurer | 1 |
| To become a carpenter | 1 |
| To become a boat captain | 1 |
| To become a lawyer | 1 |
| To finish his/her studies and have a job | 1 |
| Don't know/can't recall | 15 |

APPENDIX B

English Translations of Hausa Scripts

Manoff International, Inc.
New Versions
August 15, 1975
VEGETABLE MESSAGE WITH DOCTOR

VERSION I

MUSIC UP AND OUT

LITA : Mama, aren't you sad? So many of your old ways are changing?

MOTHER : Lita, only a fool remains with the old ways when a new way is better.

LITA : But, mama, how do you know a new way is better?

MOTHER : From the doctor on the radio. Listen -

DOCTOR : (RECORDED RADIO VOICE) From six months, a baby needs green vegetables every day with his rice and fish. These vegetables give the vitamins he needs to be healthy ... well-cooked green vegetables, not just soup.

LITA : But, mama, six months is too young for vegetables.

MOTHER : Sh-h. Listen to the doctor.

DOCTOR : (CONTINUES AS BEFORE) Six months is not too young. Every baby needs well-cooked green vegetables in his lugaw. Vegetable soup is not enough.

LITA : I did not know that.

MOTHER : Lita, you have to listen and learn. Don't be a fool.

MUSIC UP AND OUT

ANNOUNCER: For help with your baby see the doctor, home management technician, or community worker in your area. Listen and learn a better way.

VEGETABLE MESSAGE WITHOUT DOCTOR

VERSION 2

MUSIC UP AND UNDER

ANNOUNCER: Listen and learn - another drama of Lita and her mother.

MUSIC UP AND OUT

MOTHER : Lita, there is a better way to feed your baby. Mix vegetables and oil in his lugaw.

LITA : But mama, he is only six months old!

MOTHER : I heard the doctor on the radio say that even a six-month-old baby needs green vegetables every day, for vitamins for good health.

LITA : But at six months a baby can't digest green vegetables!

MOTHER : He can if they are well-cooked.

LITA : You never fed me that way when I was six months old.

MOTHER : Lita, times change and you learn new ways.

LITA : OK, I'll feed the baby green vegetables every day in his lugaw, well-cooked, of course.

MOTHER : You are even a better mother than I was, thanks to the radio and the new ways.

MUSIC UP AND OUT

ANNOUNCER: For help with your baby see the doctor, home management technician, or community worker in your area. Listen and learn a better way.

OIL MESSAGE WITH DOCTOR

VERSION 3

MUSIC UP IN BACKGROUND

ANNOUNCER: Listen and learn - another drama of Lita and her mother.

MUSIC UP AND OUT

LITA : Mama, why are you putting a drop of cooking oil in my baby's lugaw? Where did you get this strange idea?

MOTHER : From the doctor on the radio. Listen -

DOCTOR : (RADIO VOICE RECORDED) Oil is the best energy food for babies when they are six months old.

LITA : Mama, better than sugar, rice, camote and

MOTHER : Sh-h. Listen to the doctor.

DOCTOR : (CONTINUES AS BEFORE) Oil has twice the energy of sugar, rice, camote. Every baby needs all these energy foods - especially oil. The first day mix a drop with rice, mungo, fish, vegetables, everything. Then every day a little more. Gradually a teaspoon.

LITA : But mama, you didn't do that with me.

MOTHER : How could I know? I didn't even have a radio. Now you can listen and learn.

MUSIC UP IN BACKGROUND AND UNDER

ANNOUNCER: For help with your baby see the doctor, home management technician, or community worker in your area. Listen and learn a better way.

MUSIC UP AND OUT

FISH, VEGETABLE AND OIL
MESSAGE WITH DOCTOR

VERSION 4

MUSIC UP AND OUT

LITA : Mama, what are you giving my baby?

MOTHER : Lugaw, but mixed with green vegetables and a drop of oil.

LITA : But he's only six months old. Whose strange idea is this?

MOTHER : The doctor on the radio. Listen -

DOCTOR : (RADIO VOICE RECORDED) After six months a baby needs breast milk and also lugaw, but lugaw must be mixed with fish that gives protein for muscles and brain. Green vegetables for vitamins. A drop of oil for more weight.

LITA : But, mama, a six-month-old baby can't digest such foods.

MOTHER : Sh-h. Listen to the doctor.

DOCTOR : (CONTINUES AS BEFORE) A six-month-old baby can digest these foods. Just wash the salt from the dried fish, chop the vegetables and cook them well, add a little oil, and mash with the lugaw.

LITA : But, mama, you didn't feed me like that.

MOTHER : I didn't know any better. Times change. You live and learn.

MUSIC UP AND OUT

ANNOUNCER: For help with your baby see the doctor, home management technician, or community worker in your area. Listen and learn a better way.

OIL MESSAGE WITHOUT DOCTOR

VERSION 5

MUSIC UP AND UNDER

ANNOUNCER: Listen and learn - another drama of Lita and her mother.

MOTHER : Lita, my daughter, I heard the doctor on the radio say that after six months, breastefeeding is not enough to help the baby grow up strong and healthy.

LITA : But mama, I feed him lugaw also now.

MOTHER : But Lita, the doctor on the radio says to mix in a bit of lard or cooking oil with the baby's lugaw.

LITA : But, mama, it's just not done! The baby will get diarrhea!

MOTHER : Lita, he will not get sick if you follow the doctor's advice: A drop or two to begin, gradually to a teaspoon.

LITA : OK, mama, if you and the doctor say so, I'll try it.

MOTHER : As you grow older, Lita, you must learn new and better ways. The radio helps.

MUSIC UP AND OUT

ANNOUNCER: For help with your baby see the doctor, home management technician, or community worker in your area. Listen and learn a better way.

## VERSION 6

MUSIC UP AND UNDER

MOTHER : Lita, my daughter, on the radio the doctor says to add fish, green vegetables, and a drop of oil to the baby's lugaw to help him grow healthy and strong.

LITA : But mama, that's not done. He's only six months old.

MOTHER : Lita, that's what I thought, until the doctor explained the baby needs more than breast milk at six months. The new way is to use fresh fish or wash the salt out of dried or salted fish. Cook and mix the fish with green vegetables and add a drop of oil in the baby's lugaw.

LITA : But mama, you're changing your old ways!

MOTHER : Yes, because the doctor knows better.

LITA : I'll try it ... fish, vegetables, and oil in my baby's lugaw.

MOTHER : Lita, if I can learn new ways at my age, you can, too.

MUSIC UP AND OUT

ANNOUNCER: For help with your baby see the doctor, home managemen t technician, or community worker in your area. Listen and learn.

## REFERENCES

Abrahamson, L. and Velarde, N. Food classification system for developing countries. Pp. 113-122 in Teaching nutrition in developing countries, or the joys of eating daily green leaves, ed. K.W. Shack. Santa Monica, California: Meals for Millions Foundation, 1977.

Adult Education Association of the USA. How to use role playing. Leadersh Pamphlet No. 6, 743 N. Wabash Avenue, Chicago, 1960.

Ahmed, M. BRAC, Case Study Series #2. Essex, Connecticut: International Council of Educational Development, 1977a.

Ahmed, M. Savar Project, Case Study Series #1. Essex, Connecticut: Council of Educational Development, 1977b.

Ahmed, M. and Zeitlin, M. A statistical analysis of the extent to which food beliefs of the Unani medical system are accepted and practiced in West Pakistan. Unpublished. 1972.

Aitken, Dr Iain. Personal communication, 1978.

Alderman, M., Wise, P., and Ferguson, R. Reduction of young child malnutrition and mortality in rural Jamaica. New York: Cornell University Medical College, 1977.

Alderman, M.H., Husted, J., Levy, B., and Searle, R. A young-child nutrition programme in rural Jamaica, The Lancet 1(7813):1166-1168 (May 26) 1973.

Aleta, I.R. Evaluation of food and health soundslides. Philippine business for social progress. Report of evaluation. Manila, Philippines. Consumer Pulse, Inc. Unpublished. 1977.

Alexander, Janet. Personal communication, 1979.

Allison, J.E. Jr. Mass media approaches to nutrition education in developing countries. Pp. 98-103 in Teaching nutrition in developing countries, or the joys of eating dark green leaves, ed. K.W. Shack. Santa Monica, California: Meals for Millions Foundation, 1977.

Allison, Dr Jack. Personal communication, 1977.

Almatsier, S. Hospital dietetics in Indonesia. J. Am. Dietetic Assn. 58:143-6 (February) 1971.

Andersen, Jean. Personal communication, 1978.

Andre, Adeline. Personal communication, 1977

Anonymous. Bottle baby update. Mother Jones 3:5 (January) 1978.

Archampong, E.Q. Review: patterns and directions of medical research in West Africa. Trop. & Geogr. Med. 23:1-14 (March) 1971.

Arole, M. and Arole, R. A comprehensive rural health project in Jamkhed (India). Pp. 70-90 in Health by the People, ed. W. Newell. Geneva: World Health Organization, 1975.

Ashkenaz, E. Infant malnutrition in the developing countries, some social and cultural aspects. Cultural anthropology and nutrition. The Tamil Nadu nutrition study. II: B, 5-29. Haverford, Pennsylvania: Sidney M. Cantor Associates, 1973.

Asia Research Organization, Inc. Evaluation of the targeted maternal child health program in the Philippines, Manila, 1976.

Austin, J.E. The perilous journey. Am. J. Clin. Nutr. 31:2324-2338 (December) 1978.

Austin, J.E., Mahin, M., Pyle, D., and Zeitlin, M. Annotated directory of nutrition programs. Cambridge, Massachusetts: Harvard Institute for International Development, 1978.

Baertl, J.M., Adrianzen, B.T., and Graham, G.G. Growth of previously well-nourished infants in poor homes. Am. J. Dis. Child 130:33 (January) 1976.

Bagchi, K. Nutrition education through health care systems. World Health Organization document NUT/77.7. Geneva: World Health Organization, 1977.

Bagchi, K. and Bose, A.K. Effects of low nutrient intake during pregnancy on obstretric performance and offspring. Am. J. Clin. Nutr. 2:586-592, 1962.

Bai, K.I. Applied nutrition programme as media for mass communication rural areas surrounding Tirupati, J. Trop Ped. 19:152-61, 1973.

Baird, P.C. and Schultz, H.G. The marketing concept applied to "selling" good nutrition. J. Nutr. Ed. 8(1):13 (January-March) 1976.

Ballweg, J.A. Family characteristics and nutrition problems of preschool children in Fond Parisan, Haiti. J. Trop. Ped. 18(3):229-244, 1976.

Bandura, A. Social learning theory. Englewood Cliffs, New Jersey: Prentice Hall, 1972.

Bandura, A. and Walters, R.H. Social learning and personality development, New York: Holt, 1977.

Barber, B. Social stratification. New York: Harcourt Brace, 1957.

Barghouti, S.M. Integrated functional education in Machakas District. Programs for better family living. FAO W/LO 891. Nairobi: Food and Agriculture Organization, 1976.

Barnes, A. Reorganization of a nutrition unit in Papua, New Guinea. Brit. Med. J. 2:265-267 (May 3) 1975.

Barnes, R.H. The inseparability of nutrition from the social and the biological sciences. Nutr. Deita 10:1-8, 1968.

Bartolome, O.C. Integrated health programs/community aide teaching. Pp. 46-53 in Teaching nutrition in developing countries, or the joys of eating dark green leaves, ed. K.W. Shack. Santa Monica: Meals for Millions Foundation, 1977.

Beaudry-Darisme, M.N. A comparative evaluation of the effectiveness of nutrition rehabilitation centers in Haiti and Guatemala. Ph.D. thesis. Ithaca, New York: Cornell University (December) 1971.

Begnir, I., Fougere, W., and King, K. L'Alimentation et la nutrition en daiti, p. 153. Paris: Presse Universitaire de France, 1970.

Beghin, I.D. and Viteri, F.E. Nutrition rehabilitation centers: an evaluation of their performance. J. Trop. Ped. 19:404-416 (December) 1973.

Beira, R., Kinsey, D. and McGill, N. Antecedents and consequences of early school leaving: an analytic survey of research activities. Occasional Papers in Education and Development, No. 8. Cambridge, Massachusetts: Harvard University Graduate School of Education, 1972.

Bengoa, J.M. Nutrition rehabilitation centers. J. Trop. Ped. 13:169-176, 1967.

Bennett, F.J. Family structure and health at Kasingati. Soc. Sci. and Medicine 2:261-282 (September) 1968.

Berg, A. The nutrition factor. Washington, D.C.: The Brookings Institute, 1973.

Berggren, Dr. G. Personal Communication, 1979.

Bertrand, J.T. Communications pretesting. Media Monograph 6. Communication Laboratory. Community and Family Study Center. Chicago: University of Chicago, 1978.

Bowering, J., Morrison, M.A., Lowenberg, R.L., and Tirado, S. Evaluating 24-hour dietary recalls. J. Nutr. Ed. 9(1):20-25 (January-March) 1977.

Brown, R.E. Mission to Biafra. Clin. Pediat. 8(6):313-321 (June) 1969.

Brumberg, S.F. Columbia: a multimedia rural education program. In Education for Rural Development, ed. Ahmed, Manzoor & Coombs. New York: Praeger, 1975.

Burgess, A. Attitudes to and knowledge of breast-feeding Pasay City. Unpublished. 1976.

Bureau of Nutrition of Haiti and American Foundation for Overseas Blind. Assessment of Xeropthalmia in Haiti. New York: Helen Keller Foundation, 1975.

Burton, B.T. Nutricion Humana, p. 22. Washington, D.C.: Pan American Health Organization, 1966.

Caedo, N. and Engel, R.W. USAID Report, Manila, Philippines, 1973.

Caedo, N., Santiago, V. and Engel, R.W. Report on the Bulacan province nutrition and family planning program. Manila, Philippines: Nutrition Division, USAID. (Manuscript) (December) 1972.

Cain, B. and Comings, J. The participatory process: producing photo-literature, Center for International Education, Hills House South. Amherst, Massachusetts: University of Massachusetts, 1977.

Campbell Hospital. An assessment of the work done at the nutrition rehabilitation unit of C.S.I. Jamalamadugu, India. Unpublished report. April 1970-April 1975.

Capone, C. Integrating Title II Programs with locally operated nutrition, socioeconomic, and humanitarian activities. Field Bulletin No. 27. Nairobi: Catholic Relief Services, 1977.

Catholic Relief Services. A comparative evaluation of two approaches being used by the Catholic Relief Services in nutrition education. Report. Manila, Philippines: The Asian Social Institute, 1973a.

Catholic Relief Services. A pilot study of the effectiveness of the CRS-sponsored preschool program in Lesotho. Field Bulletin No. 17. CRS Nairobi: Office of Preschool Health Program, 1973b.

Chandra, P. Nonnutritional causes of malnutrition. Ind. J. Nutr. Dietet. 12:168-77, 1975.

Chandra, P. Effective method of nutrition education in India. Paper presented at IX International Conference on Health Education, Ottawa, Canada, August 29-September 3, 1976.

Chavez, A., et al. Role of lactation in the nutrition of low socioeconomic groups. Ecol. Food and Nutr. 4:159-169, 1975.

Christian Medical Commission, World Council of Churches. Rural basic health services: The Laidin Gabas way. Contact 41:1-7. 150 Route de Fernay, 1211 Geneva 20, 1977.

Church, M.A. Educational methods, cultural characteristics, and nutrition rehabilitation: experience in Kampala unit. J. Trop. Ped. 17:43-50, 1971.

Clarke, S. Mortality trends in prehistoric populations. Human Biology 49(2):181-186 (May) 1977.

Clearinghouse on Development Communication. A sourcebook on radio's role in development. Information Bulletin Number Seven. 1414 22nd Street, N.W., Washington, D.C , 1976.

Clearinghouse on Development Communication. Development communication report number 20, Washington, D.C., 1977.

Cole-King, S.M. Under five clinics in Malawi. The development of a national program. J. Trop. Ped. 21(4):183-191, 1975.

Community Systems Foundation. Thirteenth Annual Report, p. 5. Ann Arbor, Michigan, 1975/1976

Cooke, Dr. T. Personal communication, 1977.

Cooke, T. and Rouweber, S.T. Changing nutrition and health behavior through the mass media, Volume One: Philippines. Draft Final Report of AID Office of Nutrition Contract AID/ta-C-1133. Washington, D.C.: Manoff International, Inc. (October 3) 1977a.

Cooke, T. and Rouweber, S.T. Mass media nutrition education, Volume Two: Nicaragua. Draft Final Report under Contract AID/ta-C-1133. Washington, D.C.: Manoff International Inc., 1977b.

Crowley, D., Etherington, A., and Kidd, R. Radio learning group manual, mass media manual, how to run a radio learning group campaign. Friedrich-Ebert-Stiftung Mass Media Department, Godesberger Allee 149 5300 Bonn 2. GÖttinger Druckerei und Verlagsgesellschaft mbH, Gottingen. Federal Republic of Germany, 1978.

Currier, R.L. The hot-cold syndrome and symbolic balance in Mexican and Spanish-American folk medicine. Ethnology 5:251-263, 1966.

Cuthbertson, W.F.J. and Morley, D. A health and weight chart for children from birth to five. W. Afr. Med. J. 11(6):236, 1962.

Cutting, W.A.M. Promote growth and prevent malnutrition - a child weight card modified for India. J. Christian Med. Assoc. of Ind. 46:6, 1971.

Cutting, W.A.M. The under-five clinic at block level. Indian Pediat. 12(1):123-125, 1975.

Cyborski, C.K. Nutrition content in medical curricula. J. Nutr. Ed. 9(1):17-18 (January-March) 1977.

de Chavez, M.M., Gil, S.E.P., and de Regt, J. Diffusion of new concepts regarding child nutrition in rural environments. Pp. 256-265 in Proceedings of the 9th International Congress of Nutrition. Mexico, 1972.

de Gally, E.T. Experience of a publisher of training and persuasion materials for development programs in Latin America or communicating the joys of eating dark green leaves. Pp. 134-140 in Teaching nutrition in developing countries, or the joys of eating dark green leaves, ed. K.W. Shack. Santa Monica, California: Meals for Millions Foundation, 1977.

de Haas, J.H. Sociomedical achievements in the People's Republic of China. Internat. J. Hlth. Serv. 3(2):275-294, 1973.

Deodhar, N.S. Social and cultural factors conditioning infant feeding. Indian J. Med. Sci. 21:768-772 (November) 1967.

Deregowski, J.B. Illusion in art and nature. In Illusion in Art, ed. R.I. Gregory. London: Ducksworth, 1973.

De Sweemer, C. Growth and morbidity. Appendix 2, 317, Ph.D. thesis. Baltimore, Maryland: Johns Hopkins School of Public Health, 1973.

Devadas, R.P. Expectant mothers and an applied nutrition program. Pp. 103-112 in Volume III, Proceedings of the Seventh International Congress of Nutrition. Hamburg, 1966.

Dillard, J.D. Response to HIID preschool child nutrition program directory checklist. G.P.O. Box 666, Dacca, Bangladesh: The Asia Foundation, 1976.

Division of Family Hygiene. Final report of the integrated project of health and population, 1975-1978. Port au Prince, Haiti: Department of Public Health and Population, 1978.

Dobyns, Phyllis. Personal communication, 1978.

Dola, S.F. Organization of mass immunization campaigns against outbreaks of communicable diseases. E. Afr. Med. J. 50(7):362-365 (July) 1973.

Dolores, Mother. Personal communication, 1972.

Downs, S. Experimental evaluation of a prenatal leaflet series in two project centers in New York City. Nursing Research 22(6):498-506 (November-December) 1973.

Drake, W. and Fajardo, L. The promotora program in Candalaria: A Colombian attempt to control malnutrition and disease, 1968-1974. Ann Arbor: Community Systems Foundation (July) 1976.

Drummond, T. Using the method of Paul Freire in nutrition education: an experimental plan for community action in northeast Brazil. Cornell International Nutrition Monograph Series, No. 3. Ithaca, New York: Cornell University, 1975.

du Toit, A.F., Johnson, S. and Coster, E.E. Functions of a health center. S. Afr. Med. J. 45:307-19 (March 20) 1971.

Emrich, S. Nutrition education in a combined nutrition rehabilitation cente and well-child weighing clinic. Pp. 38-45 in Teaching nutrition in developing countries, or the joys of eating dark green leaves, ed. K.W. Shack. Santa Monica, California: Meals for Millions Foundation, 1977.

Engel, R.W. and Caedo, M. USAID Report. Manila, Philippines, 1969.

Fehrsen, G.S. Communicating the concept of nutritional disease in a rural area. S. Afr. Med. J. 48(60):2521-2522 (11 December) 1974.

Fernandez, N.A. Nutrition in Puerto Rico. Cancer Res. 35:3272, 1975.

Fernandez, A. and Colle, R.D. Communication at the pila. Cycle Publication P.O. Box 3923, Grand Central Station, New York: Cycle Publication.

Fifth Carribean Health Ministers Conference. Strategy and plan of action to combat gastro-enteritis and malnutrition in children under two years of age. J. Trop. Ped. 21(1):23-34 (February) 1975.

Fishbein, M. and Ajzen, I. Attitudes toward objects as predictors of single and multiple behavior criteria. Psychol. Rev. 81:59-74, 1974.

Fonseca, L. and Kearl, B. Comprehension of pictorial symbols: an experiment in rural Brazil. Department of Agriculture Journalism bulletin, No. 30. Madison: College of Agriculture, University of Wisconsin, 1960.

Fonseca, L. and Wassey, W.R. Comprehension and meaning in visual communication among illiterates, low literates and higher literate individuals. Costa Rica Science Communication Service of the Institute of InterAmerican Social Science of the OAS.

Food and Agriculture Organization. Food and nutrition education in the primary school. FAO Nutritional Studies, No. 25. Rome, 1971.

Food and Agriculture Organization. Handbook on human nutritional requirements. FAO Nutritional Series No. 28. WHO Monograph Series No. 61. Rome, 1974.

Food and Agriculture Organization. Ideas and action. FFHC/Action for Development 12(11):24, 1978.

Food and Agriculture Organization/World Health Organization. Ad Hoc Expert Committee. Energy and protein requirements. World Health Organization Technical Report Series No. 522. Geneva, 1973.

Food and Nutrition Research Center. Menu guide for southern Tagilog regions. Publication No. 96. Manila: Food and Nutrition Research Institute (October) 1966.

Food and Nutrition Research Center. Recommended classification by weight (kg.) of Filipino children ages 1 to 102 months (male and female combined). Publication no. 137, revised. Manila: Food and Nutrition Research Institute (January 15) 1974.

Food and Nutrition Research Institute. Food composition table (recommended for use in the Philippines) handbook, 3rd edition. Manila (June) 1976.

Forbes, A.L., Pelletier, O., and Keller, W. Final analysis, 1973-1975 Tunisian national nutrition survey. Tunis: Tunisian National Institute of Nutrition and Food Technology, 1979.

Foster, G.M. Relationship between Spanish and Spanish-American folk medicine. J. Amer. Folklore 66:201-217, 1953.

Fougere, W. and King, K.W. Capitulation as key ingredient in the eradication of severe malnutrition of children. J. of Trop. Ped. 21(5):240-248, 1975.

Freire, P. Pedagogy of the oppressed. New York: Seabury Press, 1970.

Fugelsang, A. Applied communications in developing countries. Uppsala, Sweden. Dag Hammerskjold Foundation. Övre Slottsgaten 2, S-752 20, Uppsala, Sweden, 1973.

Fugelsang, A. Communicating with the illiterate. Duplicated report of the National Food and Nutrition Commission, P.O. Box 2669, Lusaka, Zambia, 1969.

Fugelsang, A. Notes on Communication with Illiterates: a search for the tools of communication in educational activities in developing countries. Lusaka, Zambia, 1970.

Fugelsang, A. Mass communications applied to nutrition education of rural populations: an outline of strategy. PAG Bulletin, IV(1):7, 1973.

Fussell, D. and Haaland, A. Communicating with pictures in Nepal. Report of a study by National Development Service. Katmandu: Tribhuvan University and UNICEF, 1976.

Gopaldas, T. et al. Project Poshak: Volume Two. New Delhi: CARE-India, 1975.

Gaedeke, R.M., ed. Marketing in private and public nonprofit organizations, perspectives and illustrations. Santa Monica, California: Goodyear, 1977.

Glasser, M.A. A study of the public's acceptance of the Salk vaccine programs. Am. J. Pub. Health 48:141-146, 1968.

Gomez, E.D., Tetangoo, M.H., and Vega, L.L. The relative effectiveness of the communication strategies in presenting homemaking information. Department of Agricultural Communications, College of Agriculture, Mimeo. Los Banos, Laguna: University of the Philippines (June 27) 1971.

Gomez, F. et al. Mortality in second- and third-degree malnutrition. J. Trop. Ped. 2(2):77-83 (September) 1956

The Government Printer. Study guide for use in the public consultation program of the tribal grazing land policy to assist radio learning groups with broadcasts in July and August. Goborone, Botswana, 1976.

Gourier, Francois. Personal communication (April) 1978

Gray, S.H. Perceptual and Motor Skills 45(3):1035, 1977.

Greaves, J.P. Nutrition education - or education in child care. J. Ped. 10(6):347-9 (June) 1973

Greiner, T. The promotion of bottle feeding by multinational corporations: how advertising and the health professions have contributed. Cornell International Nutrition Monograph Series, No. 2. Ithaca, New York: Cornell University, 1975.

Guzman, V.B. Patterns of child care, illness, nutrition, growth and development during the first three years of life in a rural setting. J. Philippines Med. Assn. 52(5-6):91-127 (May-June) 1976.

Hall, B.L. Mtu Ni Afya, Tanzania's Health Campaign. Bulletin 9. Washington, D.C.: Clearinghouse on Development Communications, 1976.

Hall, B.L. and Dodds, T. Voices for development: The Tanzanian national radio study campaigns. IEC Broadsheets on Distance Learning No. 6. Cambridge CB2 1PD, England: International Extension College, 131 Hills Road, 1974.

Harland, F.S.E.G. Schools for parents, editorial. J. Trop. Ped. 21:53-54 (April) 1975

Harman D. Community fundamental education. Lexington, Massachusetts: D.C. Heath, 1974.

Harman, D. Nutrition education: an analytic description of current practice. Unpublished. Cambridge, Massachusetts: Harvard Institute for International Development, 1977.

Harman, D. and Vorapipatana, K. An experimental functional literary program in the Changwat of Lampang and Prae. UNESCO Asia Bulletin 5:2 (March) 1971.

Hart, D.V. Bisayan Filipino and Malayan Humoral pathologies: folk medicine and ethnohistory in Southeast Asia, Data Paper #76, Southeast Asia Program, Department of Asian Studies, Ithaca, New York: Cornell University, 1969.

Hemmings, Dr. Grace. Personal communication, 1978.

Herron, D.B. Marketing management for social service agencies. Administration section of the association of professional YMCA directors. Columbua, Ohio: YMCA, 1977.

Higgins, M. and Montague, J. Nutrition education through the mass media in Korea. J. Nutr. Ed. 4(2):58, 1972.

Hiniker, P.J. The mass media and study groups in Communist China. In Mass communications and the development of nations, ed. D.K. Berlo. East Lansing: Michigan State University, International Communications Institute, 1968.

Hollant, E. On the air. Salubritas. American Public Health Association and the World Federation of Public Health Associations Publication. 2(2):1-3, 1978.

Holmes, A.C. A study of understanding of visual symbols in Kenya. London: Overseas Visual Aids Center, 1969.

Hornik, R.C. Four notions about evaluation which are probably untrue. (Xerox draft.) Philadelphia: Annenberg School, University of Pennsylvania (January) 1978.

Hovland, C., Janis, I.L., and Kelley, H.H. Communication and persuasion, Psychological studies of opinion change. New Haven, Connecticut: Yale University Press, 1953.

Hudson, W. Pictorial depth perception in subcultural groups in Africa. J. Soc. Psych. 52: 183-208, 1960.

Hyman, H.H. and Sheatsley, P.B. Some reasons why information campaigns fail. Public Opinion Quarterly 11:41. (Fall) 1947.

Information Center on Instructional Technology. Directory of sources of assistance on educational technology for development. Washington, D.C., 1975.

Information Center on Instructional Technology. ICIT Report. Health Education by Open Broadcast. No. 15. Academy for Educational Development. Washington, D.C. (July) 1976.

Indira, K.B. Applied nutrition programme as media for mass communication in rural areas surrounding Tirupati. J. of Trop. Med. 19:152-161 (June) 1973.

Inkeles, A. The modernization of man. Pp. 212 in Modernization, ed. M. Weiner. New York: Basic Books, 1966.

Institut Haitian de Statistiques. Donnees chiffrees pour le VIII seminaire de la nutrition, de l'enfant et de la famille. Port au Prince (Mai) 1975.

Intengan, Dr. Carmen. Personal communication, 1977.

International Union of Nutrition Sciences. Rethinking food and nutrition education under changing socioeconomic conditions. Report from Committee 10, Commission V Workshop on "Education of the Public." Dar Es Salaam, Tanzania (June 17-26) 1978.

Isoya Rural Development Project. Fourth annual report, 1975-1976. Isoya, Nigeria, 1976.

Jacob, F. and Gordon G. An evaluation study of the preschool program in Ghana. Nairobi, Kenya: Office of the Preschool Health Program Catholic Relief Services, USCC, 1975.

Jamison, D. and McAnany, E. Radio for education and development. Beverly Hills and London: Sage Publications, 1977.

Jelliffe, D.B. Culture, social change and infant feeding - current trends in tropical regions. Am. J. Clin. Nutr. 10(1):19-45 (January) 1962.

Jelliffe, D.B. Approaches to village-level infant feeding, multimixes as weaning foods. J. Trop. Ped. 13(1):46-48, 1967.

Jelliffe, D.B. Infant nutrition in the tropics and subtropics. Geneva: World Health Organization, 1968.

Jelliffe, D.B. The children's ward as a lethal factor? Ped. 77(5):895-899 (November) 1970.

Jelliffe, D.B. Nutrition programs for preschool children. Am. J. Clin. Nutr. 25:595-605 (June) 1972.

Jelliffe, D.B. The midwife's role in the nutrition of the mother and child. J. Trop. Ped. 19:258-264 (September) 1973.

Jelliffe, D.B. Advertising and infant feeding. J. Trop. Ped. 21(4):161, 1975.

Jere, Annette. Personal communication (June) 1977.

Jere, A. A little radio goes a long way...sometimes. Pp. 86-95 in Teaching nutrition in developing countries, or the joys of eating dark green leaves, ed. K.W. Shack. Santa Monica, California: Meals for Millions Foundation, 1977.

John Chatillon and Sons, Inc. Catalogue 200D, p. 27. 83-80 Kew Garden Road, Kew Gardens, New York.

Jones, E.M., Munger, S.J., and Altman, J.W. A field guide for evaluation of nutrition education: an experimental approach to determination of effects on food behavior. Washington, D.C.: Agency for International Development, 1975.

Joy, L. Food and nutrition planning. Journal of Agricultural Economics 24(1), 1973.

Jakar, D.N., Murthy, S.K.S., and Parker, R.L. People's perception of illness and their use of medical care services in Punjab India. J. Med. Educ. 11(4):286-298 (October-December) 1972.

Jarlin, B., ed. Summary: the state of the art of delivering low-cost health services in less-developed countries. Washington, D.C.: American Public Health Association, 1977.

Jelman, H.C. Attitudes are alive and well and gainfully employed in the sphere of action. Amer. Psychologist, 29(5):317 (May) 1974.

Jidd, R. and Byram, M. Folk media and development: a Botswana case study. Gaborone, Botswana: Botswana Extension College, Private Bag 43, 1976.

Jing, K.W., et al. Cost in relation to benefits for mothercraft centers in Haiti, 1964-1974. New York: Research Corporation, 1975.

Jnig, Ufe. Personal communication, 1977.

Josa, F.W. Some practical approaches in the child health clinics of Gondar, Ethiopia. J. Trop. Ped. 9:113-117 (March) 1964.

Jtler, P. Marketing for nonprofit organizations. Englewood Cliffs, New Jersey: Prentice Hall Inc., 1975.

Jtler, P. and Zaltman, G. Social marketing: an approach to planned social change. J. of Marketing 35(3):3-12 (July) 1971.

Jttar Social Service Society. Annual report Kanya Kumari District, India, 1976-1977.

Jeimer, O. The use of advertising techniques in nutrition communication: the Iloilo project and the international conferences on nutrition education. Manila: Report to AID, 1977.

Jansa, E.V.G., Cannon, Z.A., Belcher, D.W. and Porbley, M.H. Perception and comprehension of health education visual aids by rural Ghanaian villagers. Ghana Medical Journal 11(4):387-396, 1972.

Jn Leche League International. The womanly art of breast-feeding. Franklin Park, Illinois: Universal-Tandem, 1963.

Lambert, J.N. A study of nutritional status and economic development in the Chimba district, Papua, New Guinea from 1956 to 1975. Masters Thesis, London School of Hygiene and Tropical Medicine. London: University of London, 1975.

Lambert, Julian N. Personal communication, 1977.

Lambert, J.N. Baby food controversy. Bulletin 120, 1, p. 24. Rome: Freedom from Hunger Campaign (FFHC)/Action for Development, FAO, 1978.

Laugesen, H. Better child care. New Delhi: Voluntary Health Association of India, 1977.

Leichtig, A. et al. Effect of food supplementation during pregnancy on birthweight. Ped. 56: 508-520, 1975.

Lemasson, Claude. Personal communication, 1978.

Lemasson, C. and Begin-Petillon, A. Rapport d'activites 1976 economie familiale daus la sous-refecture de Gorom-Gorom, Republique de Haute-Volta. Gorom-Gorom, Upper Volta: Compagnie Internationale de Development Regionale, 1977.

Lester, L.J., ed. Directory of sources of assistance on educational technology for development. Academy for Educational Development. Washingt D.C.: Information Center on Instructional Technology (November) 1975.

Levinson, F.J. Morinda: an economic analysis of malnutrition among young children in rural India. Cambridge, Massachusetts: Cornell/MIT International Nutrition Policy Series, 1974.

Lyly, J. Market structure analysis. Chapter 6 in Marketing in private and public nonprofit organizations, ed. R.M. Gaedeke. Santa Monica, California: Goodyear, 1977.

McAnany, E.G. Radio's role in development: five strategies of use. Information Bulletin No. 4. Washington, D.C.: Clearinghouse on Development Communication, 1973.

McAnany, Dr. Emil. Personal communication (March) 1979.

McNaughton, Dr. Jean. Personal communication, 1978.

Manoff International Inc. Mass media nutrition education. Ecuador and Washington, D.C., 1975.

Manoff, R.K. Potential uses of mass media programs. J. Nutr. Ed. 5:2 (April-June) 1973a.

Manoff, R.K. The effective use of mass media in nutrition education. PAG Bulletin. 4(1):12-17, 1973b.

Manoff, R.K. Whose business is nutrition education? Paper presented at Nutrition Education Seminar. Bethesda, Maryland: American Institute of Nutrition (September) 1973).

Manoff, R.K. and Cooke, T.M. Whose milk shall we market? Newsletter, pp. 1-4. Washington, D.C.: League for International Food Education (September) 1977.

Manoff, R.K., Cooke, T.M. and Romweber, S.T. Radio nutrition education - using the advertising technique to reach rural families: Philippines and Nicaragua. Final Report. Washington, D.C.: Manoff International Inc. (December) 1977.

Margulies, L. A critical essay on the role of promotion in bottle feeding. PAG Bulletin. 7(3-4):73-81, 1977.

Mathur, Y.C. Feeding habits and beliefs of practical significance in villages: impact of urbanization on feeding habits and beliefs. Indian Pediat. 12(1):70-71, 1975.

May, J.M. The ecology of malnutrition. J. Am. Med. Assn. 207(13):2401-5 (31 March) 1969.

Mellander, O. Nutrition and health care in preschool children: report from China. J. Trop. Ped. 19:253-257, 1973.

Mendelsohn, H. Some reasons why information campaigns can succeed. Public Opinion Quarterly, Spring 1973.

Messer, Dr. Ellen. Personal communication, 1977.

Meyer, Eva. Personal communication, 1977.

Meyer, A.J. TDY to Tunis to monitor radio nutrition education project: May 8-13 memorandum to AID, DS/ED and DS/N. Washington, D.C.: USAID, 1978.

Meyer, A.J. and Maccoby, N. The role of mass media in maintaining health. Pp. 248-265 in Viestinnan virtauksia (The flows of communication), eds. E. Erholm and L. Abert. Keuruu, Finland: Delfiinikirjat, 1978.

Meyer, A.J., Maccoby, N. and Farquar, J.W. The role of opinion leadership in a cardiovascular health education campaign. Pp. 579-591 in Communication yearbook I, ed. B.D. Rubin. Newsbrunswick, New Jersey. Transaction Books, Rutgers University, 1978.

Miller, S.A. The kinetics of nutritional status: diet culture and economics. Pp. 187-208 in Diet of man: need and wants, ed. J. Yudkin. London: Applied Science Publishers Ltd., 1978.

Mitton, J. Understanding print: a survey in rural Lesotho of people's ability of understanding text and illustrations. Maseru, Lesotho: Lesotho Distance Teaching Centre (July) 1976.

Monckeberg, Dr. Fernando. Personal communication, 1978.

Moumouni, Dr. Jean Claude Ouedraogo. Personal communication, 1978.

Morehead, Dr. Jean. Personal communication.

Morley, D. The road to health care. Chapter 7 in Pediatric priorities in the developing world. London: Butterworths, 1973a.

Morley, D. The spread of comprehensive care through under-fives clinics. Trans. R. Soc. Trop. Med. Hyg. 67(1):155-170, 1973b.

Morley, D. Charts to help with malnutrition and overpopulation problems. Lancet. 1:712-714 (April 20) 1974.

Morley, Dr. David. Personal communications, 1976 and 1978.

Movido, M.S. Comics magazine exposure and family planning knowledge, attitudes and practice among Murphy Libis' housewives. Philippine Journal Communication Studies. Vol. 1, No. 1 (September) 1971.

Mtimavalye, L.A.R. The relationship between increasing birthweight and cephalopelvic disproportion in Dar Es Salaam, Tanzania. J. Obst. Gyn. Br. Comm. 81:380-382 (May) 1974.

Myrdal, G. Asian drama. New York. Pantheon, 1968.

National Nutrition Program. An evaluation of mothercraft feeding program in the Philippines (Las Pinas). Philippines: Department of Health, 1975.

Nelson, W.E. ed. Textbook of pediatrics, 10th ed. Philadelphia: Saunders, 1975.

Newell, K. Health by the people. Geneva: World Health Organization, 1975.

Ngubane, H. Body and mind in Zulu medicine, an ethnography of health and disease in Hyuswa-Zulu thought and practice. London: Academic Press, Harcourt Brace Jovanovich, 1977.

Nie, N.H. et al. SPSS statistical package for the social sciences, second edition. New York: McGraw-Hill, 1975.

Niehoff, A. Changing food habits. J. Nutr. Ed. 1(1):10-11, 1969

Nutrition Center of the Philippines. Trainers' manual on the new direction of the Philippine nutrition program, Course I. Makati Rizal, Philippines: Communications Department NCP, Superhighway, 1975.

Nutrition Center of the Philippines. The Philippine Nutrition Program 1975-1976. Pp. 29-31. Makati Rizal, Philippines: The National Nutrition Council, Nutrition Center of the Philippines, 1976.

Nutrition Center of the Philippines. Nutripak, nutrition fact sheet 7. Communications Department. Manila, Philippines: Communications Department, 1976.

Nutrition Communication and Behavior Change Component. Indonesian Nutrition Development Project. Ministry of Health, Republic of Indonesia, and Manoff International, Inc. Progress report and proposed plan of work for the development of nutrition education and training materials, nutrition communication and behavior change component, Indonesian nutrition development project. Jakarta: Ministry of Health, Republic of Indonesia and Manoff International, Inc. (March) 1979.

Nutrition Foundation of the Philippines. BPI planting calendar. Quezon City, 1977.

Odenyo, A.O. Observations of the international field operational seminar on practical evaluation techniques for nonformal adult education programs. Report. New York: World Education, 1414 Sixth Avenue, 1977.

Pan American Health Organization. Unpublished. 1974.

Parlato, R. Advertising and mass communications: a model for rural nutrition information programs. FAO Bulletin 4(1):17, 1973.

Parlato, R., Parlato, M.B., and Cain, B.J. The use of popular graphic media in development support communications programs: a survey of fotonovelas and comic books. Study under Contract AID/CM/Ta-C-147-594, available from Dr. A. Meyer, Communications and Educational Technology Division, Office of Education and Human Resources Development Support Bureau AID. Washington, D.C. 20523, 1977.

Paulson (1967) as quoted in Reynolds, J. Building the evaluation of communication activities into family planning programmes. Evaluation research on family planning communication, eds. E. Rogers and R. Rogers. Paris: UNESCO, 1976.

Pellerin, A. Rapport sur le deroulement du premier programme de formation d'auxiliares en nutrition, 28 aout 1973 - 18 septembre 1974. Port-au-Prince, Haiti: OPS/OMS, 1974.

Pellerin, A. Some challenges for training auxiliary nutritionists for the ministry of health of the Republic of Haiti. Pp. 54-66 in Teaching nutrition in developing countries, or the joys of eating dark green leaves, ed. K.W. Shack. Santa Monica, California: Meals for Millions Foundation, 1977.

Philippine Nutrition Program. Nutrition in the Philippines. Manila, Philippines: Nutrition Communications Office, National Media Production Center 1976.

Phillips, L., Lwanga, S.K., Lore, W. and Wasswa, D. Methods of hygiene of infant feeding in an urban area of Uganda. J. Trop. Ped. 15:167-71 (December) 1969.

Pielemeier, N., Zeitlin, M., Fisher, J., and Brooks, R. Ghana case study. Chapter 4 in Integrated nutrition programs. Study VII in Nutrition intervention in developing countries, ed. J.E. Austin. Cambridge, Massachusetts: Oelgeschlager, Gunn & Hain, 1981.

Pollit, E. Failure to thrive: socioeconomic, dietary intake, and mother-child interaction data. Federation Proceedings. 34(7):1593-1597, 1975.

Prasada, Rao, D.C.B. A study of social aspects of child health in the slum communities of Pondicherry. Indian J. Pediat. 39(297):311-316 (October) 1972.

Premack, D. and Woodruff, G. Chimpanzee problem solving: a test for comprehension. Science. 202(4367):532-535, 1978.

Protein Foods Association of India. A pilot study in the feasibility of using mass media for imparting nutrition education. Unpublished report. Bombay (July) 1972.

Pyle, D.F. Integrated project of health and population. Petit Goave, Haiti, Site Visit Report. Ann Arbor, Michigan: Community Systems Foundation, 1977.

Rachman, S. The modification of attitudes and behavior: malnutrition is a problem of ecology. Bibl. Nutr. Diet. No. 14. Basel/New York: Karger, 1970.

Rajagopalan, S., Strassburger, B., Radha, B.A., and Kantha, R. Nutrition intervention: a study of take home dry food as a distribution system. The Tamil Nadu Nutrition Study, Vol. II. C, Part 1, p. 28. Haverford, Pennsylvania: Sidney M. Cantor Associates, 1973.

Ramage, D. Course outline: education for teaching in Catholic Relief Services project centers. USCC/Jerusalem, West Bank: Catholic Relief Services.

Ramage, Darlene. Personal communication, 1976.

Rao, D.H. and Balasubramanian, S.C. Sociocultural aspects of infant feeding practices in a Telengana village. Trop. and Geogr. Med. 18:353-60, 1966.

Rawson, I. and Valverde, V. The etiology of malnutrition among preschool children in rural Costa Rica. J. Trop. Ped. 22:12-17, 1976.

Reddy, V. Nutrition rehabilitation units. Indian Pediat. 12(1):103 (January) 1975.

Research Corporation. A practical guide to combating malnutrition in the preschool child. New York: Appleton-Century-Crafts, The Meredith Corporation, 1970.

Research and Evaluation Unit. Some factors which have inhibited and may continue to inhibit the development and adoption of pretesting procedures. Bangkok, Thailand: Development Support Communication Services, United Nations Development Programme. Unpublished. 1974.

Robertson, T.H. Innovative behavior and communication. New York: Holt, Rinehart, and Winston, 1971.

Rogers, E.M. and Shoemaker, F.F. Communication of innovation: a cross-cultural approach. New York: Free Press, 1971.

Rogers, E.M. and Svenning, L. The modernization of peasants. New York: Reinholt and Winston, 1967.

Rohde, J., Ismael, J., and Sutrisno, E. Mothers as weight watchers: the road to child health in the village. Env. Ch. Hlth. 21:6 (December) 1975.

Rosa, F.W. Some practical approaches in the child health clinics of Gondar, Ethiopia. J. Trop. Ped. 9:113-17 (March) 1964.

Roy, P. Evaluation of Thailand's pilot functional literacy programs (Mimeographed.) New York: World Education, 1972.

Rutishauser, I.H.E. The child in the African environment. Nairobi. East African Literature Bureau, 1975.

Sabbhi, J.S. Obstetrical problems created by increasing fetal size in developing communities. Internat. J. Gyn. Obstr. 2(2):51-54, 1973.

Sanghvi, T.G. God's will or a community problem? A community awareness strategy for understanding the problem of malnutrition. Westport, Connecticut: Save the Children Federation, Inc.

Sanjur, D., Cravioto, J., Rosales, L. and Van Veen, A. Infant feeding and weaning practices in a rural pre-industrial setting. Acta Paediat. Scand. Supplement 200, Sweden, 1970.

Saunders, D.J. Visual Communication Handbook. London: Butterworth Press, 1974.

Schlinger, M.J. The role of mass communications in promoting public health. Pp. 3, 302-305 in Advances in Consumer Research, ed. B.B. Anderson. Proceedings of 6th Annual Conference of the Association for Consumer Research. Atlanta, Georgia: Georgia State University, Department of Marketing, 1976.

Schuman, H. and Johnson, M.P. Attitudes and behavior. Pp. 161-207, Vol. 2, in Annual Rev. Soc., ed. Alex Inkeles. Palo Alto, California: Annual Reviews, Inc., 1976.

Schramm, W., Coombs, P.H., Friedrich, K., and Lyle, J. The new media: Memo to educational planners. UNESCO: International Institute for Educational Planning. Amsterdam, Holland: Breumelhof, 1967.

Schwartz, N.E. Nutrition knowledge, attitudes and practices of Canadian Public Health nurses. J. Nutr. Ed. 8(1):28-30, 1976.

Scrimshaw, S.C.M. Infant mortality and behavior in the regulation of family size. Population and Development Review. 4(3):383-403, 1978.

Senanayake, J.P. Evaluation of a health care system for children under five years of age in Africa. Ph.D. thesis, London: London University, 1974.

Shack, K.W. ed. Teaching nutrition in developing countries, or the joys of eating dark green leaves. Santa Monica, California: Meals for Millions Foundation, 1977.

Shah, Dr. P.M. Personal communication (May) 1978.

Shah, P.M., Wagh, K.K., Kulkarni, P.V., and Shah, B. The impact of nutrition rehabilitation on the diet of children. Trop. and Geogr. Med. 26:446-8, 1973.

Shah, P.M., Wagh, K.K., Kulkarni, P.V., and Shah, B. The impact of hospital and domiciliary nutrition rehabilitation on diet of the child and other young children in family and neighborhood. Ind. Peds. 12(1):95-98, 1975.

Shakir, A. and Morley, D. Measuring malnutrition. The Lancet, pp. 758-759 (April 20) 1974.

Shakuntala, S. A study of methods used for child rearing in Bikaner (West Rajastan). Ind. J. Pediat. 35(246):342-349, 1968.

Shaw, J. World food programme statistics. Personal communication, 1978.

Sidney M. Cantor Associates, Inc. An operations oriented study of nutrition as an integrated system in the state of Tamil Nadu. The Tamil Nadu nutrition study, Vol. 1. Report to USAID/nesa-399. Haverford, Pennsylvania, 1973.

Simmels, G. The sociology of George Simmels. K.H. Wolff, ed. and translator. Glencoe, Illinois: Free Press, 1960.

Simon, J.L. Market segmentation in promoting contraception. Pp. 145-163 in Marketing in private and public nonprofit organizations, ed. R.M. Gaed. Santa Monica, California: Goodyear, 1977.

Smith, F.A. et al. Health information during a week of television. N. Eng. J. Med. 286:516-520 (March 2) 1972.

Snap, Dr. Jeremy. Personal communication (March) 1978.

Sneidman, I., Bennett, F.J., and Rulshauser, I.H.E. The nutrition rehabilitation unit at Mulago Hospital - Kampala, development and evaluation. 1965-67. J. Trop. Ped. 17:25, 1971.

Solon, Florentino. Personal communication, 1977.

Srikantia, S.G. and Sastry, C.Y. Effects of maternal attributes on malnutrition in children. Proceedings of First Asian Congress of Nutrition. Hyderabad, India, 1972.

Srinivasan, L. Perspectives on nonformal adult learning. Monograph on on functional education. New York: World Education, 1977.

Stanfield, J.P. Nutrition education in the context of early childhood malnutrition in low resource communities. Proc. Nutr. Soc. 35:731, 1976

Stein, Z. The Cuban health system: A trial of a comprehensive service in a poor country. Internat. J. Hlth. Serv. 2:4, 551-566, 1972.

Stephens, A.J.H. The impact of health care and nutritional education on an urban community in Zambia through the under-five clinics. J. Trop. Med. and Hygiene 78(5):97-105 (May) 1975.

Stephenson, L.S., et al. Nutritional status and stool examinations for intestinal parasites in Kenyan preschool children in Machа District. E. Afr. Med. J. 56:1-9, 1979.

Stini, W.A. Evolutionary implications of changing nutritional patterns in human populations. Am. Anthr. 73:1019-30, 1971.

Stuart, H.C. and Stevenson, S.S. Growth and development. In Textbook of Pediatrics, 10th ed. Philadelphia: Saunders, 1959.

Swartzenruber, Dwight. Personal communication, 1976.

Synectics Corporation. Field guide for evaluation of nutrition education. Allison Park, Pennsylvania, 1976.

Tanner, J.M., Whithouse, R.H., and Takaishi, M. Standards from birth to maturity for height, weight, height velocity and weight velocity. British Children 1965. Arch. Dis Child. 41:454, 1966

Tarwotjo, I. Development of nutrition education in Indonesia. J. Am. Diet. Assn. 58:137-41 (February) 1971.

Taylor, C.M. and Riddle, K.P. An annotated international bibliography of nutrition education. New York Teachers College Press, 1971.

Taylor, J.M. Changing food habits as a component of cultural change. Unpublished. 1976.

Templeton, C.L., Petty, B.J., and Harper, J.L. Weight control - a group approach for arthritis clients. J. Nutr. Ed. 10(1):33-35, 1978.

Tichenor, P.J., Donohue, G.A., and Orien, C.N. Mass media flow and differential growth in knowledge. Public Opinion Quarterly. 34(2):159-170, 1970.

Udani, P.M. and Parekh, U.C. (bait). Nutrition problems of children in new urban families. J. Trop. Ped. 19:350-5 (September) 1973.

UNESCO. Literacy as a factor in development. Minedlit 3. Paris: UNESCO, 1965.

UNESCO. The experimental world literacy programme: a critical assessment. Paris: UNDP Press, 1976.

UNICEF-WHO Joint Committee on Health Policy. Community involvement in primary health care: a study of the process of community motivations and continued participation. New York, 1977.

United Nations. Statistical yearbook, 1973. New York, 1973.

United States Agency for International Development. Mass media and health practices. Implementation Contract and Evaluation Contract and Evaluation Contract, RFP No. AID/DSPE-1001, 1978.

United States Department of Health, Education, and Welfare, Public Health Service Food and Drug Administration. Consumer nutrition knowledge survey report I DHEW Publication No. (FDA) 76-2058. Washington, D.C., 1973-1974.

United States Department of Health, Education and Welfare. Vital and heal h statistics: series 11 data from the National Health survey, No. 165. DHEW publication (PHS) 78-1650. Hyattsville, Maryland: National Center for Health Statistics, 1977.

United States Senate Select Committee on Nutrition and Human Needs. Dietary goals for the United States. Stock No. 052-070-039102. Washington, D.C.: U.S. Government Printing Office, 1977.

Valdecanas, O.C. The comic insert: popular medium for nutrition education. Manila, Philippine. J. Nutr.: 99-104 (July-September) 1976.

Valverde, V. et al. Relationship between family land availability and nutritional status. Ecol. Food Nutr. 6:1-7, 1977.

Vemury, M. and Levine, H. Beliefs and practices that affect food habits in developing countries: a literature review. New York: CARE, 1978.

Venkataswami, G. and Kabir, S.A. Report on nutrition rehabilitation centre and village child care centres with evaluation. Madurai, India: Government Erskine Hospital, 19[illegible].

Wagle, M.M. Nature of packaging and labelling. Indian Pediat. 12(1): 43-44 (January) 1975.

Walia, L.N.S. and Gambhir, S.K. The relationship between childhood malnutrition and maternal knowledge and beliefs regarding children. Indian Pediat. 12(?):563-568, 1975.

War on Want. The baby killer. 467 Cakedonian Road, London N7 9BE, 1974.

Webb, R.E., Fourgere, W., and Papillon, Y. An evaluation of the educational benefits of nutritional rehabilitation centres as measured by the nutritional status of siblings. J. Trop. Ped. 21(1):7-10, 1975.

Weil, R.P. Jr. Compendium-approaches to improve the nutritional status of the preschool child. Washington, D.C.: Nutrition and Agriculture Group, Economic Research Service, USDA, 1972.

Wennan-Van Der Mev. The decline of breast-feeding in Nigeria. Trop. and Geogr. Med. 21:93-6 (March) 1969.

Williams, C.D. Grassroots nutrition - or consumer participation. J. Am. Dietet. Assn. 63:125-129 (August) 1973.

Wilson C.S. Food beliefs affect nutritional status of Malay fisherfolk. J. Nutr. Ed. 2(3):96-8 (Winter) 1971.

Winikoff, B., ed. Nutrition and national policy. Cambridge, Massachusetts: MIT Press, 1978.

Wise, Dr. Paul. Personal communication, 1978.

Wittmann, W., Moodie, A., Hansen, J. and Brock, J. Studies on protein calorie malnutrition and infection i Ciba Foundation. In Nutrition and infection. Boston: Little Brown and Co., 1967.

Woodward, M. and Kelly, M. Nurses study growth charts. Draft 2, The Tropical Child Health Unit, Institute of Child Health. London: University of London, 1977.

World Health Organization. Malnutrition in early childhood: the newer insights. Clinical Pediat. 6(8):492-500 (August) 1967.

World Health Organization. Program review: health education. Report by the Director General to the 53rd Session of the Executive Board, Document EB53 December 11, 1973. Geneva (December 11) 1973.

World Health Organization. Report of the interregional workshop on nutrition in family health. Document NUT/76.1 Geneva. Morogoro, Tanzania, 1975.

World Health Organization. A growth chart for international use in maternal and child health care guidelines for primary health care personnel. G - 1978.

World Neighbors. Audio-visual communication handbook. Peace Corps contract 25-1707. Overseas Development Materials, World Neighbors International Headquarters, 5116 North Portland Avenue, Oklahoma City, Oklahoma 73112

Wortzel, L. H. The behavior of the health care consumer: a selective review. In Advances in consumer research, Vol 3, ed. B.B. Anderson. Atlanta, Georgia: Georgia State University Department of Marketing, 1976.

Yankauer, A. An evaluation of nutrition classes for mothers in a pediatric setting. J. Trop. Ped. 21(2):90-92, 1975.

Zaltman, G., Altwood, J., and Carrillo, G. Child-feeding practices and the influence of educational level and mass media in Costa Rica, WHO Bulletin 45:827-834, 1971.

Zeitlin, M.F. A study of traditional food beliefs in Pakistan. Report to USAID. Islamabad. Unpublished. 1972.

Zeitlin, M.F. The road to development: diet and hygiene; the road to development: a new look at foods; and the road to development: my share of the family food. Set of three nutrition and health education booklets, in Urdu, Punjabi, Sindhi, and Pashto languages Sirali Kitaben. Lahore, Pakistan: Adult Basic Education Society Publishers, 592 Shadman Colony, 1973.

Zeitlin, M.F. Breast-feeding and growth status in two preschool child populations; reference standards for maximum thigh circumference from 0-5 years; thigh circumference - an age-independent screening index for preschool nutrition interventions, Chapter 1, Ph.D. thesis, Massachusetts Institution of Technology, Department of Nutrition and Food Science, 1977a.

Zeitlin, M. Directions for the evaluation of nutrition education. Pp. 169-193 in Teaching nutrition in developing countries, or the joys of eating dark green leaves, ed. K.W. Shack. Santa Monica, California: Meals for Millions Foundation, 1977b.

Zeitlin, M. Upper Volta trip report. Cambridge, Massachusetts: Harvard Institute for International Development, 1977c.

Zeitlin, M.F. A reference standard for maximum thigh circumference of preschool children. Human Biol. 51(1);11-21 (February) 1979.

Zeitlin, M.F. and Austin, J.E. Impediments and requirements of nutrition evaluation. In Nutrition and food science: present knowledge and utilization. Volume I. New York: Plenum, 327-345, 1980.

Zeitlin, M.F., Pyle, D.F., Austin, J.E., Sempore, G. and Gouba, E. Circumference growth charts for community-level workers with little or no formal schooling. J. Trop. Ped. (In press.)

Zeitlin, M.F., Ineiong, M.B., Lacuna, R. and Opena, N. Advantages of using a thigh circumference tape analogous to the Shakir Strip. J. Trop. Ped. (In press.)

## NUTRITION INTERVENTION IN DEVELOPING COUNTRIES

Prepared by the Harvard Institute for International Development
for the U.S. Agency for International Development
James E. Austin, Project Director; Marian F. Zeitlin, Assistant Project Director

**NUTRITION INTERVENTION IN DEVELOPING COUNTRIES: AN OVERVIEW**
Edited by James E. Austin and Marian F. Zeitlin
0-89946-077-1 ca. 350 pages $25.00

**THE SUPPLEMENTARY STUDIES**

Volume 1
**Study I: Supplementary Feeding**
Mary Ann Anderson, James E. Austin, Joe D. Wray, and Marian F. Zeitlin
0-89946-081-x 224 pages $30.00; $125.00 for 5-volume set

Volume 2
**Study II: Nutrition Education**
Marian F. Zeitlin and Candelaria S. Formacion
0-89946-082-8 368 pages $30.00; $125.00 for 5-volume set

Volume 3
**Study III: Fortification**
James E. Austin, Thomas K. Belding, David Pyle, Florentino S. Solon, Thomas L. Fernandez, Michael C. Latham, and Barry M. Popkin
**Study IV: Formulated Foods**
Jerianne Heimendinger, Marian F. Zeitlin, and James E. Austin
0-89946-083-6 304 pages $30.00; $125.00 for 5-volume set

Volume 4
**Study V: Consumer Food Price Subsidies**
Beatrice Lorge Rogers, Catherine A. Overholt, Eileen Kennedy, Federico Sanchez, Adolfo Chavez, Thomas K. Belding, C. Peter Timmer, and James E. Austin
**Study VI: Agricultural Production, Technical Change, and Nutritional Goals**
Richard H. Goldman and Catherine A. Overholt
0-89946-084-4 224 pages $30.00; $125.00 for 5-volume set

Volume 5
**Study VII: Integrated Nutrition and Primary Health Care Programs**
James E. Austin, Thomas K. Belding, Richard Brooks, Richard Cash, Jonathan Fisher, Richard Morrow, Nancy Pielemeyer, David Pyle, Joe D. Wray, and Marian F. Zeitlin
0-89946-085-2 272 pages $30.00; $125.00 for 5-volume set

0-89946-082-8