

PN-AAP-405

ISN 33675

**MASS MEDIA AND NONFORMAL
NUTRITION EDUCATION**

FINAL REPORT

PNAAP405

C-T0696-Y

MASS MEDIA AND NONFORMAL
NUTRITION EDUCATION

FINAL STUDY REPORT

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Prepared for:

Development Support Bureau
Agency for International Development
U. S. Department of State
Washington, D.C. 20523

Under Contract AID/ta-C-1198

Submitted by:

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October 1978

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EXECUTIVE SUMMARY

The study reported here was directed to development and demonstration of a communication model which would guide LDC nationals in design of education programs for improvement of nutritional behavior. More specifically, it was concerned with how one might best combine mass media and nonformal education to achieve greater impact than with either approach alone.

The communication model is based on findings from a search of the literature to identify controllable or manipulable factors which potentially bear upon how and whether or not objectives of an education program/media campaign are achieved. The factors stratify into four domains: the education domain; the communication domain or media and message characteristics; the behavioral domain, including the skills, knowledges, attitudes, and motivations of the audience; and the evaluation domain, which can measure effects and provide feedback to adjust some aspect of any or all of the other domains. The model is primarily concerned with how subelements of these factors interrelate across domains to achieve greatest effects.

Designed for use by LDC nationals, the model was tried out in Tunisia by a team working within the National Institute for Nutrition and Food Technology. The project combined mass media--short radio messages--and existing nonformal education activity in the Maternal Child Health (MCH) centers. The major focus of the Tunisian study team was on the design and dissemination of messages, addressing in concert the same objectives as the nonformal education. Some buttressing of the nonformal education was also done at selected MCH centers.

The most powerful result of the study was the phenomenal interest the mass media aspect of the study evoked--an interest which cut across economic and social levels, across cultures and international borders. What began as a very modest media project exploded into a national media event. The fictitious character, Dr. Hakim, through whom the messages were delivered, quickly became a folk hero. The media project is being carried forward beyond the planned time and expanded to address new objectives.

In interview data collected from mothers who attended the MCH centers there was no conclusive evidence that nutrition and nutrition-related behavior patterns were changed by the program. This finding was predictable, given the short four-month period of time the program had operated prior to the data collection. There were, however, some discernible trends in knowledge and attitude change.

The communication model used here is generalizable only at a rather abstract level. It represents a coherent frame of reference within which conceptual and methodological improvements might be carried out. One implication of this study is that a comprehensive communication model can lead to more rigorous LDC development of media campaigns than might be achieved without such guidance.

ACKNOWLEDGMENTS

Synectics Corporation gratefully acknowledges the opportunity afforded by the Agency for International Development (AID), Development Support Bureau to carry out this project. In particular, appreciation is extended to Dr. Anthony J. Meyer and to other personnel of the Office of Education and Human Resources and of the Office of Nutrition who have given helpful guidance and assistance in developing and fielding the effort.

We are immensely grateful to the USAID/Tunis Mission which entered into study activities and arrangements well beyond any requirement. In particular, we appreciate the persistent and patient support given by Mr. Charles R. Sadler of the USAID/Tunis Mission. We are also grateful to Dr. Tahar El Amouri, Director of the Tunisian Institut El Amouri de Psychologie Appliquée, who provided subcontractor assistance in the message preparation and in the collection and reduction of questionnaire data. Dr. El Amouri's dedication to the project, his perceptiveness and candor, and his unending demand for quality work of himself and staff greatly contributed to the successful completion of the effort.

Most importantly, we are grateful to the personnel of the Tunisian Institut National de Nutrition et de Technologie Alimentaire--to Dr. Zouhair Kallal, the Director, and to the study team members who made the project a reality; Mme Fathia Mezhoud, the team leader whose quiet perseverance was invaluable, and to the other, all deeply committed, team members--Mlle Cherifa Ben Ali, M. Ben Salem, Mme Saida Monsour, Mme Anne-Marie Bahri, M. Mustapha Behi, and Mlle Ferial Ben Hassan. Our lives have been much enriched by this cross-cultural interaction.

We also extend our appreciation to those who served as reviewers of the preliminary communication model--Dr. Micheline Beaudry-Darismé, Dr. Edward Cross, Dr. Johanna Dwyer, Ms. Sue Gibson, Dr. Edward Hirabayashi, Dr. Nathan Maccoby, Dr. David Sprague, Dr. Ted Ward, and Dr. Bernard Wilder.

The author wishes to express special thanks to the following members of the Synectics Corporation research staff: Dr. James W. Altman and Jesse L. Gates, who contributed greatly to the definition and development of the communication model; and Ms. Edna M. Jones and Ms. Nancy R. Pielemeier, who participated in the site selection surveys and the on-site planning phases of the demonstration in Tunisia.

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INTRODUCTION

Background for the Study

Nutritional deficiencies in the United States, in other developed countries, and in Lesser Developed Countries (LDCs) come in various forms and are addressed through a variety of approaches--through direct donation of food, financial support to extend food availability, agricultural development and improvements, and through nutrition education. The ultimate objectives of improved health and growth and reduced morbidity and mortality through better nutrition do not differ around the world. But, the approaches taken to address these goals do and should differ. For example, in developed countries, mass food production through highly sophisticated and mechanized agribusiness is appropriate. In LDCs, such an approach is not independently feasible and frequently is resisted because it fails to be labor intensive. Yet, the world's need for adequate food supplies may force a large agribusiness solution within the LDCs.

Likewise, approaches to nutrition education may vary from condition to condition, from country setting to country setting. In developed countries, where food is relatively plentiful, nutrition education most likely focuses on appropriate food consumption--education to the point where the food manager has the capability to provide diets which meet minimum daily nutritive requirements through provision of a variety of foods. But, even in the United States, nutrition education programs which treat nutrition education in depth include instruction on food procurement, food storage, and food preparation and preservation. One program has established teaching and evaluation objectives and criteria which attend to 70 specific food-related behaviors in addition to the food consumption objectives and criteria (Munger & Jones, 1976--EFNEP Progression Model). These precursor behaviors to food consumption are probably even more important in LDCs where food supplies are more limited, storage and transportation facilities are poorer, and where literacy levels are lower, especially for the poor and more rural populations. Under these circumstances, each food-related behavior leading to proper food consumption must be taught with intensity. In many instances, it is necessary to overcome long-held and well-established taboos or prejudices which counteract even the potential for adequate nutrition for specific categories of a population. Deep-seated and broad cultural responses and resistances may have to be overcome before basic nutritional concepts can even be addressed. The educational problem is well-demonstrated by Dr. Jacques May in the following passage:

Basically, the African wishes to produce no more than he needs. Surplus production for money is not a part of his outlook on life. Given better seed, he will rejoice not because it will give him a better yield, but because he will get the same result from a smaller plot. Surpluses are not particularly appreciated. First,

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they spoil in the harsh African climate. Second, when food is abundant there is no demand for the surpluses in the local areas; transportation to distant markets is difficult and prices uncertain. Therefore, when food is abundant it is better to gorge oneself than to carry it away for little or no profit. Even if money can be made by selling food, what can be done with the money?
[May, 1965, pp. xiv-xv]

Within Dr. May's brief text lie a multitude of educational problems which must be broached individually and their interdependencies established if the scourge of malnutrition is to be controlled. These complexities have been well understood by the U. S. Agency for International Development (AID). Its missions around the world, its Office of Nutrition and Office of Education and Human Resources of the Development Support Bureau have all worked independently and jointly to respond to the complex set of nutritional problems. The Office of Nutrition has mounted food production campaigns, food distribution campaigns, and nutrition education projects. The Office of Education and Human Resources has supported a great variety of exploration into different types of educational approaches, including traditional classroom instruction, instructional radio, instructional television, programmed instruction, computer assisted instruction, slides, filmstrips, audiotapes, and a variety of nonformal education approaches.

Considerable attention has been given for some time to the exploration of the effectiveness of different types of media in modifying knowledges, attitudes, and behaviors. Meyer and Maccoby (undated) present a succinct and provocative description of these activities and results. Two investigations into the effectiveness of alternative media sponsored by the Office of Human Resources (Jamison, Suppes, & Welles, 1973; Schramm, 1973) provide an overview of media effectiveness under different conditions of implementation. In general, the two surveys agree with Gagné's earlier observation that--given the right attention to design and use, most media can be made effective for most situations (Gagné, 1965). Most recently, Manoff International (Cooke & Romweber, 1977) demonstrated the effectiveness of the reach-and-frequency technique of commercial advertising in increasing knowledge, and in changing attitudes and behaviors in a health and nutrition education campaign.

In his recent and insightful summary on "Communications in Development" Everett M. Rogers argues that interpersonal and mass media channels have different and potentially complementary roles in creating various communications effects of a developmental nature. The major contribution of mass media is to awaken interest and create a climate favoring receptivity of new information and change, and to support continuance of new behaviors once adopted. Interpersonal message transfer, such as in nonformal education programs, is effective in teaching the "how to" aspects of change--how to nourish a child, how to preserve foods, how to increase farm production, or how to build storage bins for grain (Rogers, 1974).

Rogers argues further that combined use of mass media and interpersonal approaches holds great potential for expeditiously achieving development goals. The use of radio promises to be particularly powerful since inexpensive

transistor radios have proliferated in the LDCs. But the point is that some novel combination of mass media and nonformal education programs could provide a cost-effective means of linking related objectives to enhance progress toward the ultimate objective of all programs.

However, as pointed out by Groves and Miller (1976) a major cause of failure of media programs lies in the inability to apply principles of effective design to the instructional materials. It is this problem which is recognized and addressed in this study effort--a study which addresses the establishment and retention of the conceptual linkage between a mass media campaign and an ongoing nonformal education process.

Objectives for the Study

The primary objectives established for the study are:

- ✓ To design a communication model which can be used to guide LDCs in development and implementation of mass media components as adjuncts to nonformal education programs directed at the improvement of food behavior of nutritionally vulnerable groups in both urban and rural settings.
- ✓ To conduct a field demonstration of the communication model in an LDC setting.

Conclusions

At the most general level, three major conclusions can be drawn from this field study of mass media in combination with nonformal nutrition education:

- ✓ The project team was able to develop and implement a comprehensive communication model which guided all developmental, operational, and evaluation phases of the project, and which has clear potential for more general application.
- ✓ The study team was able to develop and implement a mass media (radio) campaign which adhered to the precepts of the communication model. The mass media campaign had high governmental and public recognition and was successful, as judged by a variety of criteria.
- ✓ The measured effects of the mass media campaign for improved nutritional behavior among the target audience were as anticipated by the general communication model. There were stronger indicators of positive effects on the precursor elements of the behavioral domain--awareness, knowledge, and attitude--

than on the behavioral domain proper. The indicators of positive effect on diet, although in the general direction anticipated were less reliable and less substantial. This is precisely what the model would predict given the short period of mass media campaign that could be allowed prior to the collection of the evaluation data. There were, in addition, some problems in overcoming dietary effects of a somewhat heightened socio-economic status.

Implications

Success of the project herein described has many and varied implications, probably many of them for social program applications which we cannot even imagine. We do see the following eight major areas of impact on social programming:

- ✓ The demonstrated feasibility and utility of a comprehensive communication model should quickly obsolete any public information campaign which is less rigorously structured.
- ✓ The only mass media technique tested within the scope of the current study was radio. Multimedia studies clearly should be undertaken along similar lines.
- ✓ Extension of the domain of food behavior to other areas of preventive health seems natural and desirable. Multisectoral studies clearly should be undertaken along similar lines.
- ✓ The nonformal nutrition education component within this study was not sufficiently controlled or managed by the study team. This component essentially failed to show the anticipated combinatorial effects. Many questions of relationship between nonformal education and mass media remain to be answered.
- ✓ This study demonstrated the feasibility and underscored the importance of interagency cooperation in supporting a wide-scope social program. We believe prior top-down agreements and commitments at the working level are essential before a public information and action program is undertaken.
- ✓ This study confirmed the feasibility of conducting a relatively rigorous field evaluation of media programs even in an LDC. The quality of field data was, we believe, excellent by any current standards. This quality was due, we feel, to two essential factors. First, the field data collection was the clear responsibility of a highly professional Tunisian behavioral research organization. Second, the study team exerted a great deal of effort in defining responsibilities, objectives, methods, and resource requirements for this data collection. On the other hand, collection of cost data to provide a cost-effectiveness analysis was not achieved.

- ✓ Initial applications and evaluation of a communication model require strong participation and leadership by qualified development and research personnel. It is clear that this study would have diverted quickly from essential objectives without a strong component of technical assistance and leadership.

- ✓ The current communication model has broad generalizability only at a rather abstract level. Once program development begins within this general structure, the results become increasingly specific and difficult to generalize. In addition, the linkage of the model to specific development and research methods is relatively weak. We believe, therefore, that there is a great opportunity and need for conceptual and methodological improvements in the area of media studies. We hope to have made a useful contribution to the posture to make such improvements within a coherent frame of reference.

A COMMUNICATION MODEL

Figure 1 presents an overview of the communication model established for the project. The four key domains of the model are:

- ✓ Education Domain. The education domain refers to the types and characteristics of nutrition education programs operated by individuals, groups, or agencies to effect changes in nutritional knowledges, attitudes, and behaviors of the recipient population. Changes must be effected in accord with educational objectives; educational content must support the educational objectives. Usually a number of educational approaches have potential for achieving the objectives. The education domain addressed here is that of nonformal education, i.e., outside the purview of formal school-bound educational systems.
- ✓ Communication Domain. The communication domain deals with medium and message characteristics which are under the control of the originators of the communications and which are capable of influencing the behavioral domain of the target population. Communication objectives must be in agreement with and support educational objectives. It is likely that more than one media type has potential for achieving the objectives.
- ✓ Behavioral Domain. The behavioral domain attends to those aspects of the target population behavior amenable to influence by the education and communication domains. The behavioral domain also attends to characteristics of the target population.
- ✓ Evaluation Domain. The evaluation domain involves the procedures required for identifying and measuring the effects of education and communication on the target population and feeding this information back to sources of control.

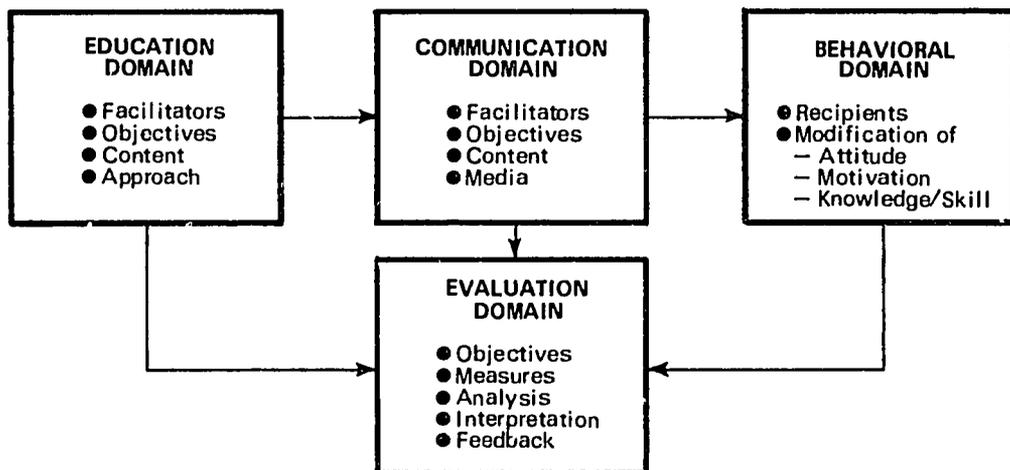


Figure 1. A Communication Model

Model Components

Education Domain

The education domain of interest to the study is that of nutrition and nutrition-related subject matter. The domain is further restricted to the target audience considered to be within the nutritional risk group. In Tunisia, as in most LDCs, those under the most severe nutritional risk are young children, six years of age and under, and pregnant and lactating women, especially those women and children in low socioeconomic status. Both rural and urban populations are at risk.

The sources of nutrition and nutrition-related information are many and varied. Invariably, numerous organizations and programs, directly or indirectly, contribute to the attack. Organizations and programs which typically provide nutrition and nutrition-related education include governmental, private, and voluntary programs in nutrition, health care, family planning, sanitation, agriculture, resource management, and combinations of these. Nonformal nutrition and nutrition-related education activities to instruct the target population on how best to utilize available food resources usually take place in the above settings.

Contributors to the educational activity vary considerably in size and complexity of their organization, the extent of outreach, educational objectives, and modes of operation. The range of actions may originate at the national Ministerial and international relief organization level and be implemented through individual programs and voluntary field worker groups at the local level. Within these entities, there may be multiple and varied emphases of nutrition and nutrition-related education.

Whatever the form of education undertaken under the auspices of these organizations and programs--person-to-person, small group, large group--the approach falls within the realm of nonformal education, i.e., outside of formal education managed and proffered through the "school system." Thus, lectures, demonstrations, discussions, etc., given in health clinics, supplemental feeding programs, hospitals, home visits, etc., form the universe out of which nutrition and nutrition-related education activities appropriate to the model could be selected.

The nutrition and nutrition-related education content domain of interest is defined to include:

- ✓ Nutrition--information and instruction in how to acquire, store, prepare, and distribute foods for optimum utilization of food resources.
- ✓ Health care--information and services for preventive and curative measures which promote proper, or at least improved, health status.
- ✓ Population planning--information and services for the control of family size and the spacing of children.

- ✓ Sanitation--information and services for the reduction/elimination of unsanitary conditions which foster parasitic and infectious diseases that prohibit or limit food absorption.
- ✓ Agriculture--efforts for improvement and expansion of crops, especially those intended for domestic consumption.
- ✓ Resource management--assistance and instruction for optimal utilization of resources, including exploitation of available natural or wild food resources.

Communication Domain

Communication agents vary greatly, depending upon the media selected and local media control conditions. Selection of media type(s) is dependent upon: availability, suitability to and acceptability by the target audience, cost, outreach, and willingness on the part of agents/organizations with appropriate capabilities to participate in the communications campaign. For some of these aspects of the communication domain, it is not possible to pregeneralize within the model concept. At this general level of model construction, however, two aspects of the communication domain can be examined in the abstract: message-related characteristics and media types.

Message-Related Characteristics. Message-related characteristics deal with structured features of messages without regard to specific content, and with the arrangement, emphasis, intent, and style of content within the message. Message-related characteristics include:

- ✓ Valence--the value or worth of the message as viewed by the recipient, is a joint function of several aspects of the message, including credibility, general attractiveness, truthfulness, method of handling dissonant message content, and perceived source power. Some aspects of valence are clearly not intrinsic to the organization and structure of the message itself, but rather result from the consonance of message style and content with recipient knowledge and belief patterns.
- ✓ Relevance--the extent to which messages present identifiable objectives, include audience involvement as an essential feature of content, and relate to situations in which objects of potential message-mediated behavior change are likely to be encountered.
- ✓ Congruence--the sensitivity of message elements to existing belief, knowledge, skill, and need attributes within the message recipient population.
- ✓ Structure--the placement of message information elements within some larger, logically derived, and conceptually

consistent set of assumptions, data, and knowledges. Concepts such as knowledge hierarchies, learning and objective sequences, conceptual boundaries, categorization, subsumption, and generalization are important here.

- ✓ Distinctiveness--involves processes associated with aiding the recipient to conceptually concretize key elements of the message content. Key concepts here include: use of exemplary material, positivism/negativism of exemplary instances, highlighting, and level of detail.
- ✓ Order and Tempo--involve the positioning and spacing of message elements.
- ✓ Realism--deals with mechanisms for handling the potentially deleterious effects of: (1) lag time between implementation of message-related suggestions and fruition of effort, and (2) failure of suggested behavior to produce desired results.

Media Types. Media types, in this context referring to mass media types, can be classified by examining three general media attributes and their combinations: text, sound, and visuals. Four of these types seem cogent to mass media applications for this effort.

- ✓ Textual Media, such as books, magazines, flyers, and pamphlets. While these media are generally considered to be text-oriented, they often include imagery for illustration and emphasis.
- ✓ Visual Media, as applied here, include photographs, slides, film strips, photonovels and posters. Books, magazines, newspapers, and pamphlets which are limited to or emphasize diagrammatic or pictorial material also fall into this category. Visual media could be particularly useful in communicating to essentially illiterate populations.
- ✓ Audio Media, such as radio, lectures, tape recordings, discussions.
- ✓ Audio-Visual Media, such as television and sound movies.

Behavioral Domain

The behavioral domain of interest is restricted to aspects of behavior which are to be influenced by the education and communication domains. Three general aspects of behavior are of concern: attitude, motivation, and knowledge/skill.

Attitude can be described as learned reaction comprised of beliefs and emotions as they relate to an object, concept, or event. Attitudes

are determined by the quality and accuracy of information and by the nature of experience with the object, concept, or event. Attitudes influence motivation and actions, and by extension, skills which are acquired.

Motivation can be described as that which causes a person to behave in a particular fashion, given a set of choices. Motivation helps in understanding not only why a person behaves in a given manner but in postulating what may induce a person to modify behavior.

Knowledge/Skill. Knowledge is a person's retrievable collection of facts and information about an object, concept, or event. Knowledge may derive from abstract information or from sensory perceptions and experiences. Skill is the ability to perform a given task or activity, and the proficiency with which it is performed. Skills are differentiated from knowledge by action. Action indicates the acquisition and retention of knowledge, whether consciously or unconsciously acquired. Thus, performance does not necessarily reflect attitudes.

The behavioral domain of interest here is that of knowledge, skill, motivation, and attitudes for nutrition and nutrition-related actions which can be divided into the following categories:

- ✓ Food Consumption--what foods are eaten, by whom, in what quantity, and in what form.
- ✓ Food Procurement/Planning--acquisition of food by a variety of means, including purchase, production, and gathering. Allocation of resources for food is an underlying concept as are the quantity and quality of the acquisition.
- ✓ Food Storage/Sanitation/Preservation--the keeping of food through a variety of techniques and through long- and short-term stages to preserve its quantity and quality.
- ✓ Food Preparation--the cleaning and cooking of food in ways which preserve its quantity and quality and which are conducive to its consumption and its absorption by the consumer.

Other behaviors of interest which could also be examined include those related to efforts of education in health care, population planning, sanitation, agriculture, and resource management.

Evaluation Domain

The evaluation domain establishes the rules and procedures by which the effects of the education and communications domains are known through measurement of the behavioral domain. Eight issues are important:

- ✓ Evaluation Objectives. Prior to the initiation of any evaluation, it is virtually mandatory to decide upon precisely what is to be analyzed, and upon the context in which analysis is

to be performed. This process assures that no valuable information will "slip through the cracks" before specific analytical procedures are executed.

- ✓ Criterion Measures. Criterion measures are, in essence, measures of the dependent variables in the evaluation process. Explication of criterion measures early in the evaluation process permits assessment of the feasibility of assessing certain forms of behavior. Relating criterion variables to independent (controllable) variables sets the stage for detailed design of evaluation procedures and experimental design.

- ✓ Evaluation Design. The essential purpose of evaluation design is to assure that the analytic process (1) maximizes the amount of useful information derivable from analyses of data collected and/or generated in the analytic process; (2) is responsive to the data--and program objective-related imperatives for analyses, and (3) highlights limitations of the analytic process imposed by the nature of the data, resource limitations, time constraints, etc.

- ✓ Data Structures. Data structures refer to organized knowledge about varieties, clusters, and interrelationships of dependent and independent variables included in the evaluation effort. An important issue here is the formulation of examinable hypotheses about relationships between independent and criterion variables.

- ✓ Data Collection. Data collection consists of the processes, techniques, and materials used to obtain the information necessary for implementation of the evaluation.

- ✓ Data Reduction and Analysis. Data reduction and analysis includes procedures associated with:
 - Combining and simplifying information to permit more efficient analyses.
 - Deriving quantitative or quantifiable information from essentially qualitative data using inductive and categorical methods.
 - Mathematically and logically manipulating data to derive objective summaries of characteristics and interactions among data and data clusters.

- ✓ Interpretation. Raw output from application of data analytic techniques rarely provides explicit, insightful information about processes undergoing evaluation. Interpretation involves:

- Drawing explicit links between analytical results and program processes.
 - Clustering analytical results to form coherent patterns and trend summaries relating to specific program issues.
 - Identifying implications of analytical results for program objectives and operation.
- ✓ Feedback. Feedback of information is an important aspect of evaluation and identification of feedback strategies is important in study design. Feedback decisions are made even more difficult when control group research is imposed on program implementation/demonstration. A combination of the three types of feedback described by Twain (in Struening and Guttentag, 1975) should be undertaken:
- Return of specific study results to the program staffs involved in the study, after completion of the evaluation.
 - A report of findings and implications for program development to administrators and policy makers--guidance for similar applications in other LDCs.
 - Communication of results to researchers and program designers.

Domain Interactions

In modeling, it is the interactions of model domains, rather than the domains themselves which are of primary interest. The full extent of interactions among the various domains is not shown for the communications model. Rather, only those interactions of primary interest to planning and conducting the study and interpreting study results are depicted. Five key interactions are defined as occurring between:

- ✓ The Education and Communication Domains.
- ✓ The Communication and Behavioral Domains.
- ✓ The Education and Evaluation Domains.
- ✓ The Communication and Evaluation Domains.
- ✓ The Behavioral and Evaluation Domains.

These interactions are used for defining boundaries--general principles for guiding a field demonstration of the communication model. Application of the general principles is discussed within the next major section of the report which describes the implementation of the model in the field demonstration.

Education and Communication Domain Interactions

Table 1 presents guidelines which result from interaction of the communication and education domains. The education and communication domains are inherently tied by commonality of objectives. Consistency of content is not a requirement, so long as content in one domain supports content in the other domain. The following general comments can be drawn about the education and communication domain interactions:

- ✓ Message characteristics do not appear to differ by educational content areas.
- ✓ Educational content areas do not impact differently on media type selections.
- ✓ Content specific to an area of the education domain is a frequently identified attribute of message characteristic parameters.

Communication and Behavioral Domain Interactions

Table 2 presents guidelines which result from interactions between the behavioral and communication domains. These interactions depict and govern characteristics of the communication domain which promote desired behavioral states. Since the communication domain extends the education domain, the behavioral states desired from the education domain are indirectly included. Relationships between aspects of the behavioral domain of interest and message characteristics/media types are intricate but extremely informative and rich in guidance. For example:

- ✓ Some message characteristics (e.g., credibility and attractiveness of messages) do not differ by behavioral aspect.
- ✓ For some message characteristics (e.g., relevance and congruence, structure, distinctiveness of the message) the behavioral aspects suggest different but nonconflicting message characteristics.
- ✓ Selection of media type is more directly affiliated with aspects of the behavioral domain than are message characteristics (e.g., the relationship of textual material to attitude/motivation versus knowledge/skill aspects of behavior).

Education and Evaluation Domain Interactions

Table 3 presents guidelines which result from interactions between the education and the evaluation domains. Aspects of the education domain contribute to content and methodology of the evaluation domain. Results and

interpretations from the evaluation domain feed back to the education domain to permit its refinement and more precise targeting. Only for the criterion measures aspects of the evaluation domain does the education domain demand different structure. However, the criterion measures impact uniquely on successive stages of the evaluation domain. Thus, they pervade the remainder of the matrix, but their presence is obscured.

Communication and Evaluation Domain Interactions

Table 4 presents guidelines which result from interactions between the communication and the evaluation domains. Message characteristics and media types contribute to content and methodology of the evaluation domain. Results and interpretations from the evaluation domain feed back to the communication domain and, indirectly, to the education domain for model refinement and improved program performance. Two distinct sets of relationships emerge in this interaction:

- ✓ Those associated with message characteristics.
- ✓ Those associated with media types.

Behavioral and Evaluation Domain Interactions

Table 5 presents guidelines which result from interactions between the behavioral and the evaluation domains. Desired behavior states contribute to the structure and content of the evaluation domain. This is the key transfer matrix in that the status of achievement of desired behavior provides the knowledge and insights through which all model domains and their interactions can be reviewed and enhanced. But, only when the behavioral and evaluation domains can be tied into specific and detailed objectives do the two domains impose on each other in unique and intricate ways.

Table 1

Guiding Principles Deriving from Interaction of the
Communication and Education Domains

COMMUNICATION DOMAIN ASPECTS	PRINCIPLES DERIVING FROM COMMUNICATION AND EDUCATION DOMAIN INTERACTIONS
<p>MESSAGE CHARACTERISTICS</p> <p>Valence</p> <p>Relevance</p> <p>Congruence</p> <p>Structure</p> <p>Distinctiveness</p> <p>Order/Tempo</p> <p>Realism</p>	<p><i>Message characteristics do not differ by educational content areas. The following guidelines pertain equally across the content areas identified for the study.</i></p> <ul style="list-style-type: none"> ● Capitalize on inherent source credibility. (McGuire, 1969, pp. 179-192) ● Emphasize aspects of the program having maximum respect of or attractiveness to the target population. ● Link educational information to specific objectives of the program. ● Identify intermediate objectives and activities relating to more distal educational objectives. (Glaser, 1968, p. 27) ● Emphasize education in objectives closely associated with ongoing program activities which are widely accepted by the target population. ● Integrate message content among a coherent set of activities. (Ausubel, 1964, p. 234) ● Emphasize message content most concordant with existing target population characteristics. ● Maximize transfer of training and behavior by analogy. ● Utilize existing program structures in presenting content-specific information. ● Derive content-specific examples from successful program efforts. ● Emphasize general concepts initially; proceed to specifics only after laying a generalizable base. (Ausubel, 1964, p. 241) ● Emphasize aspects of knowledge/performance which can be related to similar target population activity in comparable contexts. ● If short term failure of the educational effort is predicted, link the education with examples of deferred benefit drawn from past situations. (Bandura, 1969, p. 604)
<p>MEDIA TYPES</p>	<p><i>Educational content areas do not impact differently on media type selections. The following guidelines pertain equally to textual, visual, audio, and audio-visual media.</i></p> <ul style="list-style-type: none"> ● Maintain continuity of media. ● Maintain level of educational aspiration within media types. ● Maintain distinctive characteristics within media.

Table 2

General Principles Deriving from Interaction of the
Communication and Behavioral Domains

COMMUNICATION DOMAIN ASPECTS	PRINCIPLES DERIVING FROM COMMUNICATION AND BEHAVIORAL DOMAIN INTERACTIONS
MESSAGE CHARACTERISTICS	<p><i>Valence characteristics do not differ for the behavioral domain aspects of: attitude, motivation, and knowledge/skill. The following guidelines apply equally across the three behavioral aspects.</i></p>
Valence	<ul style="list-style-type: none"> ● Avoid lying, inuendo, presenting opinion as fact, and deliberate omission. (White, 1971, pp. 30-34) ● Emphasize advantages and strengths of arguments--do not present both sides of issues to essentially unknowledgeable audiences. (Martin, 1967, p. 67) ● Counter initially opposing attitudes directly, not surreptitiously. (White, 1971, p. 29) ● Severe opposition may require use of skilled personnel in face-to-face settings. (McGuire, 1969, p. 231) ● Link educative elements with agency power, credibility, and attractiveness indications. (McGuire, 1969, pp. 179-192) ● If target audience is primarily of one sex, use person of that sex as the communicator. (Weiss, 1969, p. 99)
Relevance	<p><i>Relevance, congruence, structure, distinctiveness, order and tempo aspects of messages differ for the behavioral domain aspects of attitude, motivation, and knowledge/skill. The following guidelines pertain to attitudinal aspects of the behavioral domain.</i></p> <ul style="list-style-type: none"> ● Explain carefully what the message is intended to achieve. ● Explaining intermediate objectives is important for acceptance. (Bandura, 1969, p. 75)
Congruence	<ul style="list-style-type: none"> ● Depicting consequences can outweigh existing values. (Bandura, 1969, pp. 613-614) ● Group conformity can facilitate opinion change. (Brehm & Cohn, 1962, pp. 39-40) ● Link message content to existing value systems. (Martin, 1971, p. 69)
Structure	<ul style="list-style-type: none"> ● Messages should fulfill needs and aspirations and agree with existing attitudes, opinions, and beliefs. (Martin, 1971, p. 68)
Distinctiveness	<ul style="list-style-type: none"> ● Positive instances are more easily assimilated than negative ones. (Glaser, 1968, p. 31) ● Concentrating on that which is inherently interesting and relevant will help gain and maintain attention. (White, 1971, p. 28) ● Humor is not necessarily effective in attitude change. (McGuire, 1969, p. 208) ● Periodic questioning can enhance message saliency. (Rothkopf, 1968, p. 127)
Order and Tempo	<ul style="list-style-type: none"> ● Conclusions should precede supporting information. (McGuire, 1969, pp. 212-213) ● Persuasive arguments of greatest impact may come either first or last in a presentation, but should not be temporally or positionally intermediate. (McGuire, 1969, pp. 213-214)

Table 2 (Continued)

COMMUNICATION DOMAIN ASPECTS	PRINCIPLES DERIVING FROM COMMUNICATION AND BEHAVIORAL DOMAIN INTERACTIONS
<p>Relevance</p> <p>Congruence</p> <p>Distinctiveness</p> <p>Order and Tempo</p>	<p><i>The following guidelines pertain to interactions between message characteristics and motivational aspects of the behavioral domain.</i></p> <ul style="list-style-type: none"> ● Positive attitudes do not necessarily imply motivation to change behavior. (Bandura, 1969, p. 595) ● Motivation will increase with successful application of message content. (Atkinson, 1965, pp. 32-34) ● Messages should appeal to strong motives. (White, 1971, pp. 29-30) ● Motivation is increased by identification of relationship to felt needs. (Ausubel, 1963, p. 227) ● Surprise, doubt, perplexity, and contradiction can be motivating influences. (Rothkopf, 1968, pp. 78-81) ● Multicontextual learning can be motivating. (Ausubel, 1963, pp. 225-227)
<p>Realism</p>	<p><i>The following guidelines pertain to interactions between message characteristics and both attitudinal and motivational aspects of the behavioral domain.</i></p> <ul style="list-style-type: none"> ● Preparatory messages can stave off extinction from the effects of early failure. (Bandura, 1969, p. 601) ● Admired models which show delay in gratification can result in preference for delay. (Bandura, 1969, p. 604)
<p>Relevance</p> <p>Congruence</p> <p>Structure</p> <p>Distinctiveness</p> <p>Order and Tempo</p>	<p><i>The following guidelines pertain to interactions between message characteristics and knowledge/skills aspects of the behavioral domain.</i></p> <ul style="list-style-type: none"> ● Successfully changed attitudes do not necessarily imply ready acceptance of new skills and knowledge. (Bandura, 1969, pp. 602-603) ● Creation of new skills or knowledges engenders heightened involvement. (White, 1971, p. 30) ● Aspirations increase with successful application of new skills and knowledges. (Atkinson, 1965, p. 48) ● Logical sequencing of knowledge/skills prerequisites support higher-level learning. (Gagné, 1965, pp. 59-60) ● Mediated learning and utilization of hierarchical learning sets facilitates transfer of training. (Wittrock, 1968, pp. 164-180) ● Perceptual learning involves task hierarchies. (Gibson, 1968, p. 74) ● Concepts can be sharpened and their integration heightened by examples. (Glaser, 1968, p. 2) ● Learning and retention of new materials depends highly upon the perceived stability and clarity of subsumers. (Ausubel, 1964, p. 239) ● Perceptual learning is aided by emphasis on distinctive features of the object of learning. (Gibson, 1968, p. 67) ● Learning tasks should be progressively differentiated, starting with the general and inclusive. (Ausubel, 1964, p. 241) ● Multicontextual presentations facilitate learning and positively affect eventual behaviors. (Ausubel, 1963, pp. 225-227)

Table 3

Guiding Principles Deriving from Interaction of the Education and Evaluation Domains

EVALUATION DOMAIN ASPECTS	PRINCIPLES DERIVING FROM EDUCATION AND EVALUATION DOMAIN INTERACTIONS														
ANALYTICAL OBJECTIVES	<p><i>With the exception of the criterion measure aspects of the evaluation domain, general guidelines deriving from interaction of the education and evaluation domains do not differ with respect to educational content area.</i></p> <ul style="list-style-type: none"> Analytical objectives should be consistent with the program purview, its operational characteristics, and operational objectives. Analytical objectives derive out of operational objectives and thus are specific to each operational evaluational context. 														
CRITERION MEASURES	<ul style="list-style-type: none"> Criterion measures must be explicitly stated for each analytical objective. Criterion measures vary by area of educational content, although there may be some redundancy. Appropriate areas for identifying criterion measures within the content areas specified include: <table border="0" data-bbox="435 875 1266 1589"> <thead> <tr> <th data-bbox="435 875 718 908">Content Area</th> <th data-bbox="718 875 1266 908">Criterion Measure Areas</th> </tr> </thead> <tbody> <tr> <td data-bbox="435 919 718 1039">Nutrition</td> <td data-bbox="718 919 1266 1039">Food consumption Food procurement/planning Food storage/sanitation/preservation Food preparation</td> </tr> <tr> <td data-bbox="435 1050 718 1192">Health care</td> <td data-bbox="718 1050 1266 1192">Human development Disease incidence Disease severity Health attitude Health care acquisition</td> </tr> <tr> <td data-bbox="435 1203 718 1323">Population planning</td> <td data-bbox="718 1203 1266 1323">Population growth rate Birth characteristics Birth defect rates Child spacing intervals</td> </tr> <tr> <td data-bbox="435 1334 718 1410">Sanitation</td> <td data-bbox="718 1334 1266 1410">Waste disposal procedures Food storage/preparation procedures Sanitation-related disease/disorder incidence</td> </tr> <tr> <td data-bbox="435 1421 718 1520">Agricultural</td> <td data-bbox="718 1421 1266 1520">Food planting and harvesting Stock raising Fish/poultry raising</td> </tr> <tr> <td data-bbox="435 1530 718 1589">Resource management</td> <td data-bbox="718 1530 1266 1589">Hunting/fishing activities Food gathering activities</td> </tr> </tbody> </table>	Content Area	Criterion Measure Areas	Nutrition	Food consumption Food procurement/planning Food storage/sanitation/preservation Food preparation	Health care	Human development Disease incidence Disease severity Health attitude Health care acquisition	Population planning	Population growth rate Birth characteristics Birth defect rates Child spacing intervals	Sanitation	Waste disposal procedures Food storage/preparation procedures Sanitation-related disease/disorder incidence	Agricultural	Food planting and harvesting Stock raising Fish/poultry raising	Resource management	Hunting/fishing activities Food gathering activities
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Agricultural	Food planting and harvesting Stock raising Fish/poultry raising														
Resource management	Hunting/fishing activities Food gathering activities														
ANALYTICAL/EVALUATION DESIGN	<ul style="list-style-type: none"> Design features must be in accordance with program/agency characteristics and should attend to: <ul style="list-style-type: none"> •Criterion variables. •Target population samples. •Nutritional area coverage. •Nutrition-related content areas. 														
DATA STRUCTURES	<ul style="list-style-type: none"> Develop hypothetical relationships among independent and criterion variables. Develop hypothetical relationships about nonprogram contributions to variations in criterion measures. 														

Table 3 (Continued)

EVALUATION DOMAIN ASPECTS	PRINCIPLES DERIVING FROM EDUCATION AND EVALUATION DOMAIN INTERACTIONS
DATA COLLECTION	<ul style="list-style-type: none"> ● Maximize use of existing program data. ● Utilize existing agency client contact mechanisms for expanding the data base.
DATA REDUCTION AND ANALYSIS	<ul style="list-style-type: none"> ● Test for sensitivity of dependent variables to various combinations of program activity. ● Test for sensitivity of dependent variables to activities of other agencies/ programs.
INTERPRETATION	<ul style="list-style-type: none"> ● Review and interpret in light of program relevant goals. ● Review and interpret in light of type and extent of piggybacked activities.

Table 4

Guiding Principles Deriving from Interaction of the Communication and Evaluation Domains

EVALUATION DOMAIN ASPECTS	PRINCIPLES DERIVING FROM COMMUNICATION AND EVALUATION DOMAIN INTERACTIONS
ANALYTICAL OBJECTIVES	<p><i>General guidelines deriving from interaction of the communication and evaluation domains do not differ for communication domain aspects except for the major considerations of message characteristics and media types. The following general guidelines apply for message characteristic aspects of the communication domain.</i></p> <ul style="list-style-type: none"> ● Objectives should attend to message characteristics both separately and jointly.
CRITERION MEASURES	<ul style="list-style-type: none"> ● Identify hypothetical relationships of independent variables with criterion variables.
ANALYTICAL/ EVALUATION DESIGN	<ul style="list-style-type: none"> ● Assure independence of dependent variable measurement. ● Assure comprehensiveness of coverage of independent variables.
DATA STRUCTURES	<ul style="list-style-type: none"> ● Derive independent variables. ● Define message characteristic measures. ● Assure unambiguous measures of message characteristics.
DATA COLLECTION	<ul style="list-style-type: none"> ● Sample messages, if required.
DATA REDUCTION AND ANALYSIS	<ul style="list-style-type: none"> ● Score messages, assuring consistency among scorers, if more than one scorer. ● Test postulated relationships. ● Test for interactions among message characteristics. ● Test for interactions with media, agency/program type.
INTERPRETATION	<ul style="list-style-type: none"> ● Place results in context. ● Differentiate among message characteristic effects. ● Define interrelationships with media. ● Define interrelationships with agency/program characteristics. <p><i>The following general guidelines apply for media type aspects of the communication domain.</i></p>
ANALYTICAL OBJECTIVES	<ul style="list-style-type: none"> ● Objectives should attend to each media type.
CRITERION MEASURES	<ul style="list-style-type: none"> ● Postulate differential media effects on criterion behaviors.
ANALYTICAL/ EVALUATION DESIGN	<ul style="list-style-type: none"> ● Assure independence of media coverage. ● Postulate and distribute diffusion mechanisms and processes.
DATA STRUCTURES	<ul style="list-style-type: none"> ● Derive independent variables. ● Identify the extent to which messages are compatible with media characteristics.

Table 4 (Continued)

EVALUATION DOMAIN ASPECTS	PRINCIPLES DERIVING FROM COMMUNICATION AND EVALUATION DOMAIN INTERACTIONS
DATA COLLECTION	<ul style="list-style-type: none"> ● Sample media characteristics.
DATA REDUCTION AND ANALYSIS	<ul style="list-style-type: none"> ● Test postulated relationships. ● Test for interactions among media types. ● Test for interactions with message characteristics, program/agency type.
INTERPRETATION	<ul style="list-style-type: none"> ● Differentiate among media effects. ● Define interrelationships among media types. ● Define interrelationships with agency/program characteristics.

Table 5

Guiding Principles Deriving from Interaction of the Behavioral and Evaluation Domains

EVALUATION DOMAIN ASPECTS	PRINCIPLES DERIVING FROM BEHAVIORAL AND EVALUATION DOMAIN INTERACTIONS
ANALYTICAL OBJECTIVES	<p><i>General guidelines deriving from interaction of the behavioral and evaluation domains do not differ for the behavioral domain aspects. The following general guidelines apply across the behavioral domain aspects of: attitude, motivation, and knowledge/skills.</i></p> <ul style="list-style-type: none"> ● Objectives should be consistent with the educational objectives.
CRITERION MEASURES	<ul style="list-style-type: none"> ● Desired types and levels of criterion measures will be in the areas of: food consumption, food procurement/planning, food storage/sanitation/preservation, food preparation, health care, population planning, sanitation, agriculture, and resource management.
ANALYTICAL/EVALUATION DESIGN	<ul style="list-style-type: none"> ● Design features should be in concordance with education, communication, and target population variables.
DATA STRUCTURES	<ul style="list-style-type: none"> ● Develop hypothetical relationships among independent and criterion variables. ● Develop hypothetical relationships about nonprogram contributions to variations in criterion measures.
DATA COLLECTION	<ul style="list-style-type: none"> ● Maximize use of existing program data. ● Implement data categories compatible with existing categories. ● Implement data categories with program-intrinsic value.
DATA REDUCTION AND ANALYSIS	<ul style="list-style-type: none"> ● Test for sensitivity of dependent variables to program activities. ● Test for sensitivity of dependent variables to combinations of program activities. ● Test for sensitivity of dependent variables to activities external to the program.
INTERPRETATION	<ul style="list-style-type: none"> ● Review and interpret in light of program goals. ● Review and interpret in light of type and content of program activities, including combinations of activities.

DEMONSTRATION OF THE COMMUNICATION MODEL

Demonstration of the communication model assumed: utilization of an ongoing nonformal education component; development and implementation of a mass media communication component which promotes or extends the objectives of the education component; development and application of measures of effectiveness of the combination of the education and communication components, as well as of the impact of these individual components; and interpretation and feedback to the participating entities. The ultimate objective of the model implementation was to provide, within the constraints of a one-time one-country application, data and guidance which could act as a demonstration to assist developing countries in implementing and investigating the effectiveness of similar applications.

The description of the model demonstration is addressed in its separate parts for convenience of presentation. In reality, any such implementation is highly complex. Implementation of one domain is dependent upon activities within another domain; as in the system design process, it cycles back and forth among domains and activities. The recognition of the need for such movement and the willingness to undergo these seemingly back-and-forth actions are essential requirements for implementation of similar programs.

Host Country Selection

In order to find an appropriate developing country within which to apply the communications model, inquiries were made through AID as to interest in the study on the part of various developing country governments. Based on response to these inquiries, visits were made to several countries to assess the potential for model demonstration. Tunisia was selected on the basis of satisfactory fulfillment of the following considerations:

- ✓ Availability of nonformal nutrition education reaching the under-five target population and with rural and urban dispersion.
- ✓ Identification of sample sizes large enough to permit data stability within educational treatment variations.
- ✓ Potential for development of a study team composed of key nationals--for guidance, assistance, and coordination of the effort.
- ✓ Availability of in-country resources to mount a mass media program.

Other factors also contributed to the selection of Tunisia as the study location. Included in these was a high expression of interest in the study on the part of top-level government personnel, especially those within the Ministry of Public Health and the National Institute for Nutrition and Food

Technology, formed within the Ministry of Health. The stage of development within Tunisia also seemed appropriate to the study, i.e., not so advanced that it would likely perform such activity without some outside assistance or motivation, while at the same time sufficiently interested and with persons capable of participating in and profiting from such assistance.

Formation of a Study Team

Designation of a study team composed of key nationals for guidance, assistance, and coordination of the effort was of paramount concern in the development and implementation of the communications model. A Tunisian study team and team director were identified within the National Institute of Nutrition and Food Technology. This group worked with the Synectics project staff and a Tunisian subcontractor group to participate in the study, in particular in the development of the communications and educational components of the model demonstration.

The communication model was rewritten into simplified language and translated into French. This document was provided to the study team as a demonstration of what was to be achieved through project implementation, serving the team as a "how to" guide.

Implementation of the Education Domain

Three types of activity were required for implementation of the education domain:

- ✓ Exploration for an appropriate educational context.
- ✓ Identification of educational objectives.
- ✓ Identification of curriculum characteristics.

The decisions and actions undertaken with respect to resolution of these three areas are discussed below.

Exploration for an Appropriate Educational Context

Primary considerations in the identification of the educational context were that it be an ongoing activity and addressed to correction of nutritional problems of the under-six population. One program in particular met these conditions, the Maternal Child Health (MCH) centers operated under the direction of the Institute of Child Health of the Ministry of Public Health. At the time of study implementation, there were 92 of these centers identified throughout Tunisia in both urban and rural areas. The primary purpose of the centers is to provide pediatric and gynecological services for the low

income population. For infants there are both routine medical and recuperative services. Staffing of a center consists of physicians, midwives, nurses, and nursing aides. Education of the mother is a required activity and frequently there is a nutritionist who assumes this educational responsibility. In some instances, staff overburden and/or lack of facilities limits the educational activity. Nonetheless, the MCH centers filled the educational component requirements very well and they were selected over other contending programs as the educational context.

Identification of Educational Objectives

At the time of the survey for host country selection, data collection for a national nutrition survey was underway in Tunisia under combined USAID/Tunis and Government of Tunisia (GOT) auspices. Lacking results of this timely effort, the need for and objectives of nutrition education within Tunisia were identified primarily through the results of a nationwide survey conducted in 1966 by the Study Division of the Secretariat of State for Planning and National Economy. Results of this earlier survey indicated that within the lower socioeconomic level population of Tunisia, 30 percent of the rural population and 12 percent of the urban population had less than minimally adequate consumption of calories. Diets for these populations were also found to be deficient in calcium, niacin, and Vitamins A, B₂, C, and D. While the total protein consumption, in general, was adequate, the ratio of animal to total protein consumption was inadequate: of the lower socioeconomic status population 70 percent of the rural population and 34 percent of the urban population were reported to receive less than 20 percent of their protein as animal protein.

By the time the educational objectives were being established for the implementation of the communication model, preliminary results of the 1973-1975 nutritional survey were available (Forbes, et al., 1976). The deficiencies identified in these results were as follows: anemia; growth retardation in children; rickets; goiter; Vitamin B complex deficiency; Vitamin C deficiency; dental caries; and a combination of high cholesterol, hypertension, high blood pressure, and obesity. A reasonably satisfactory state of protein consumption was demonstrated but calorie deficit problems were most apparent for 1-2 year old children.

These results plus other information available to the staff of the Nutrition Institute were used by the study team to develop a set of educational objectives for the study. In this identification, consideration was given to factors such as: the importance of the nutritional problem for the target population, i.e., young children and pregnant and lactating mothers; the generalizability of the problem for all geographical parts of the country; and, the amenability of the deficiency to an educational intervention. For example, the GOT was discussing the possibility of fortifying salt with iodine to overcome the goiter problem. Addressing the goiter problem seemed of less importance than some of the others due to the population affected, the probable lower impact of an educational program relative to other problems, and the government's intention to check a noneducational resolution to the problem (although similar type iodine fortification projects in other countries have demonstrated the need for a simultaneous educational campaign). The full set of nutritional needs/deficiencies was

"scrubbed" to come up with a set of objectives of greatest importance to the target population and which were considered to be best addressed through an educational program approach.

The following educational objectives were designated for the project:

- ✓ Increased consumption of fruits and vegetables, specifically, the use of raw and green leafy vegetables; the use of fruits and vegetables on a seasonal basis; the importance of fruits and vegetables for all people, including young children; and preservation of nutritive value in preparation of fruits and vegetables.
- ✓ Increased consumption of legumineses as a source of inexpensive protein; suggesting methods of preparation particularly of lentils, broad beans, chick peas, and ways to combine these with other foods especially in the feeding of young children.
- ✓ Increased consumption of eggs as a source of animal protein; encouraging the use of eggs in child feeding; combatting negative beliefs about egg consumption by young children and pregnant and lactating women; and encouraging the raising of chickens as a source of reduced-cost animal protein--increased animal protein consumption through both egg and poultry availability.
- ✓ Encouragement of breastfeeding and improvement in child feeding practices in general. Specific actions include pointing out the advantages of breastfeeding (available, sanitary, inexpensive, nutritious); providing information on when to introduce supplemental feeding, what weaning foods to introduce and how, the need for milk and milk products; and drawing attention to food needs of young children.
- ✓ The need for exposing the baby to the sun, specifically, to provide information on the problems associated with lack of sunshine, why the sun is important for all age groups, and to give instruction about the method and length of exposure for infants.

Throughout the set of objectives was the underlying concept of feeding a balanced diet--for example, identifying typical Tunisian dishes that are or could be balanced meals, and encouraging awareness of the need for food variety and how the Tunisian cuisine is easily adapted to satisfying the need for a balanced diet.

Identification of Curriculum Characteristics

Inherent in the design of the study was the intention to make use of the ongoing nonformal nutrition education offered in the MCH centers. Because of the role the Institute of Nutrition plays in the development, support, and coordination of nutrition education activities in Tunisia, including that ongoing in the MCH centers, the educational objectives established for

the study were in no way in conflict with those already implemented. Continuing interaction of the study team with the MCH centers had made the team aware, however, that education in some of the MCH centers risked being so minimal as to not be considered adequate to fulfill conditions of the educational component. Thus, it was decided to reinforce the nutrition education in half of the clinics selected randomly from the 16 clinics selected for the study. This was done through providing a brief (approximately three hours) "refresher" nutrition education miniseminar at selected clinics. At each of eight clinics, designated as the "experimental" condition clinics because of this educational activity, two persons having responsibility for nutrition education activities were given the miniseminar and textual and graphic materials to support nutrition education activities. The seminars were conducted by study team members from the Nutrition Institute.

The persons chosen for these educational activities were the nutritionists and midwives or nurses who already had the responsibility for nutrition education in the MCH centers. Seminar content focused on the nutritional needs of the young child in particular, demonstrating through flannel board, picture, lecture, and question-and-answer techniques the specific nutritional needs of children and how these vary as the child advances in age. Each participant was given a packet of nutrition education materials, some of which had been specifically designed by the staff of the Nutrition Institute for use in other MCH centers which were participating in a concurrent nutrition education project using interpersonal techniques only.

Implementation of the Communication Domain

Key activities in the implementation of the communication domain included the following:

- ✓ Selection of the media type(s).
- ✓ Preparation of the media.
- ✓ Test and revision of the media.
- ✓ Implementation of the media.

Selection of the Media Type(s)

As suggested by the communication model, consideration was given to a variety of media types. But, it must be noted that from the beginning of discussion about the study, the Tunisian Institute of Nutrition was particularly interested in developing a radio message format. Other factors also contributed to the selection of radio as the media, including: the widespread ownership of radios even among the poorer/target population in Tunisia; the fact that radio broadcast in Tunisia is under government control--the Radio Television Tunisienne (R.T.T.)--and could provide radio broadcast and other related services at no cost to the study; and AID

support of other mass media nutrition education activities which had implemented radio as the mass media. Adding to that body of information seemed appropriate.

The use of radio posed one disadvantage. In the intended experimental design, exposure to the media was to be withheld from certain participants. The countrywide reach of the Tunisian radio system made control of exposure impossible. In the end, the advantages and disadvantages of implementing radio as the selected mass media were weighed by the project staff and members of the AID advisory group and the option to implement a radio campaign was elected.

Preparation of the Media

Use of short spot announcements as the broadcast format was chosen rather than a discussion or other type format for the following reasons: short spot announcements offered greater ease of preparation for the study team, greater programming convenience and adaptability, and greater audience exposure potential. Development of the radio messages was a team activity. As a first step in the process, the educational objectives were reviewed and specific content which was to be transferred to the target audience was identified. No specific number of messages per educational objective "message theme" was established. Rather, key concepts of appropriate and desirable behavior were identified, and the number of messages per theme evolved primarily as a result of the importance of the educational objective and the number of content indications that had been suggested by the team members. Also, because of the nature of the Tunisian radio setup, no exact time limit had to be placed on the messages. Nor did the R.T.T. place any limit on the number of messages which would be aired. All of these conditions fostered a freedom in message preparation and programming which is unusual if not impossible to achieve under most circumstances.

All of the Nutrition Institute study team members are at least bilingual (Arabic and French) and much of their technical work is done in the French language. However, since the messages were to be broadcast in Arabic, the team decided to do all message preparation in Arabic and thus avoid the stiltedness of translation. The team worked together, message by message for the most part, developing message content through discussion and writing, recording it on tape, listening to it, reworking it, etc., until satisfaction was achieved. Message preparation was a time-consuming activity, particularly through the initial process. Message length did not exceed 60 seconds. In all, 37 messages were prepared against the set of objectives, as follows:

<u>Message Theme</u>	<u>Number of Messages</u>
Program introduction	1
Fruits and vegetables	7
Proteins--eggs, legumineses	9
Milk and milk products	4
Breastfeeding, weaning foods	12
Exposure to the sun	<u>4</u>
	37

Message Test and Message Revision

The set of preliminary messages was recorded by a professor of Arabic language who was chosen for his pleasant voice and clear diction qualities. The recorded messages were tested with typical target audience mothers in seven MCH centers which were not to be used in the demonstration project. Two teams of investigators went out, each team consisting of one nutritionist from the Nutrition Institute and one staff member employed by the subcontractor. Mothers listened to one to four messages, one mother at a time, one message at a time. Messages were presented in random fashion. On the average, each message was tested more than twelve times and no message was presented less than ten times.

A standard format was established for questioning and data recording. Information was gained from the mothers as follows:

- ✓ What ideas were retained and in what order?
- ✓ What words were not understood?
- ✓ What words were misunderstood or confused with another word?
- ✓ What confusions were created by the content of the message?
- ✓ What was the reaction to the rhythm of the message?
- ✓ What was the perception of the speaker's voice?
- ✓ What was the perception of the speaker's role or position?

In addition, radio listening data were collected--what station, what times of day the radio was listened to, and the number of radios the family owned. These data indicated that most of the families (better than 75 percent) owned at least one radio; that many mothers claimed to listen to the radio all day long but especially in the morning; and that the R.T.T. Arabic language station was most frequently heard, although some reported listening to Libyan and Algerian stations as well.

The message test demonstrated that the messages were well understood and well received by the mothers. As a result of the message test, only very minor word revisions were made in less than one-third of the messages. Of interest were the mothers' responses as to "who was speaking the message." About 30 percent thought the speaker was an announcer at the radio station while another 30 percent thought it was a doctor or a medical assistant. The text of the 37 messages (as translated from Arabic to French to English) is presented in Appendix A.

Implementation of the Messages

From the beginning of planning the project in Tunisia, the Tunisian radio had been extremely cooperative and anxious to participate in the project. R.T.T. agreed to tape the messages and to prepare them for broadcast, adding the lead-in music and the message identification information

presented by a staff announcer to each message. The same professor of Arabic language who had recorded the messages for the message test recorded them for broadcast. Based on results of earlier experiments sponsored by AID (Manoff International, Inc., 1976) and also because of the responses of the mothers during the message test, the speaker was identified as "Dr. Hakim." (Note: Hakim is an Arabic word meaning wise or learned one.) It was felt that the concept of a doctor was very acceptable to the audience. Each message was also identified as prepared by the Institute of Nutrition.

At the time of scheduling of the radio messages, no listener data for R.T.T. were available. The listener data collected through the message pre-test plus other information known about radio listening habits were used to develop the message broadcast schedule. In addition to scheduling during the times mothers reported they usually listened to the radio, attention was given to when husbands and fathers could also hear the messages since in some areas of Tunisia, particularly rural areas, much of the food shopping is done by men. Another consideration was to schedule the majority of the programming prior to initiation of television broadcasting during the evening hours. (Note: nearly 50 percent of the targeted audience reported television ownership.)

Initial arrangements with R.T.T. were for two messages to be broadcast three times each day. A program schedule was provided to R.T.T. covering a period of six months. This schedule was such that each theme was presented over a period of one or two weeks, depending upon the number of messages contained. This sequence was repeated twice and then a purely random presentation of all messages was planned. After ten weeks, this scheme was modified due to pressure brought on the Nutrition Institute by certain journalists and other persons of influence who objected to the "simplified language" of the messages and the "repetitiveness" of the programming. As a result of these objections, six new messages were added, and the programming was rescheduled to a purely random sequence and cut back to two messages twice a day. Broadcast of the 37 original messages was also reduced to approximately four months. (However, the preparation and broadcast of new "Dr. Hakim" messages continues and the number of messages developed and presented had reached 64 by 25 May.) The broadcast schedule for the period of time covered by the implementation study is presented in Appendix A.

Implementation of the Behavioral Domain

Indications for implementation of the behavioral domain were directly related to the educational objectives and the content areas identified for the messages. These had to do with child feeding practices and with the mother's knowledge and attitude about nutrition and health, especially that of the young child. The types of behavioral domain modifications which were sought are best explored in the context of the evaluation domain wherein they were investigated.

Implementation of the Evaluation Domain

Key activities in implementation of the evaluation domain are described within the following subtopics:

- ✓ Description of the study design.
- ✓ Identification of data types and measures.
- ✓ Strategies for data collection, data reduction, and data analysis.

Description of the Study Design

The experimental design selected for implementation of the evaluation domain was that of the Posttest-Only Control Group Design, as described by Campbell and Stanley (1963). As defined by the title, this design implements only a single data collection (measure) following the educational "treatment" for the experimental group. The utility of this Campbell and Stanley "type 6" design depends, to a large extent, on randomization. Thus, random selection of centers, random assignment of centers to the experimental or control condition, and selection of mother-child combinations within centers on a random basis were essential activities.

Random selection of centers from the roster of MCH centers was made within the following constraints. Selection was restricted to the geographic area relatively near to Tunis (within approximately 125 kilometers) so that a greater level of involvement on the part of the Nutrition Institute staff could be achieved. Of the 92 MCH centers in Tunisia, 38 are located within this restricted area. There are seven "Region Sanitaires" (Health Regions) within this geographic area. To achieve selection of the 16 centers, two centers were randomly chosen from each of six regions; four were randomly chosen from one region having a large number of MCH centers.

Assignment of centers to the "experimental" (reinforcement of non-formal nutrition education in the center) and "control" (no reinforcement of nutrition education in the center) conditions was made independently of center selection. Figure 2 shows the location of the selected centers and their assignment to the experimental or control condition. It should be noted that the only real distinction between the experimental and control centers was that of provision of the miniseminar to selected health workers in the center. Without that support, ongoing nonformal nutrition education was as likely to occur in the control centers as in the experimental centers. The seminars were intended to enhance the nutrition knowledge of the center's nutrition trainers. Those receiving the miniseminars were encouraged to provide nutrition education but no outright reward for doing so was offered. Experimental center health trainers were asked to tell the mothers about the "Dr. Hakim broadcasts." Health personnel in the control centers were advised of the Dr. Hakim programming but were not requested to inform the mothers of the broadcasts. (Health workers in both types of centers did advise mothers to listen to the broadcasts. But, in the end there was

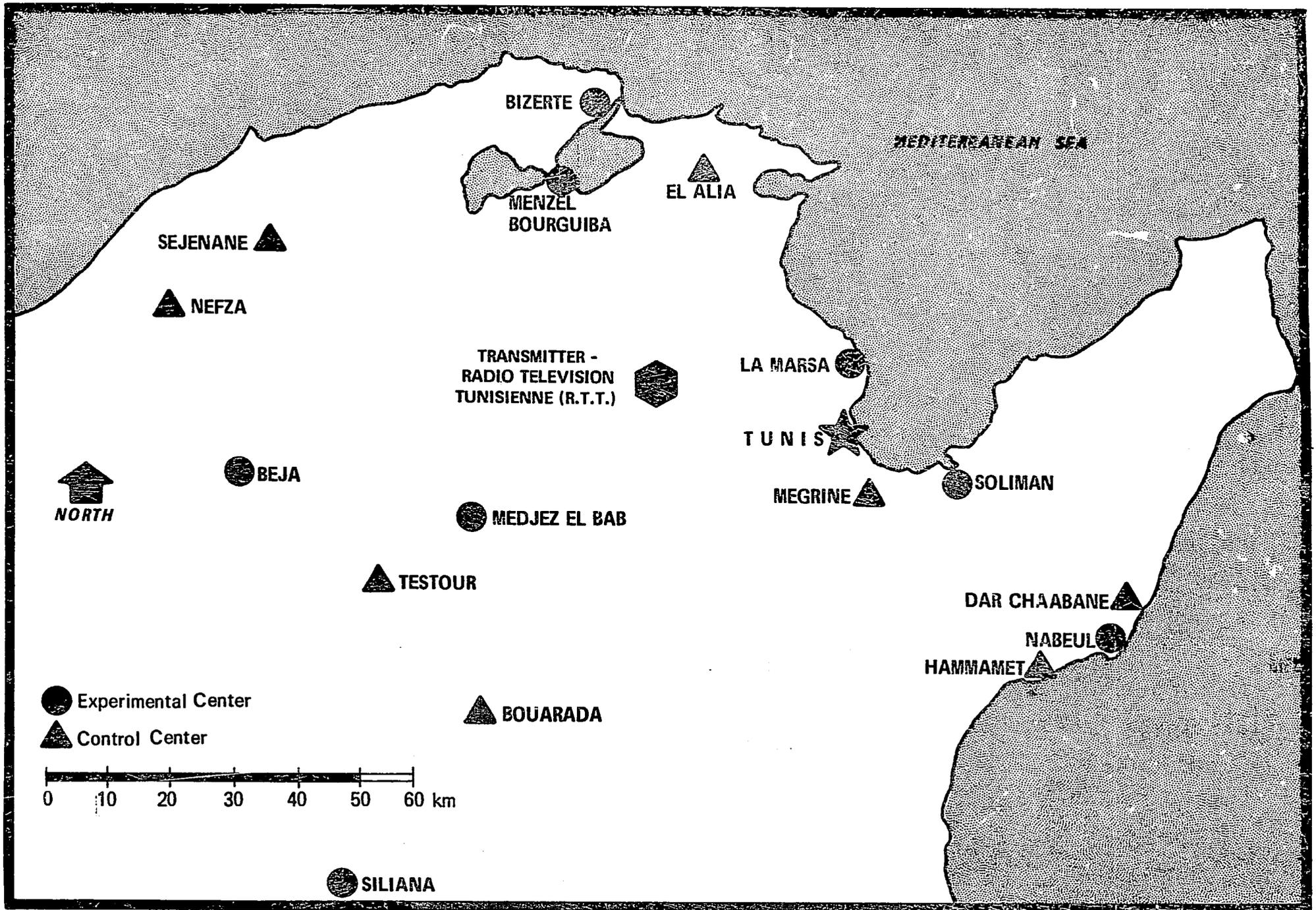


Figure 2. Map of Northern Tunisia Showing Study Locations, by Type

little effect of this encouragement due to the widespread awareness and acceptance of the Dr. Hakim personality.)

Procedures for registration of mothers and children at MCH centers vary from location to location, when they exist. In order to achieve a roster from which to randomly select mother-child combinations, a list of 200 attendees was built in each center. Procedures for compiling this list varied from center to center, depending upon such factors as the number of mother-child participants per day, the number of days of clinic operation, and the number and type of clinic personnel participating in the study. Clinics achieved a roster of 200 mother-child combinations through one of the following procedures: registration of the first 200 mother-child combinations to attend the center after a certain date; registration of the first 20 mother-child combinations to attend over 10 days of clinic activity; registration of the first 10 mother-child combinations to attend over 20 days of clinic activity. In addition to the original registration--for which the need to provide a precise address at which the mother could be located for interview was stressed--the center workers kept track of the number of visits made by the mother-child combination and of the number and type of nonformal nutrition education sessions given to the mother during that time period. Records were maintained by the center workers over the course of about five months--until the selection of mothers for interview was complete.

Identification of Data Types and Measures

The study objectives of improvement of the child's and mother's diets and modification of the mother's nutritional knowledges and attitudes dictated a major portion of the data to be collected. These were augmented by descriptive data and the full dataset contained the following data types:

- ✓ Data describing the mother, child, family, and household.
- ✓ Food consumption data for the mother and child.
- ✓ Mother's nutrition and nutrition-related knowledges and attitudes.
- ✓ MCH center visit and educational treatment data, collected from the registration records maintained at the center.

The above data types were incorporated into a single questionnaire, as shown in Appendix B. The questionnaire content is discussed in the following paragraphs.

Descriptive Data. Part A of the questionnaire contains the descriptive data about the family and the household. These data were obtained by direct questioning of the mother. For the most part, questions were precoded with the full set of appropriate answers. One exception to the mother's provision of the data was a rating of the family's overall economic status (following Question 24). This was judged by the interviewer on the basis of such indicators as: size of home, number of windows, husband's occupation, amount of land owned, etc. Because of regional variation in types of housing, agrarian

or commercial economy, etc., it was not possible to establish a set of standards across the set of study locations. Rather, interviewers judged the economic status of a given family on the basis of what was "typical" for the area. No attempt was made to obtain income information about the family since without a great amount of interviewer training and verification of the data, income data are extremely unreliable.

Food Consumption Data. Part B of the questionnaire contains the child's food consumption data; Part C contains the mother's. Both sets of food consumption data were collected through use of the 24-hour food recall. Consumption conditions were investigated to assure that they were "typical" for the mother and the child. When food consumption was typical, these data were assessed in several ways:

- ✓ Judgment of the "goodness" of the diet based on the food items consumed, the quantity of the food item, and the child's age or the mother's physical state with respect to pregnancy or breastfeeding. A five-point rating scale was employed. Judgments were made by nutritionists of the Institute of Nutrition who were members of the study team.
- ✓ Identification of specific food types consumed, in any quantity.
- ✓ Identification of specific food types lacking in the diet. Food types could be indicated because they were not consumed at all or because they were consumed in insufficient quantity.

Mother's Nutrition and Nutrition-Related Knowledges and Attitudes.

These data, contained in Part D of the questionnaire, explored the mother's knowledges and attitudes with respect to the specific educational objectives and the content of the messages. Questions dealt with knowledges, practices, attitudes, changes in knowledges and attitudes, and when and why the change occurred.

Media Exposure. Part E of the questionnaire contains data about the mother's and the family's radio listening patterns as well as the mother's identification of information she has acquired through the radio messages and advice and instruction at the MCH center.

Activities at the MCH Center. The data recorded at the MCH center about visits and nutrition education activities were transferred to Part F of the questionnaire.

Strategies for Data Collection, Reduction, and Analysis

Data collection and reduction to a coded form (all numeric) and entry on a computer tape were the responsibility of the Tunisian subcontractor. Development of the questionnaire and the data analyses were the responsibility of the prime contractor.

Questionnaire Development. A preliminary version of the questionnaire shown in Appendix B was prepared in English and translated into French. Pretest of the questionnaire was conducted during the period of 13-28 February in one urban and one rural location not included in the study sample. Mothers who attend the MCH center were identified by center personnel; the interviews were conducted in the homes. A total of 50 pretest interviews were completed by women hired as supervisors for the study interviews. The pretest questionnaire was orally translated into Arabic as it was administered.

Pretest of the questionnaire served the following functions:

- ✓ Identified questions which were ambiguous or for which it was impossible to obtain a response. One example of the latter was a question about "types of latrine." Neither the mother nor the interviewer was able to make the requisite distinction. The question was deleted because of the frustration it caused.
- ✓ Verified or provided new responses for close-ended questions.
- ✓ Provided data on which to establish at least partial response categories for open-ended questions.
- ✓ Verified the need for the questionnaire to be prepared in Arabic rather than French.
- ✓ Provided indications for interviewer training requirements.

Interviewer Selection and Training. Selection of interviewers was done very carefully and systematically. Interviewers were hired locally so that they had appreciation of local customs, conventions, and language. Interviewers were hired through the local Bureau of Employment and only applicants fitting the following profile were considered:

- ✓ Female, since male interviewers would not have been admitted into the homes.
- ✓ At least five years of secondary education.
- ✓ Good character references and acceptance in the community.
- ✓ Capable of developing a good relationship with the mothers.
- ✓ No speech defect.

Between 40 and 50 candidates were interviewed and given a general intelligence test (Progressive Matrice) and 16 interviewers were selected on the following criteria:

- ✓ General intelligence.
- ✓ Oral expression, speaking quality, articulation, etc.
- ✓ Physical presentation, e.g., poise and appearance.

- ✓ Aptitude for posing the interview questions.
- ✓ Aptitude for coding the interview responses.
- ✓ Motivation for participating in the study.
- ✓ Dynamism.

None of the interviewers had prior experience as an interviewer; all were in their early twenties (20-25); few had any previous work experience. Due to a general unemployment problem for women, particularly in rural areas of Tunisia, higher educated women were available and anxious for the employment. Three of the interviewers had a year or two at the university level; nine of the interviewers had six years of secondary school.

The interviewers were brought to Tunis for three days of group training which consisted of theoretical and practical sessions concerning interviewing and data coding techniques. Training sessions included the following topics: objective of the investigation, comprehension of the questionnaire, interviewer attitude and risks of influencing the response, role playing using the questionnaire, the coding process and use of the various code types.

Interviews. All interviewing took place between 17 April and 26 May. Each interviewer completed an average of three interviews per day, including all coding. They were instructed to complete no more than four and no less than two interviews per day. Photo identification cards established their employment by the subcontractor Institute, giving them status and credibility and facilitating their access into the homes. (Only one mother refused the interview.)

Close supervision of interviewers was maintained for data consistency and accuracy. Questionnaires were collected and reviewed incrementally. A 15 percent validation was done, demonstrating no falsification of data and exceedingly high data accuracy. Despite the attempt to obtain accurate and detailed addresses of the registered families in the MCH center, locating families was the one real difficulty encountered in completing the interviews. MCH personnel and local officials were exceedingly helpful. In only one location (La Marsa) did this problem result in a reduced sample size (52 out of 60 scheduled interviews). This was due to a change in the house numbering system during the study. Even with the help of the police, extensive time was spent attempting to locate the selected families. Eventually, time ran out before the remaining families could be located.

Data Coding, Verification, and Taping. Interviewers coded the completed interviews daily. Each questionnaire was also completely reviewed by a member of a second team which ascertained data accuracy and consistency. Data from the registration card maintained by the MCH centers were entered at this time. Coded data were entered directly on a data tape. These entries were replicated and compared in a verification process. The raw data remain at the Institute of Nutrition in Tunis.

Data Reduction and Analysis. Data card listings for the full dataset were prepared; all data fields were examined for "out of range" entries.

These procedures demonstrated good quality data for this type of interview. Only very minimal data cleanup was required. Data reduction and analysis consisted of routine descriptive statistics (frequency distribution, means, standard deviations, ranges) on the basis of individual MCH center, group assignment (experimental or control), and data subsets defined *ex post facto* on the basis of the mother's combined exposure to the radio messages and the nonformal education in the center. Additional analyses (Chi-square, tests of mean differences, correlations) were performed to explore interesting and promising aspects of the data. Results of the data analyses are described in the next section of this report.

RESULTS OF THE DEMONSTRATION

Results of the demonstration of the communication model are of several varieties, including observations about the process of implementation, comments and reactions to the resultant radio program in Tunisia, and demonstration of effects through the questionnaire data.

Observations About the Process of Implementation

The Nutrition Institute's commitment to the project was strong and nearly constant from the project's inception. The pilot project has been taken over by the Institute as one of its own continuing activities. Continuation of message preparation by the staff of the Institute and continued commitment to message broadcast by management of R.T.T. are indications of the success of the project. There are, however, some qualifying comments to note and some lessons to be shared.

Members of the Institute's study team fully understood the communication model and the rigor with which the media program was to be designed and carried out. Given the freedom to do so, they would construct, test, refine, and disseminate messages in accordance with the guidelines provided in the model. They are not always given that freedom. Key management staff at the Institute did not fully share in the understanding of the need for constant rigor in message development. The results were periodic misdirection and delay during early phases of the project and lack of rigor in subsequent independent message preparation. Now, with increased experience and confidence, the team appears close to capable of persuading key management staff of the need for rigor and discipline in design of the continuing media program. Much frustration might be avoided if sponsoring management staff could be apprised of and committed to required discipline as well as to the media program itself.

Implementation of the model was conducted through a series of field visits rather than by in-country residence. The resultant perils to such a study have become vividly apparent to all concerned; in-country residence to provide technical assistance is recognized as a future implementation requirement. One positive aspect of this project was the interest and attention given by the USAID/Tunis Mission. An additional positive aspect was the availability of a strong and appropriately skilled host country subcontractor. Without such on-the-spot assistance--not to be counted on as available in the LDC--the threats to project completion might have turned into reality. A third positive aspect of the implementation was the strong commitment and regularity of broadcast provided by R.T.T.--again, a "not-to-be-counted-on" phenomenon in an LDC. Lastly, without the readiness and stance of the Nutrition Institute to participate in the study it never could have happened in this fashion. There is no way to assure that comparable good conditions can be met ahead of time. But it is imperative for success of such an implementation to either find or create such conditions.

Extraneous Effects and Reactions to the Radio Messages

The radio messages were designed for a specific target audience--the low income, rural and urban, illiterate and semiliterate malnourished families with young children. The broader audience which was potentially exposed to the messages can be viewed on a continuum from the high-risk target group to the affluent, essentially urban, well-educated and well-nourished. Reactions can generally be expected from both ends of the continuum. The impact of the radio messages in Tunisia was no exception to this general expectation. Indeed, the popularity of the Dr. Hakim personality was nothing short of phenomenal in both segments of the population. In some part, the fact that Dr. Hakim became a household personality can be attributed to the design of the media program and its appeal to the target audience. But in some measure, credit must also be attributed to the reactions of a special segment of the nontarget audience and the manner in which the project team dealt with extraneous effects of the messages on that segment of the population.

Adverse reactions to the messages came from the nontarget audience--persons who were urban or periurban professionals and upper-middle class. The most evident critics were the newspaper journalists. Editorials, feature articles, and cartoons heightened the public awareness of the messages and, in the end, likely contributed to the popularity of Dr. Hakim. In print, journalists accused the Nutrition Institute of underrating the intelligence of the Tunisian people--describing the media program as constant repetition of simple-minded messages. They charged the Nutrition Institute with negligence in that the messages failed to include medical information or precise advice on consumption of quantities of foodstuffs and nutrients by which to meet daily requirements. Some critics attacked the Dr. Hakim personality itself as having an unconvincing manner.

The Nutrition Institute's project team director's method of dealing with the journalists' criticisms was direct and effective. Newspaper articles explaining the purpose of the media program and the rationale underlying the design and programming of messages were carefully prepared by the study team. Credit was given for the constructive elements of criticism. These responses to the journalists' comments were also published in the newspapers. Selective adjustments were made in the programming of the messages. The study team did not, however, yield on the basic design of the media program; nor did they at that point change the voice of Dr. Hakim--a voice which was acceptable to the target audience and to which that audience had become accustomed.

A more subtle and potentially more troublesome source of controversy evolved around the content of some of the messages. Problems were of two types: the first problem was the urging of consumption of foods which were at the moment in short supply. These messages were temporarily eliminated from the programming schedule. The second problem was the request by food processors to, in effect, "push" consumption of specific food types or products. These requests were initiated as a response to messages promoting use of a government-produced weaning food for infants. The only appropriate response to this problem and the one taken was the explanation that the messages could not be converted to such purposes.

The nontarget audience reactions to the messages are illustrative of problems which are likely to occur with any use of radio as a change agent in LDCs or other countries. The sponsoring team cannot anticipate all sources of extraneous reactions, but must be prepared to deal with them expeditiously when and where they arise, to assess the potential effects of not responding to critics, to make the necessary compromises, and to mollify critics without jeopardizing the potential for positive effects of the media program on the intended audience. Two conditions were particularly helpful in sustaining the message broadcast--the positive utilization of adverse criticisms and the favorable reaction to the broadcast from influential and high-level government officials in Tunisia and in the neighboring countries of Algeria, Egypt, and Libya.

Demonstration of Effects--Questionnaire Data

The data collected through the interview with the selected sample of mothers were used to answer the following questions:

- ✓ Does the combination of radio and nonformal nutrition education have a greater impact on changing the mother's nutrition and nutrition-related knowledges, attitudes, and behaviors than either of the two alone?
- ✓ What factors about the family, the mother, the program, etc., contribute to or are associated with heightened impact of the radio and/or nonformal nutrition education program?
- ✓ If mothers report a change in knowledge, attitude, or behavior, to what extent do they attribute the change to either the radio or the nonformal education to which they have been exposed? Are they able to make realistic assessment of these impacts?

The data were first examined to determine the comparability of the experimental and control groups.

Comparison of Experimental and Control Groups

It was recognized from the outset that the individual MCH centers would vary greatly from one to another. The intent was, by random selection of centers and random assignment of centers to groups, to achieve comparable experimental and control groups on the basis of noncriterion variables. Family characteristics data, shown in Tables 6 and 7 for the experimental and control groups respectively, were examined to determine group comparability. Tests of mean differences and Chi-square tests demonstrated group comparability with one exception, that of judged socioeconomic status (SES), as shown in Table 8.

Table 6
Family Characteristics by Study Location
Experimental MCH Centers

DATA CATEGORY	LOCATION								
	La Marsa	Bizerte	Menzel Bourguiba	Medjez El Bab	Béja	Siliana	Nabeul	Soliman	All Experimental Centers
<u>Family Size</u> N	52	57	57	60	59	57	64	60	466
Mean	6.04	4.96	6.58	6.08	8.29	5.98	6.34	8.55	6.62
Std. Dev.	2.27	1.86	3.21	2.25	3.65	2.52	2.53	4.24	3.12
Range	3-12	3-12	2-18	2-11	3-18	3-14	3-14	3-25	2-25
N-no data	0	0	0	0	0	0	0	0	0
<u>Number of Children in Home Under Six</u> N	50	56	56	60	59	57	64	59	461
Mean	2.08	1.93	2.05	1.95	2.42	1.67	2.06	2.66	2.11
Std. Dev.	1.01	0.89	1.23	0.91	1.16	0.74	0.96	-	-
Range	1-5	1-5	1-7	1-5	1-6	1-3	1-5	1-5	1-7
N-no data	2	1	1	0	0	0	0	1	5
<u>Mother's Age</u> N	52	57	57	59	55	57	64	58	459
Mean	31.11	26.46	29.40	29.97	29.64	29.75	29.11	29.34	29.32
Std. Dev.	4.35	5.47	6.81	5.86	7.60	6.71	6.27	6.90	6.42
Range	22-39	18-49	18-48	19-44	20-42	19-46	18-43	19-43	18-49
N-no data	0	0	0	1	4	0	0	2	7
<u>Mother's Educational Level</u> N	51	57	57	60	59	56	62	60	462
Percentage:									
None	70.6	29.8	59.6	61.7	76.3	60.7	33.9	45.0	54.3
Religious instruction only	2.0	3.5	-	1.7	1.7	5.4	6.4	1.7	2.8
Incomplete primary	15.7	31.6	17.5	31.7	16.9	25.0	48.4	48.3	29.9
Complete primary	7.8	24.6	15.8	1.7	5.1	-	1.6	-	6.9
Incomplete secondary	3.9	7.0	5.3	3.3	-	8.9	8.1	3.3	5.0
Complete secondary	-	3.5	1.7	-	-	-	1.6	-	0.9
Superior level	-	-	-	-	-	-	-	1.7	0.2
Total	100.0	100.0	99.9	100.1	100.0	100.0	100.0	100.0	100.0
N-no data	1	0	0	0	0	1	2	0	4
<u>Family's Highest Educational Level</u> N	48	57	56	59	59	34	63	54	430
Percentage:									
None	-	7.0	8.9	3.4	42.4	5.9	6.4	5.6	10.5
Religious instruction only	8.3	-	5.4	6.8	8.5	2.9	12.7	1.8	6.0
Incomplete primary	37.5	12.3	30.4	33.9	30.5	61.8	52.4	64.8	39.3
Complete primary	29.2	36.8	28.6	22.0	8.5	14.7	6.3	3.7	18.6
Incomplete secondary	20.8	14.0	19.6	16.9	8.5	11.8	14.3	13.0	14.9
Complete secondary	2.1	19.3	7.1	15.2	1.7	2.9	4.8	5.6	7.7
Superior level	2.1	10.5	-	1.7	-	-	3.2	5.6	3.0
Total	100.0	99.9	100.0	99.9	100.1	100.0	100.0	100.1	100.0
N-no data	4	0	1	1	0	23	1	6	36

Table 6 (Continued)

DATA CATEGORY	LOCATION								
	La Marsa	Bizerte	Menzel Bourguiba	Medjez El Bab	Bôja	Siliana	Nabeul	Soliman	All Experimental Centers
<u>Husband's Occupation</u> N	51	56	54	59	58	54	63	60	455
Percentage:									
Farmer	-	-	3.7	1.7	-	1.8	-	13.3	2.6
Herder	-	-	-	-	1.7	-	-	-	0.2
Day laborer	33.3	30.4	11.1	42.4	31.0	46.3	38.1	41.7	40.9
Merchant	-	-	3.7	1.7	3.4	-	3.2	1.7	1.8
Clerk	3.9	8.9	1.8	15.2	1.7	14.8	11.1	15.0	9.2
Regular workman	45.1	30.4	18.5	13.6	1.7	20.4	22.2	13.3	20.2
Artisan	7.8	16.1	20.4	23.7	8.6	1.8	23.8	11.7	14.5
Other	9.8	14.3	40.7	1.7	1.7	14.8	1.6	3.3	10.5
Total	99.9	100.1	99.9	100.0	99.8	99.9	100.0	100.0	99.9
N-no data	1	1	3	1	1	3	1	0	11
<u>Home Location Area Type</u> N	51	57	57	59	58	56	64	60	462
Percentage:									
Rural	3.9	-	-	8.5	3.4	26.8	-	3.4	5.6
Town	5.9	-	100.0	91.5	96.6	73.2	1.6	96.7	58.4
Urban	90.2	100.0	-	-	-	-	98.4	-	35.9
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.1	99.9
N-no data	1	0	0	1	1	1	0	0	4
<u>Number of Rooms in Home</u> N	52	57	55	59	58	55	64	59	459
Percentage:									
One	44.2	36.8	34.5	57.6	89.7	32.7	46.9	8.5	44.0
Two	30.8	33.3	40.0	28.8	8.6	40.0	29.7	20.3	28.8
Three	17.3	22.8	18.2	11.9	-	18.2	20.3	16.9	15.7
Four	7.7	5.3	3.6	1.7	1.7	9.1	1.6	13.6	5.4
More than four	-	1.7	3.6	-	-	-	1.6	40.7	6.1
Total	100.0	99.9	99.9	100.0	100.0	100.0	100.1	100.0	100.0
N-no data	0	0	2	1	1	2	0	1	7
Mean	1.88	2.10	2.02	1.58	1.14	2.04	1.81	3.85	2.05
Std. Dev.	0.96	1.40	1.01	0.77	0.48	0.94	0.92	1.80	1.33
Range	1-4	1-10	1-5	1-4	1-4	1-4	1-5	1-8	1-10

Table 6 (Continued)

DATA CATEGORY	LOCATION								
	La Marsa	Bizerte	Menzel Bourguiba	Medjez El Bab	Béja	Siliana	Nabeul	Soliman	All Experimental Centers
<u>Number of Windows in Home</u> N	52	57	54	54	58	43	61	56	435
Percentage:									
None	1.9	1.7	-	-	5.2	16.3	8.2	3.6	4.4
One	30.8	29.8	33.3	44.4	69.0	27.9	16.4	3.6	32.0
Two	38.5	26.3	40.7	35.2	22.4	25.6	34.4	17.9	30.1
Three	17.3	22.8	18.5	13.0	1.7	16.3	16.4	12.5	14.7
Four	5.8	15.8	3.7	5.6	1.7	9.3	11.5	16.1	8.7
More than four	5.8	3.5	3.7	1.8	-	4.7	13.1	46.4	10.1
Total	100.1	99.9	99.9	100.0	100.0	100.1	100.0	100.1	100.0
N-no data	0	0	3	6	1	14	3	4	31
Mean	2.15	2.35	2.04	1.85	1.26	1.93	2.61	4.82	2.39
Std. Dev.	1.26	1.32	1.01	0.98	0.66	1.52	1.77	3.84	2.12
Range	0-6	0-7	1-5	1-5	0-4	0-7	0-8	0-11	0-11
<u>Home Facilities</u> N	52	57	57	59	59	57	64	59	464
Percentage with:									
None of the following	5.8	5.3	5.3	3.4	32.8	26.3	-	5.1	10.6
Electricity	90.4	91.2	78.9	50.8	44.8	52.6	87.5	86.4	72.6
Running water	76.9	75.4	56.1	66.1	22.4	68.4	54.7	80.0	61.9
Cook stove	63.5	77.2	57.9	52.5	5.2	50.9	81.2	88.1	59.7
Refrigerator	19.2	21.1	19.3	8.5	-	17.5	14.1	23.7	15.3
Radio	59.6	77.2	70.2	74.6	58.6	64.9	84.4	91.5	72.8
Television	57.7	63.2	63.2	45.8	8.6	38.6	54.7	72.9	50.4
All of the above	5.8	19.3	14.0	8.5	-	15.8	9.4	16.9	11.2
N-no data	0	0	0	1	0	0	0	1	2
<u>Home Ownership</u> N	52	57	57	60	58	56	63	59	462
Percentage:									
Owned by husband, wife	30.8	15.8	33.3	48.3	13.8	46.4	28.6	69.5	35.9
Owned by other family member	17.3	38.6	19.3	31.7	5.2	10.7	49.2	25.4	25.1
Rented	50.0	43.9	33.3	18.3	74.1	10.7	19.0	5.1	31.4
Furnished by employer	-	-	3.5	1.7	3.4	3.6	1.6	-	1.7
Other	1.9	1.7	10.5	-	3.4	28.6	1.6	-	5.8
Total	100.0	100.0	99.9	100.0	99.9	100.0	100.0	100.0	99.9
N-no data	0	0	0	0	1	1	1	1	4

Table 6 (Continued)

DATA CATEGORY	LOCATION								
	La Marsa	e	Menzel Bourguiba	Medjez El Bab	Béja	Siliana	Nabeul	Soliman	All Experimental Centers
<u>Distance to MCH Center</u> N	52	57	57	60	58	57	63	58	462
Percentage:									
1 kilometer or less	51.9	87.7	52.6	93.3	31.0	71.9	65.1	51.7	63.4
1-2 kilometers	23.1	12.3	29.8	1.7	62.1	28.1	20.6	29.3	25.8
2-3 kilometers	7.7	-	12.3	-	3.4	-	11.1	13.8	6.1
3-4 kilometers	15.4	-	5.3	-	3.4	-	-	1.7	3.0
4-5 kilometers	1.9	-	-	-	-	-	-	3.4	0.6
Greater than 5 kilometers	-	-	-	5.0	-	-	3.2	-	1.1
Total	100.0	100.0	100.0	100.0	99.9	100.0	100.0	99.9	100.0
N-no data	0	0	0	0	1	0	1	2	4
<u>Family's Judged Socio-Economic Status (SES)</u> N	52	57	55	60	59	56	62	46	447
Percentage judged:									
Superior (1)	-	-	-	6.7	-	1.8	3.2	2.2	1.8
Good (2)	3.8	28.1	7.3	13.3	6.8	16.1	25.8	15.2	14.8
Average (3)	44.2	57.9	21.8	21.7	3.4	21.4	33.9	47.8	30.9
Poor (4)	40.4	10.5	54.5	28.3	61.0	21.4	25.8	19.6	32.9
Very low (5)	11.5	3.5	16.4	30.0	28.8	39.3	11.3	15.2	19.7
Total	99.9	100.0	100.0	100.0	100.0	100.0	100.0	100.1	100.1
N-no data	0	0	2	0	0	1	2	14	19
Mean	3.60	2.89	3.80	3.62	4.12	3.80	3.16	3.30	3.54
Std. Dev.	0.75	0.72	0.80	1.24	0.77	1.18	1.04	0.99	1.02
Range	2-5	2-5	2-5	1-5	2-5	1-5	1-5	1-5	1-5

Table 7
Family Characteristics by Study Location
Control MCH Centers

DATA CATEGORY	LOCATION								
	Megrine	El Alia	Sedjenane	Testour	Nefza	Bou Arada	Ham-mamet	Dar Chaabane	All Control Centers
<u>Family Size</u> N	60	60	58	59	58	60	59	62	476
Mean	7.13	7.27	5.91	8.39	5.84	6.82	5.42	5.26	6.50
Std. Dev.	3.26	3.51	2.11	3.49	2.70	2.63	2.13	1.90	2.94
Range	3-14	3-22	3-11	4-22	2-16	2-13	3-10	3-9	2-22
N-no data	0	0	0	0	0	0	0	0	0
<u>Number of Children in Home Under Six</u> N	60	59	58	59	58	60	59	62	475
Mean	1.92	2.49	1.91	2.59	1.95	2.08	2.15	2.00	2.03
Std. Dev.	1.15	1.18	0.80	1.27	1.15	0.87	0.92	0.97	0.94
Range	1-6	1-8	1-4	1-6	1-6	1-5	1-5	1-5	1-8
N-no data	0	1	0	0	0	0	0	0	1
<u>Mother's Age</u> N	58	60	57	58	55	58	58	62	466
Mean	29.60	31.25	26.51	29.19	27.02	33.22	28.36	28.55	29.24
Std. Dev.	6.89	6.43	5.19	5.76	6.25	7.62	6.49	6.36	6.71
Range	19-48	19-45	17-40	20-48	19-40	21-47	19-46	20-41	17-48
N-no data	2	0	1	1	3	2	1	0	10
<u>Mother's Educational Level</u> N	59	50	56	59	57	59	59	62	461
Percentage:									
None	57.6	76.0	71.4	67.8	66.7	67.8	52.5	30.6	60.7
Religious instruction only	16.9	-	5.4	6.8	5.3	3.4	-	-	4.8
Incomplete primary	22.0	14.0	5.4	18.6	12.3	13.6	42.4	51.6	23.0
Complete primary	-	6.0	10.7	-	8.8	6.8	-	1.6	4.1
Incomplete secondary	1.7	-	7.1	5.1	7.0	5.1	3.4	14.5	5.6
Complete secondary	1.7	2.0	-	1.7	-	3.4	1.7	1.6	1.5
Superior level	-	2.0	-	-	-	-	-	-	0.2
Total	99.9	100.0	100.0	100.0	100.1	100.1	100.0	99.9	99.9
N-no data	1	10	2	0	1	1	0	0	15
<u>Family's Highest Educational Level</u> N	59	55	58	50	56	55	58	58	449
Percentage:									
None	16.9	23.6	1.7	12.0	8.9	14.5	19.0	8.6	13.4
Religious instruction only	15.2	12.7	15.5	18.0	10.7	10.9	3.4	3.4	11.1
Incomplete primary	45.8	36.4	46.5	44.0	39.3	21.8	58.6	70.7	45.7
Complete primary	6.8	12.7	8.6	4.0	14.3	10.9	1.7	-	7.3
Incomplete secondary	13.6	9.1	20.7	16.0	17.9	27.3	13.8	12.1	16.3
Complete secondary	1.7	3.6	5.2	6.0	7.1	7.3	1.7	5.2	4.7
Superior level	-	1.8	1.7	-	1.8	7.3	1.7	-	1.6
Total	100.0	99.9	99.9	100.0	100.0	100.0	99.9	100.0	100.1
N-no data	1	5	0	9	2	5	1	4	27

Table 7 (Continued)

DATA CATEGORY	LOCATION								
	Megrine	El Alia	Sedje- nane	Testour	Nefza	Bou Arada	Ham- mamet	Dar Chaabane	All Control Centers
<u>Husband's Occupation</u> N	60	59	56	55	57	58	55	62	462
Percentage:									
Farmer	1.7	8.5	1.8	3.6	5.3	-	-	6.4	3.5
Herder	-	-	-	-	-	1.7	-	-	0.2
Day laborer	73.3	62.7	51.8	54.5	38.6	46.5	21.8	35.5	48.3
Merchant	1.7	-	1.8	1.8	1.7	3.4	3.6	1.6	1.9
Clerk	3.3	6.8	30.4	14.5	33.3	20.7	12.7	11.3	16.4
Regular workman	16.7	5.1	5.4	7.3	10.5	12.1	43.6	11.3	13.8
Artisan	3.3	8.5	8.9	18.2	8.8	10.3	18.2	30.6	13.4
Other	-	8.5	-	-	1.7	5.2	-	3.2	2.4
Total	100.0	100.1	100.1	99.9	99.9	99.9	99.9	99.9	99.9
N-no data	0	1	2	4	1	2	4	0	14
<u>Home Location Area Type</u> N	59	60	57	59	58	59	59	61	472
Percentage:									
Rural	-	-	7.0	-	50.0	-	-	-	7.0
Town	45.8	100.0	92.9	83.0	50.0	100.0	-	52.5	65.5
Urban	54.2	-	-	17.0	-	-	100.0	47.6	27.5
Total	100.0	100.0	99.9	100.0	100.0	100.0	100.0	100.0	100.0
N-no data	1	0	1	0	0	1	0	1	4
<u>Number of Rooms in Home</u> N	59	59	57	53	57	58	59	62	464
Percentage:									
One	32.2	47.5	5.3	15.1	31.6	41.4	40.7	51.6	33.6
Two	35.6	32.2	78.9	41.5	54.4	43.1	37.3	30.6	44.0
Three	27.1	11.9	10.5	28.3	12.3	12.1	15.2	12.9	16.2
Four	3.4	5.1	5.3	11.3	1.7	3.4	6.8	4.8	5.2
More than four	1.7	3.4	-	3.8	-	-	-	-	1.1
Total	100.0	100.1	100.0	100.0	100.0	100.0	100.0	99.9	100.1
N-no data	1	1	1	6	1	2	0	0	12
Mean	2.08	1.85	2.16	2.47	1.84	1.78	1.88	1.71	1.96
Std. Dev.	1.00	1.05	0.59	1.01	0.70	0.80	0.91	0.88	0.90
Range	1-6	1-5	1-4	1-5	1-4	1-4	1-4	1-4	1-6

Table 7 (Continued)

DATA CATEGORY	LOCATION								
	Megrine	El Alia	Sedjenane	Testour	Nefza	Bou Arada	Ham-mamet	Dar Chaabane	All Control Centers
<u>Number of Windows in Home</u> N	59	49	57	52	57	55	57	59	445
Percentage:									
None	5.1	12.2	-	5.8	-	1.8	-	3.4	3.4
One	30.5	30.6	3.5	11.5	28.1	34.5	31.6	23.7	24.3
Two	28.8	20.4	75.4	15.4	56.1	45.4	12.3	28.8	35.7
Three	18.6	16.3	12.3	17.3	12.3	9.1	17.5	20.3	15.5
Four	8.5	6.1	7.0	34.6	3.5	5.4	19.3	11.9	11.9
More than four	8.5	14.3	1.7	15.4	-	3.6	19.3	11.8	9.2
Total	100.0	99.9	99.9	100.0	100.0	99.8	100.0	99.9	100.0
N-no data	1	11	1	7	1	5	2	3	31
Mean	2.25	2.33	2.30	3.36	1.91	1.94	3.09	2.66	2.48
Std. Dev.	1.46	2.01	0.80	2.05	0.74	1.10	2.02	1.88	1.64
Range	0-6	0-10	1-6	0-11	1-4	0-6	1-9	0-11	0-11
<u>Home Facilities</u> N	60	57	57	58	55	60	56	62	465
Percentage with:									
None of the following	-	3.5	-	-	7.3	3.3	1.8	1.6	2.2
Electricity	98.3	56.1	86.0	79.3	41.8	70.0	69.6	85.2	73.5
Running water	98.3	80.7	78.9	75.9	43.6	80.0	53.6	70.5	72.9
Cook stove	81.7	54.4	87.7	51.7	50.9	60.0	75.0	83.6	68.2
Refrigerator	11.7	7.0	5.3	20.7	7.3	5.0	10.7	13.1	10.1
Radio	76.7	75.4	75.4	89.6	89.1	80.0	82.1	72.1	79.8
Television	6.5	21.0	36.8	50.0	43.6	36.7	44.6	41.0	43.7
All of the above	10.0	5.3	1.7	19.0	7.3	3.3	8.9	6.4	7.7
N-no data	0	3	1	1	3	0	3	0	11
<u>Home Ownership</u> N	60	60	58	55	58	59	58	62	470
Percentage:									
Owned by husband, wife	51.7	91.7	67.2	65.4	69.0	61.0	31.0	33.9	58.7
Owned by other family member	10.0	3.3	12.1	3.6	3.4	10.2	29.3	59.7	16.8
Rented	35.0	5.0	20.7	25.4	19.0	23.7	39.7	6.4	21.7
Furnished by employer	3.3	-	-	3.6	8.6	3.4	-	-	2.3
Other	-	-	-	1.8	-	1.7	-	-	0.4
Total	100.0	100.0	100.0	99.8	100.0	100.0	100.0	100.0	99.9
N-no data	0	0	0	4	0	1	1	0	6

Table 7 (Continued)

DATA CATEGORY	LOCATION								
	Magrine	El Alia	Sedje-nane	Testour	Nefza	Bou Arada	Ham-mamet	Dar Chaabane	All Control Centers
Distance to MCH Center N	60	60	58	58	58	60	59	62	475
Percentage:									
1 kilometer or less	50.0	98.3	100.0	87.9	79.3	100.0	49.1	95.2	82.5
1-2 kilometers	48.3	1.7	-	12.1	6.9	-	30.5	1.6	12.6
2-3 kilometers	1.7	-	-	-	8.6	-	15.2	1.6	3.4
3-4 kilometers	-	-	-	-	-	-	1.7	1.6	0.4
4-5 kilometers	-	-	-	-	-	-	1.7	-	0.2
Greater than 5 kilometers	-	-	-	-	5.2	-	1.7	-	0.9
Total	100.0	100.0	100.0	100.0	100.0	100.0	99.9	100.0	100.0
N-no data	0	0	0	1	0	0	0	0	1
Family's Judged Economic Status N	60	60	56	58	58	60	59	62	473
Percentage judged:									
Superior (1)	3.3	1.7	3.6	3.4	1.7	1.7	6.8	1.6	3.0
Good (2)	5.0	20.0	25.0	5.2	31.0	18.3	18.6	24.2	18.4
Average (3)	26.7	40.0	35.7	25.9	39.7	28.3	27.1	37.1	32.6
Poor (4)	21.7	25.0	30.4	43.1	19.0	23.3	28.8	33.9	28.1
Very low (5)	43.3	13.3	5.4	22.4	8.6	28.3	18.6	3.2	18.0
Total	100.0	100.0	100.1	100.0	100.0	99.9	99.9	100.0	100.1
N-no data	0	0	2	1	0	0	0	0	3
Mean	3.97	3.28	3.09	3.76	3.02	3.58	3.34	3.13	3.40
Std. Dev.	1.10	0.99	0.96	0.98	0.96	1.14	1.18	0.88	1.07
Range	1-5	1-5	1-5	1-5	1-5	1-5	1-5	1-5	1-5

Table 8

Comparison of Experimental and Control Groups
or Judged Socioeconomic Status (SES)

		Experimental Group	Control Group
	N	447	473
Judged Socioeconomic Status (SES)	Mean	3.54 (lower)	3.40 (higher)
(1 = high; 5 = low)	Standard deviation	1.02	1.07
	F ratio		1.10
	t ratio		2.05*

*Significant at the .05 level of probability.

Comparison on Food Consumption Criterion Variables

The child's and mother's food consumption data are shown for each study location and for the overall experimental and control groups in Tables 9 through 12. The overall experimental and control groups were compared on the basis of the child's and mother's diet ratings through application of "t" and "F" ratio techniques. No significant differences were found.

Data reporting foods eaten and foods required by children and by mothers were examined for consistency of direction of group differences. For example, consumption of vegetables by children favors the control group (49.9 versus 42.7 percent) as does the percentage of children requiring vegetables in their diet (54.5 versus 56.2 percent). Consistency in children's consumption of and need for fruits and SAHA (the Tunisian government's weaning food) favor the experimental group (8.8 versus 6.3 percent consumption of fruits, 70.9 versus 81.1 percent need for fruits; 17.3 versus 10.8 percent consumption of SAHA, and 27.2 versus 40.7 percent need for SAHA). But, only for the SAHA measures is there a consistent statistically significant difference between the experimental and control groups when the data are tested by the Chi-square technique. The difference in consumption of SAHA is significant at the .01 level of probability; the difference in need for SAHA is significant at the .001 level of probability. Thus, there is some indication that the experimental condition may have influenced the mothers' behavior to feed SAHA to their young children. /

Consistent differences between the mothers' consumption and their requirement for certain foods were found in favor of the experimental group for vegetables (82.8 versus 77.4 percent consumption), (20.8 versus 28.7 percent need) and for fruit (21.5 versus 13.2 percent consumption), (67.9 versus 81.0 percent need) and in favor of the control group for eggs (15.8 versus 10.6 percent consumption), (11.3 versus 14.2 percent need) and for milk and milk products (69.7 versus 69.1 percent consumption), (36.0 versus 37.7 percent need). When tested by Chi-square these differences proved significant for vegetables (at the .05 level of significance for consumption, the .01 level for need) and for fruit (the .01 level of significance for consumption, .001 level for need). There is some potential that the experimental condition may have contributed to a greater consumption of fruits and vegetables by the experimental group mothers than by the control group mothers.

The demonstrated lack of consistency of better food consumption on the part of the experimental group children and mothers was not unexpected due to the following factors:

- ✓ The educational component was not sufficiently strong in the experimental centers to create a real difference between these and the control centers. As shown in Table 13, there was not a strong group difference in terms of educational exposure in the MCH centers. Selection of a mother/child combination for the study tended to initiate at least one nutrition education

/ As indicated by Carver (1978), sample size such as attained in this study for the total experimental and control groups can lead to overinterpretation of trivial results as "significant" or important when they are results which would rarely be replicated when sampling from the same population again. Therefore, extreme caution has been taken to avoid overinterpretation of results here.

Table 9

Child's Diet Information by Location
Experimental MCH Centers

DATA CATEGORY	LOCATION								
	La Marse	Bizerte	Menzel Bourguiba	Medjez El Bab	Béja	Siliana	Nabeul	Soliman	All Experi- mental Centers
Child's Diet Rating N	39	52	53	54	53	53	56	58	418
Percentage:									
Very Poor (1)	10.3	-	5.7	11.1	1.9	17.0	8.9	6.9	7.7
Poor (2)	53.8	26.9	35.8	55.6	71.7	54.7	41.1	50.0	48.5
Moderately good (3)	33.3	44.2	47.2	18.5	24.5	18.9	33.9	29.3	31.1
Good (4)	2.5	21.1	11.3	14.8	1.9	9.4	14.3	12.1	11.2
Excellent (5)	-	7.7	-	-	-	-	1.8	1.7	1.4
Total	99.9	99.9	100.0	100.0	100.0	100.0	100.0	100.0	99.9
N-no data	13	5	4	6	6	4	8	2	48
Mean	2.28	3.10	2.64	2.37	2.26	2.21	2.59	2.52	2.50
Std. Dev.	0.69	0.89	0.76	0.87	0.52	0.84	0.91	0.86	0.85
Range	1-4	2-5	1-4	1-4	1-4	1-4	1-5	1-5	1-5
Percentage eating:									
Vegetables	25.6	51.9	49.1	47.2	24.1	45.3	53.6	40.7	42.7
Fruits	2.6	27.4	5.8	7.5	3.7	13.2	5.4	3.8	8.8
Legumineuses	10.5	-	3.9	2.0	7.4	1.9	14.5	9.4	6.2
Eggs	10.3	12.5	15.7	8.0	3.8	3.9	26.4	7.7	11.1
Milk or milk products	97.4	94.2	86.8	88.5	96.3	69.8	94.6	96.3	90.3
Weaning food (SAHA)	5.4	25.5	22.0	8.0	15.4	22.0	18.9	18.2	17.3
Percentage requiring: N	39	48	53	54	56	52	56	58	416
Nothing--diet is good	-	25.0	9.4	14.8	1.8	11.5	1.8	12.1	9.6
Vegetables	79.5	50.0	49.0	46.3	66.1	61.5	51.8	51.7	56.2
Fruits	87.2	60.4	67.9	68.5	71.4	67.3	89.3	58.6	70.9
Legumineuses	46.1	-	17.0	25.9	19.6	32.7	25.0	12.1	21.6
Eggs	74.3	27.1	43.4	66.7	66.1	67.3	48.2	60.3	56.5
Milk or milk products	28.2	-	13.2	11.1	7.1	28.8	26.8	10.3	15.4
Cereal or grain	7.7	2.1	-	1.8	1.8	-	3.6	3.4	2.4
Weaning food (SAHA)	35.9	16.7	13.2	16.7	44.6	19.2	21.4	48.3	27.2
All of the above	-	-	-	-	-	-	-	1.7	0.2

Table 10
Child's Diet Information by Location
Control MCH Centers

DATA CATEGORY	LOCATION								
	Megrine	El Alia	Sedje- nane	Testour	Nefza	Bou Arada	Ham- mamet	Dar Chaabane	All Control Centers
<u>Child's Diet Rating</u> N	53	57	36	57	41	58	53	58	413
<u>Percentage:</u>									
Very Poor (1)	9.4	14.0	5.6	7.0	9.8	15.5	-	-	7.7
Poor (2)	47.2	63.2	52.8	73.7	56.1	65.5	20.7	22.4	50.1
Moderately good (3)	34.0	17.5	33.3	12.3	26.8	8.6	49.1	46.5	28.1
Good (4)	7.5	5.3	8.3	7.0	7.3	10.3	28.3	27.6	13.1
Excellent (5)	1.9	-	-	-	-	-	1.9	3.4	1.0
Total	100.0	100.0	100.0	100.0	100.0	99.9	100.0	99.9	100.0
N-no data	7	3	22	2	17	2	6	4	63
Mean	2.45	2.14	2.44	2.19	2.32	2.14	3.11	3.12	2.49
Std. Dev.	0.84	0.72	0.73	0.67	0.76	0.80	0.75	0.80	0.85
Range	1-5	1-4	1-4	1-4	1-4	1-4	2-5	2-5	1-5
<u>Percentage eating:</u>									
Vegetables	44.2	46.4	52.9	45.6	40.5	58.6	56.1	52.5	49.9
Fruits	5.8	7.1	5.9	3.4	2.4	8.8	5.3	10.2	6.3
Legumineuses	19.6	3.7	14.7	-	7.3	19.0	12.3	37.9	14.7
Eggs	17.6	14.8	38.7	19.0	21.9	16.4	23.6	33.9	22.5
Milk or milk products	92.3	85.7	91.2	84.5	97.6	86.2	96.5	98.3	91.3
Weaning food (SAHA)	7.5	11.5	9.1	15.8	15.0	3.4	19.6	5.2	10.8
<u>Percentage requiring: N</u>									
Nothing--diet is good	3.8	1.7	2.8	6.9	4.8	-	11.1	3.3	4.3
Vegetables	62.3	65.5	57.1	51.7	64.3	48.3	38.9	51.7	54.5
Fruits	90.6	81.0	94.3	62.1	71.4	87.9	79.6	85.0	81.1
Legumineuses	26.4	27.6	20.0	36.2	28.6	51.7	1.8	3.3	24.6
Eggs	60.4	63.8	54.3	65.5	73.8	75.9	37.0	31.7	57.4
Milk or milk products	26.4	12.1	40.0	25.9	30.9	39.6	9.7	23.3	25.1
Cereal or grain	9.4	1.7	8.6	-	4.8	12.1	5.5	8.3	6.2
Weaning foods (SAHA)	52.8	27.6	51.4	29.3	64.3	44.8	42.6	25.0	40.7
All of the above	1.9	-	-	-	-	-	-	-	0.2

Table 11

Mother's Diet Information by Location
Experimental MCH Centers

DATA CATEGORY	LOCATION								
	La Marsa	Bizerte	Menzel Bourguiba	Medjez El Bab	Béja	Siliana	Nabeul	Soliman	All Experi- mental Centers
Mother's Diet Rating N	38	52	50	52	54	54	55	59	414
Percentage:									
Very poor (1)	28.9	3.8	16.0	23.1	13.0	42.6	9.1	16.9	18.8
Poor (2)	34.2	25.0	54.0	44.2	74.1	38.9	47.3	25.4	43.0
Moderately good (3)	34.2	28.8	24.0	25.0	9.3	9.3	23.6	32.2	22.9
Good (4)	2.6	32.7	4.0	7.7	3.7	9.3	18.2	25.4	13.5
Excellent (5)	-	9.6	2.0	-	-	-	1.8	-	1.7
Total	99.9	99.9	100.0	100.0	100.1	100.1	100.0	99.9	99.9
N-no data	14	5	7	8	5	3	9	1	52
Mean	2.11	3.19	2.22	2.17	2.04	1.85	2.56	2.66	2.36
Std. Dev.	0.86	1.05	0.84	0.88	0.61	0.94	0.96	1.04	0.99
Range	1-4	1-5	1-5	1-4	1-4	1-4	1-5	1-4	1-5
Percentage eating:									
Vegetables	46.2	96.2	83.0	84.6	83.0	80.0	81.8	96.6	82.8
Fruits	-	62.3	5.7	13.5	1.9	25.4	23.6	32.8	21.5
Legumineuses	23.1	7.7	9.4	3.9	13.5	7.3	33.3	27.1	15.7
Eggs	15.0	13.2	5.7	9.6	3.9	7.5	14.8	10.2	10.6
Milk or milk products	61.5	80.8	79.2	70.6	81.1	49.1	63.6	66.1	69.1
Percentage requiring: N	39	48	54	50	54	55	55	59	414
Nothing--diet is good	-	37.5	3.7	8.0	3.7	7.3	1.8	23.7	10.9
Vegetables	53.8	8.3	14.8	20.0	22.2	18.2	32.7	5.1	20.8
Fruits	89.7	18.7	83.3	80.0	70.4	70.9	80.0	52.5	67.9
Legumineuses	48.7	2.1	5.5	-	22.2	3.6	12.7	10.2	12.1
Eggs	20.5	8.3	1.8	2.0	24.1	9.1	18.2	28.8	14.2
Milk or milk products	43.6	27.1	24.1	28.0	22.2	47.3	63.6	44.1	37.7
Cereal or grain	2.6	-	-	-	-	3.6	1.8	3.4	1.4
Meat, fish or poultry	69.2	22.9	68.5	68.0	63.0	76.4	36.4	23.7	52.9
All of the above	-	-	-	-	-	-	1.8	-	0.2

Table 12

Mother's Diet Information by Location
Control MCH Centers

DATA CATEGORY	LOCATION									
	Megrine	El Alia	Sedje- nane	Testour	Nefza	Bou Arada	Ham- mamet	Dar Chaabane	All Control Centers	
Mother's Diet Rating N	52	57	53	53	55	56	55	56	437	
<u>Percentage:</u>										
Very poor (1)	17.3	12.3	13.2	13.2	16.4	17.9	7.3	1.8	12.4	
Poor (2)	42.3	59.6	49.1	66.0	61.8	48.2	32.7	12.5	46.4	
Moderately good (3)	32.7	19.3	34.0	17.0	14.5	26.8	43.6	44.6	29.1	
Good (4)	7.7	8.8	3.7	3.8	5.4	5.3	14.5	23.2	9.1	
Excellent (5)	-	-	-	-	1.8	1.8	1.8	17.9	3.0	
Total	100.0	100.0	100.0	100.0	99.9	100.0	99.9	100.0	100.0	
N-no data	8	3	5	6	3	4	4	6	39	
Mean	2.31	2.25	2.28	2.11	2.14	2.25	2.71	3.43	2.44	
Std. Dev.	0.85	0.79	0.74	0.67	0.83	0.88	0.87	0.99	0.93	
Range	1-4	1-4	1-4	1-4	1-5	1-5	1-5	1-5	1-5	
<u>Percentage eating:</u>										
Vegetables	71.7	85.7	62.3	96.8	61.4	89.3	82.5	78.9	77.4	
Fruits	13.2	10.7	3.8	1.9	14.0	7.1	12.5	40.3	13.2	
Legumineuses	41.2	10.9	43.4	1.9	26.3	38.2	34.5	53.6	31.3	
Eggs	5.7	12.7	7.7	18.9	5.3	9.1	21.4	44.6	15.8	
Milk or milk products	73.6	71.4	58.5	79.3	70.2	75.0	61.4	68.4	69.7	
<u>Percentage requiring: N</u>										
Nothing--diet is good	53	60	54	53	55	55	55	57	442	
Vegetables	1.9	5.0	1.8	3.8	-	-	5.4	22.8	5.2	
Fruits	56.6	18.3	33.3	13.2	40.0	25.4	27.3	17.5	28.7	
Legumineuses	83.0	85.0	92.6	90.6	76.4	90.9	74.5	56.1	81.0	
Eggs	34.0	8.3	14.8	1.9	25.4	30.9	7.3	5.3	15.8	
Milk or milk products	32.1	13.3	5.5	1.9	16.4	12.7	5.4	3.5	11.3	
Cereal or grain	30.2	30.0	40.7	22.6	34.5	36.4	47.3	45.6	36.0	
Meat, fish or poultry	1.9	-	-	-	-	-	-	-	0.2	
All of the above	56.6	61.7	75.9	75.5	83.6	78.2	29.1	7.0	58.1	
	-	-	-	-	-	-	-	-	-	

Table 13

Nutrition Instruction to Mothers in the MCH Center
by Study Design Condition

DATA CATEGORY	STUDY DESIGN CONDITION		
	All Experi- mental MCH Centers	All Control MCH Centers	
<u>Number of visits to the MCH Center</u>	N	447	452
	Mean	2.64	1.74
	Std. Dev.	2.05	1.08
	Range	1-8	1-10
	N-no data	19	24
<u>Number of nutrition lessons given to the mother</u>	N	466	476
	Mean	2.02	1.16
	Std. Dev.	2.16	0.59
	Range	0-12	0-6
	N-no data	0	0
<u>Percent of mothers receiving instruction in:</u>	N	466	476
Fruits and vegetables		75.8	58.8
Legumineuses		60.5	45.2
Eggs		69.9	60.5
Breastfeeding		44.4	32.1
Feeding babies		66.1	17.6
Milk		55.8	36.8
Balanced diet		45.1	25.4
Exposure to the sun		62.4	37.8
Other information		32.4	20.2

session for the mother. Also, it was not possible to control on the basis of education prior to initiation of the study. Records had not been kept of educational activities with the mothers; after-the-fact verbal reports are exceedingly unreliable.

- ✓ As shown in Table 14, the potential for exposure to radio was not the same for all mothers, but this variation was not associated with the study group assignment.

Thus, groups were defined *ex post facto* on the basis of exposure to the radio messages and to the nonformal nutrition education given in the MCH centers. Exposure to the educational component, i.e., the nonformal education condition, was defined as: at least two educational sessions. Exposure to the radio component was defined by: a radio in the home and the mother's report that she listens to the radio every day. These two conditions formed four treatment groups defined as: Radio and Nonformal Education (Both Radio and NFE), Radio Only, Nonformal Education Only (NFE Only), and Neither Nonformal Education nor Radio (Neither NFE nor Radio).

The child's and mother's diet data were compiled on the basis of these four groups with the results presented in Tables 15 and 16. On both diet rating measures, the Radio Only group appears to have a better diet than any of the other groups, with the Both Radio and NFE condition the second best. Tests of mean differences on these measures, presented in Tables 17 and 18, demonstrate the superiority of the Radio Only and the Both Radio and NFE groups. However, rather than draw a false conclusion that exposure to the radio alone or in combination with nonformal education was actually effecting improved food consumption, other variables were examined to identify what relationships they bear to the reported food consumption patterns. The following variables were included in this exploration:

- ✓ Distance of the MCH center from Tunis--the closer to Tunis the more desirable the assignment; better qualified MCH personnel tend to be located closer to Tunis.
- ✓ Mother's educational level.
- ✓ Highest level of education within the immediate family.
- ✓ Socioeconomic status--the judged SES level.
- ✓ Child's diet rating, as valued on the basis of the food consumption report.
- ✓ Mother's diet rating, as valued on the basis of the food consumption report.

This set of data was available on 686 of the total 942 mother-child combinations included in the interview data. Correlations were made among these variables with the results shown in Table 19, indicating that the SES level and the mother's educational level appear to contribute more heavily than any of the other variables to the child's and the mother's diet ratings. A correlation of $-.359$ is found between the mother's diet rating and the SES level; a correlation of $-.237$ is found between the child's diet rating and

Table 14
 Mothers Reported Radio Listening Patterns

DATA CATEGORY	STUDY DESIGN CONDITION		
	All Experi- mental MCH Centers	All Control MCH Centers	
Have a radio at home	N	466	476
	% Yes	76.8	83.6
	N-no data	0	0
Listen to the radio somewhere else	N	446	463
	% Yes	33.4	32.4
	N-no data	20	13
How often listen to the radio?	N	403	435
Percentage reporting:			
Every day		58.8	64.8
Almost every day		28.3	20.9
Several times a week		4.7	6.0
Several times a month		0.5	0.5
Very seldom		5.5	6.0
Never		2.2	1.8
Time of day listen to the radio	N	398	410
Percentage reporting:			
All day		13.3	11.6
Early morning		18.4	20.2
Midmorning		19.9	16.7
Midday		13.0	13.7
Afternoon		16.6	13.0
Early evening		7.6	10.9
Late evening		9.1	11.9

Table 15

Child's Diet Information by Treatment Condition

DATA CATEGORY	STUDY DESIGN CONDITION		RADIO AND NONFORMAL EDUCATION (NFE) CONDITION				
	All Experimental MCH Centers	All Control MCH Centers	Both Radio and NFE	Radio Only	NFE Only	Neither NFE nor Radio	
Child's Diet Rating	N	418	413	128	321	108	263
Percentage:							
Very poor (1)		7.7	7.7	6.2	5.6	13.0	9.1
Poor (2)		48.6	50.1	50.0	42.7	45.4	58.6
Moderately good (3)		31.1	28.1	32.0	34.0	29.6	22.8
Good (4)		11.2	13.1	11.7	16.2	10.2	8.4
Excellent (5)		1.4	1.0	-	1.6	1.8	1.1
Total		100.0	100.0	99.9	100.1	100.0	100.0
N-no data		48	63	11	46	16	36
Mean		2.50	2.49	2.49	2.65	2.43	2.34
Std. Dev.		0.85	0.85	0.78	0.87	0.91	0.80
Range		1-5	1-5	1-4	1-5	1-5	1-5
Percent eating:							
Vegetables		42.7	49.9	48.8	50.0	46.2	41.1
Fruits		8.8	6.3	10.1	9.4	5.7	5.0
Legumineuses		6.2	14.7	11.0	12.5	8.5	8.6
Eggs		11.1	22.5	8.9	23.0	17.5	13.4
Milk		90.3	91.3	88.4	93.8	83.8	91.2
SAHA		17.3	10.8	18.7	11.2	19.8	12.4
Percent requiring:	N	416	418	129	323	107	263
Nothing, diet is good		9.6	4.3	7.7	9.0	5.6	4.6
Vegetables		56.2	54.5	50.4	52.6	57.9	60.1
Fruits		70.9	81.1	73.6	74.6	82.2	76.4
Legumineuses		21.6	24.6	24.0	20.1	25.2	26.2
Eggs		56.5	57.4	59.7	51.4	57.9	62.0
Milk and milk products		15.4	25.1	17.8	19.8	22.4	21.3
Cereal or grain		2.4	6.2	4.6	4.0	3.7	4.9
Meat, fish, or poultry		27.2	40.7	31.0	33.7	25.2	39.2
All of the above		0.2	0.2	0.8	-	-	0.4

Table 16

Mother's Diet Information by Treatment Condition

DATA CATEGORY	STUDY DESIGN CONDITION		RADIO AND NONFORMAL EDUCATION (NFE) CONDITION				
	All Experi- mental MCH Centers	All Control MCH Centers	Both Radio and NFE	Radio Only	NFE Only	Neither NFE nor Radio	
Mother's Diet Rating	N	414	437	129	328	111	272
Percentage:							
Very poor (1)		18.8	12.4	9.3	9.8	25.2	20.6
Poor (2)		43.0	46.4	49.6	40.2	44.1	48.5
Moderately good (3)		22.9	29.1	27.9	29.9	19.8	23.5
Good (4)		13.5	9.1	12.4	15.2	10.8	6.2
Excellent (5)		1.7	3.0	0.8	4.9	-	1.1
Total		99.9	100.0	100.0	100.0	99.9	99.9
N-no data		52	39	10	39	13	27
Mean		2.36	2.44	2.46	2.65	2.16	2.19
Std. Dev.		0.99	0.93	0.86	1.01	0.93	0.87
Range		1-5	1-5	1-5	1-5	1-4	1-5
Percent eating:							
Vegetables		82.8	77.4	82.3	81.8	79.6	77.2
Fruits		21.5	13.2	19.4	22.4	10.6	12.4
Legumineuses		15.7	31.3	23.4	29.5	18.0	19.0
Eggs		10.6	15.8	14.8	18.0	11.8	7.3
Milk or milk products		69.1	69.7	76.1	73.4	58.9	66.1
Percent requiring:	N	414	442	131	328	112	274
Nothing, diet is good		10.9	5.2	7.6	11.3	5.3	4.7
Vegetables		20.8	28.7	25.2	21.6	33.0	24.4
Fruits		67.9	81.0	74.8	70.1	79.5	78.1
Legumineuses		12.1	15.8	9.9	13.7	15.2	15.3
Eggs		14.2	11.3	12.2	9.7	16.1	15.7
Milk and milk products		37.7	36.0	31.3	33.8	43.7	40.1
Cereal or grain		1.4	0.2	0.8	0.3	0.9	1.4
Meat, fish, or poultry		52.9	58.1	53.4	50.3	55.3	63.1
All of the above		0.2	-	-	-	-	0.4

Table 17

Comparison of Treatment Subgroups on Child's Diet Rating †

DATA CATEGORY		RADIO AND NONFORMAL EDUCATION (NFE) CONDITION			
		Both Radio and NFE	Radio Only	NFE Only	Neither NFE nor Radio
	N	128	321	108	263
	Mean	2.49	2.65	2.43	2.34
	Std. Dev.	0.78	0.87	0.91	0.80
Both Radio & NFE	F-Ratio	-	1.24 N.S.	1.36*	1.05 N.S.
	t-Ratio	-	1.81 N.S.	0.54 N.S.	1.75 N.S.
Radio Only	F-Ratio	-	-	1.09 N.S.	1.18 N.S.
	t-Ratio	-	-	2.24*	4.43***
NFE Only	F-Ratio	-	-	-	1.29*
	t-Ratio	-	-	-	0.94 N.S.

Table 18

Comparison of Treatment Subgroups on Mother's Diet Rating †

DATA CATEGORY		RADIO AND NONFORMAL EDUCATION (NFE) CONDITION			
		Both Radio and NFE	Radio Only	NFE Only	Neither NFE nor Radio
	N	129	328	111	272
	Mean	2.46	2.65	2.16	2.19
	Std. Dev.	0.86	1.01	0.93	0.87
Both Radio & NFE	F-Ratio	-	1.38*	1.17 N.S.	1.02 N.S.
	t-Ratio	-	1.88 N.S.	2.58*	2.91**
Radio Only	F-Ratio	-	-	1.18 N.S.	1.35**
	t-Ratio	-	-	4.50***	5.90***
NFE Only	F-Ratio	-	-	-	1.14 N.S.
	t-Ratio	-	-	-	0.30 N.S.

† Diet rated on a scale of 1 to 5; 1 = Very poor diet; 5 = Excellent diet.
The higher the score the better the diet.

N.S. = Not significant

* = Significant at the .05 level

** = Significant at the .01 level

*** = Significant at the .001 level

Table 19

Correlations Between Selected Variables and
Child's and Mother's Diet Ratings (N = 686)

	Distance, MCH Center to Tunis	Mother's Educational Level	Family's Highest Educational Level	S.E.S. Rating	Child's Diet Rating	Mother's Diet Rating
Mean	58.72	1.00	2.38	3.49	2.51	2.44
Standard Deviation	25.15	1.32	1.47	1.04	.85	.94
CORRELATIONS						
Distance, MCH center, to Tunis	-	.004	.018	-.087	-.009	-.053
Mother's Educational Level	.004	-	.374	-.351	.228	.311
Family's Highest Educational Level	.018	.374	-	-.351	.116	.151
SES Rating	-.087	-.351	-.351	-	-.237	-.359
Child's Diet Rating	-.009	.228	.116	-.237	-	.492
Mother's Diet Rating	-.053	.311	.151	-.359	.492	-

Table 20

Mean SES, Educational Level, and Diet Scores
by Radio and Nonformal Education Condition

OBSERVED MEAN VALUES	Both Radio and NFE	Radio Only	NFE Only	Neither NFE nor Radio
<u>Mother's Education</u>	0.97	1.32	0.81	0.71
SES (Rating of 1 to 5; 1 = Superior, 5 = Very low)	3.63	3.10	3.71	3.75
<u>Mother's Diet</u> (Rating of 1 to 5; 1 = Very poor, 5 = Excellent)	2.46	2.65	2.16	2.19
<u>Child's Diet</u> (Rating of 1 to 5; 1 = Very poor, 5 = Excellent)	2.49	2.65	2.43	2.34

the SES level. The comparable correlations between the mother's and child's diet ratings and the mother's educational level are .311 and .228, respectively.

The demonstrated association of diet ratings with both SES level and the mother's educational level has some important implications for interpretation of the study data. It indicates, for instance, that if one treatment group differs from the other treatment groups in mean SES and/or mean mother's educational level, then diet scores may differ without regard to the type or amount of exposure to nonformal education or radio. A comparison of the four treatment subgroups on the relevant variables is presented in Table 20. From these data, it is evident that the Both Radio and NFE, the NFE Only, and the Neither NFE nor Radio groups are relatively comparable on mother's education (values of .97, .81, and .71 respectively). The mean value for the Radio Only group is 1.32.

For SES level, the disparity between the Radio Only group and the other three groups is even more pronounced, and the other three groups even more comparable. The Radio Only group demonstrates a higher socioeconomic status than the other three groups (a value of 3.10 for the Radio Only group versus values of 3.63, 3.71, and 3.75 for the other three groups).

Reasons for the demonstrated differences in the treatment subgroups are not clear, but may involve selection bias occurring at the MCH centers and operating in the following manner:

- ✓ Mothers with relatively higher educational and SES levels tend not to receive nonformal nutrition education because the clinic workers do not view them as most in need of education.
- ✓ Mothers with relatively lower educational and SES levels do not receive nonformal nutrition education because the clinic workers do not view these mothers as equally receptive to the education as some others not having the adequate resources (intellectual and/or financial) to put the education to practical application.

Whatever the reason(s) for the disparate SES score and educational level of the Radio Only group, one would expect the diet scores for this group to be higher than for the other groups because of those factors. This result is assured by the observed correlations among the diet scores, the SES level, and the educational level. Given the possible selection bias and the unique SES and educational attributes of the Radio Only group, caution must be exercised in ascribing differences among the groups to treatment conditions.

Comparison of Mother's Food Knowledges, Attitudes, and Behaviors

The questionnaire contained a variety of questions relating to the mother's exposure to the messages and her knowledges and attitudes and changes in knowledges and attitudes about foods relevant to the series of educational objectives established for the program. These questions also addressed food behaviors other than those examined through the food consumption data.

Exposure to the Media. One series of questions collected data from the mother to report her exposure to the media. These responses are presented by treatment condition (experimental versus control group and the four radio and nonformal education subgroups) in Table 21. The most interesting data reported in Table 21 relate to the rate at which the mothers were able to identify Dr. Hakim as the person delivering the message and to identify the Nutrition Institute as the responsible source of the message. About 88 percent of the mothers identified Dr. Hakim by name when asked who delivered the message. Experimental group mothers were significantly more likely to identify Dr. Hakim than were control group mothers. (Chi-square was significant at the .001 level of probability.) No significant differences in the rate of identification of Dr. Hakim were found associated with the nonformal education and radio subgroups.

Although the target population had not had prior exposure to the National Institute of Nutrition, the Institute's identification as the sponsor of the radio messages, repeated with each message broadcast, appears to have given the Institute good "visibility." Overall, about 39 percent of the mothers identified the Institute as the originator of the messages. However, about 56 percent of the mothers identified R.T.T. as responsible. When the radio and NFE subgroup data are examined, it is clear that the combination of radio and NFE leads to more frequent correct identification of the Nutrition Institute as the message developer and less frequent incorrect identification of R.T.T. than does exposure to the radio message alone. (Both of these comparisons create Chi-squares significant at the .01 level of probability.) It appears that adequate exposure to the radio messages plus nonformal education in the MCH center best supported awareness of the Nutrition Institute's role in the presentation of the messages.

In general, the mothers were unable to identify how long they had been hearing the nutrition messages. The messages had been broadcast for about five months at the time the interviews were held. A great majority of the mothers (better than 83 percent) reported that they had been hearing the messages for six months or more. Experimental group mothers were somewhat more accurate than control group mothers in setting the duration of time they had been hearing the messages. About 23 percent of the experimental group mothers stated they had heard the messages for five months or less as compared to 12 percent for the control group mothers. (This difference tested significant at the .001 level of probability.)

Lastly, the experimental group mothers more frequently reported that they had discussed the message content--most frequently with their husbands--than did the control group mothers. (Probability of less than .05.) Thus, in general, there is good reason to believe that the staff in the experimental MCH centers effectively did advise the mothers to listen to the radio broadcasts, as they were instructed. There is also good reason to believe that the mothers heeded this advice. And there are at least some preliminary indications that the combination of radio and NFE has potential for greater impact than radio or NFE alone.

Recall of Message Information. If there is evidence of positive acceptance of the messages on the part of the mothers, is there also evidence of positive knowledge impact of the message content? To search out the answer

Table 21

Mother's Report of Exposure to the Media
by Treatment Condition

DATA CATEGORY	STUDY DESIGN CONDITION		RADIO AND NONFORMAL EDUCATION (NFE) CONDITION				
	All Experi- mental MCH Centers	All Control MCH Centers	Both Radio and NFE	Radio Only	NFE Only	Neither NFE nor Radio	
<u>Advised in the MCH Center</u>	N	464	470	139	362	124	296
<u>to listen to the radio</u>	% Yes	42.9	37.2	52.5	36.7	46.0	35.1
<u>messages</u>	N-no data	2	6	0	5	0	3
<u>Percent reporting message</u>	N	388	404	132	360	86	205
<u>was delivered by:</u>							
A man		1.3	6.9	1.5	5.0	5.8	3.9
A woman		1.5	0.5	0.8	1.4	-	1.0
A doctor		3.6	4.7	4.5	3.9	5.8	3.9
Dr. Hakim		92.8	82.9	90.1	86.4	88.4	87.8
Identified male		0.8	3.7	0.8	2.8	-	1.9
Identified female		-	1.2	2.3	0.6	-	1.5
Other		-	-	-	-	-	-
Total		100.0	99.9	100.0	100.1	100.0	100.0
N-no data		78	72	7	7	38	94
<u>Percent reporting the</u>	N	278	328	108	264	74	152
<u>source of the message as:</u>							
National Institute of							
Nutrition		42.4	36.3	57.4	39.4	41.9	23.0
Vague nutrition institute		4.0	2.7	2.8	2.3	6.8	3.9
Radio (R.T.T.)		52.9	58.5	38.9	55.7	50.0	72.4
Another institution		-	1.2	-	1.1	-	0.7
Other		0.7	1.2	0.9	1.5	1.3	-
Total		100.0	99.9	100.0	100.0	100.0	100.0
N-no data		188	148	31	103	50	147
<u>Percent reporting</u>	N	290	348	116	290	79	146
<u>hearing the messages for:</u>							
1 month or less		0.7	1.7	-	0.3	5.1	2.0
2 months		2.8	2.6	0.9	2.1	5.1	4.1
3 months		2.8	2.0	1.7	2.1	5.1	2.0
4 months		13.8	5.2	6.0	9.0	12.7	10.3
5 months		2.8	0.6	3.4	1.4	-	0.7
6 months		7.2	2.6	6.9	4.5	6.3	2.7
More than 6 months		70.0	85.3	81.0	80.7	65.8	78.1
Total		100.1	100.0	99.9	100.1	100.1	99.9
N-no data		176	128	23	77	45	153

Table 21 (Continued)

DATA CATEGORY	STUDY DESIGN CONDITION		RADIO AND NONFORMAL EDUCATION (NFE) CONDITION				
	All Experimental MCH Centers	All Control MCH Centers	Both Radio and NFE	Radio Only	NFE Only	Neither NFE nor Radio	
<u>Percent reporting they discussed the radio messages</u>	N	422	456	139	364	107	257
	% Yes	71.1	63.4	79.9	74.4	61.7	53.3
<u>Percent reporting they discussed the radio messages with:</u>	N	303	289	110	274	66	138
Husband		71.9	49.1	69.1	65.7	48.5	49.3
Children		13.5	11.1	15.4	10.2	16.7	12.3
Older relatives		44.9	46.0	40.9	48.5	53.0	39.1
Friends, neighbors		39.3	49.5	49.1	42.3	53.0	41.3
MCH Center personnel		15.5	9.0	29.1	6.9	15.1	7.2
Other mothers at the MCH Center		18.5	13.5	29.1	9.8	24.2	13.8
Others		-	0.3	-	-	-	0.7

to this question, mothers were asked another series of open-ended questions about message content. In general, these data, presented in Table 22, are not reported in fine enough detail to associate the responses with specific content of the messages. One exception to this is the set of responses about breastfeeding and weaning practices. Detailed responses were recorded often enough in the breastfeeding and weaning categories to demonstrate that specific message content was being communicated even after only four or five months of message broadcast.

Mothers' Knowledges, Attitudes, and Behaviors and Changes Thereto. The questionnaire also addressed mothers' knowledges, attitudes, and reports of behavior concerning the specific objectives of the program through a variety of questions. These data are presented in Table 23 for the two sets of treatment groups. As expected, when food knowledge is compared with actual food consumption behavior, as reported through the food recall data, knowledge is better than behavior. However, there are some interesting patterns of response within the Table 23 data relevant to treatment conditions. For example, the responses to the first question relating to foods the mother feels she should feed her family indicate that the experimental group mothers' knowledge of proper foods tends to be greater than that for the control group. And the Both Radio and NFE group knowledge tends to be greater than that of the Radio Only group. Both of these are in contrast to the food consumption data and may demonstrate some potential for the nonformal education plus radio condition to overcome the socioeconomic status effect of the Radio Only group, given adequate time for the program. On other questions relating to whether the mother serves certain higher priced foods such as meat, fish, and eggs, the Radio Only group more frequently responds "yes," probably because of greater resources for purchase of these foods.

The data in Table 23 concerning exposure of the baby to the sun indicate that there has been good absorption of this concept by the mothers. Nearly all mothers in every treatment category recognize the need of the sun for the baby. There has been a strong campaign in the MCH centers to convince the mothers of this benefit. When the data reporting at what age the mother thinks the child should first be exposed to the sun are examined, the effect of the teaching through the MCH center and through the radio messages is evident in that mothers exposed to these conditions indicate an earlier date for exposure of the baby to the sun. For the Both Radio and NFE group, better than 70 percent of the mothers would expose the baby at three months or younger. This is contrasted with about only 56-57 percent of mothers not exposed to the radio message who would expose the baby at this young age. One important aspect of the messages about the sun developed by this study is very early exposure of the baby, i.e., within the first few weeks of life. It is apparent from the data that the radio message and the MCH center are effective on this point. There is essentially no difference with respect to exposure of the baby at one month or less among the three radio/NFE groups. For the aggregate group exposed to either or both conditions, about 19 percent of the mothers would expose the baby to the sun at one month of age or less. This is in contrast to the mothers in the Neither NFE nor Radio group of whom only 13.5 percent would expose the baby to the sun at this early age. (This difference is significant at the .05 level of probability when tested by Chi-square.)

Table 22

Mother's Recall of Radio Message Information

DATA CATEGORY	STUDY DESIGN CONDITION		RADIO AND NONFORMAL EDUCATION (NFE) CONDITION				
	All Experimental MCH Centers	All Control MCH Centers	Both Radio and NFE	Radio Only	NFE Only	Neither NFE nor Radio	
<u>Heard messages about</u>	N	431	461	137	367	110	267
<u>food purchase</u>	N-Yes	347	347	122	327	73	164
	% Yes	80.5	75.3	89.0	89.1	66.7	61.4
<u>Content of messages about</u>	N	345	342	123	325	73	158
<u>food purchase.</u>							
Percentage reporting:							
Fruits and vegetables		82.3	77.5	83.7	79.4	83.6	76.6
Legumincuses		55.4	58.8	65.8	59.4	57.3	45.6
Eggs		66.7	68.7	69.1	67.1	67.1	67.7
Proteins		67.8	71.0	74.0	71.1	63.0	65.8
Fruits		53.6	53.8	53.6	56.6	52.0	49.4
Other		15.4	10.8	24.4	10.8	8.2	10.7
<u>Heard messages about how</u>	N	428	457	138	363	109	264
<u>to feed the family</u>	N-Yes	328	315	113	312	66	145
	% Yes	76.6	68.9	81.9	85.9	60.5	54.9
<u>Content of messages about</u>	N	329	317	115	311	66	147
<u>feeding the family.</u>							
Percentage reporting:							
Fruits and vegetables		71.4	64.7	68.7	68.8	69.7	65.3
Legumincuses		55.3	64.0	63.5	64.9	62.1	44.9
Milk and milk products		72.9	72.9	79.1	74.3	69.7	66.7
Eggs		58.4	66.6	66.9	64.6	62.1	55.1
Proteins		62.0	62.3	70.4	65.3	62.1	55.1
Raw vegetables		43.8	49.5	54.8	47.3	45.4	39.4
Harmfulness of tea and coffee		46.5	47.6	54.8	44.0	51.5	44.9
Other		4.3	2.2	1.7	2.9	3.0	4.8
<u>Heard messages about</u>	N	414	456	135	362	102	260
<u>feeding children</u>	N-Yes	372	376	129	345	76	189
	% Yes	90.0	82.5	95.6	95.3	74.5	72.7

Table 22 (Continued)

DATA CATEGORY	STUDY DESIGN CONDITION		RADIO AND NONFORMAL EDUCATION (NFE) CONDITION				
	All Experimental MCH Centers	All Control MCH Centers	Both Radio and NFE	Radio Only	NFE Only	Neither NFE nor Radio	
<u>Content of messages about feeding children</u>	N	373	365	130	343	74	182
Percentage reporting:							
Fruits and vegetables		64.3	61.1	70.8	63.3	60.8	57.7
Milk and milk products		75.3	82.5	83.4	78.4	77.0	75.3
Legumineses		37.8	41.6	51.5	37.0	55.4	30.2
Eggs		64.9	70.4	68.5	65.9	75.7	66.5
Meat		56.9	55.3	57.7	54.2	62.2	55.5
SAHA		56.0	59.2	54.6	63.3	45.9	52.2
Other		1.9	4.9	6.1	2.9	1.3	3.3
<u>Heard messages about breastfeeding/weaning</u>	N	433	462	139	367	110	268
	N-Yes	366	387	134	343	77	190
	% Yes	84.5	83.8	96.4	93.5	70.0	70.9
<u>Content of messages about breastfeeding/weaning</u>	N	367	388	134	344	77	191
Percentage reporting:							
Mother's milk is better		82.6	91.9	85.1	82.3	77.9	81.1
Breastfed child is more affectionate		35.1	40.5	38.8	37.5	45.4	36.1
Color of breast milk is not important		19.1	26.5	25.5	23.2	26.0	19.9
Mother's milk protects the child		19.9	15.7	28.3	14.5	19.5	15.7
Mother's milk is natural		17.4	16.2	18.6	16.0	15.6	16.7
Mother's milk is hygienic		24.5	20.4	21.6	24.4	23.4	18.3
Weaning should be progressive/gradual		8.4	15.2	16.4	12.2	11.7	8.4
Other		1.9	3.3	2.2	2.3	6.5	1.6
<u>Heard messages about exposing the baby to the sun</u>	N	433	462	139	367	110	268
	N-Yes	375	404	133	351	83	202
	% Yes	86.6	87.4	95.7	95.6	75.4	75.4
<u>Content of messages about sun for babies</u>	N	372	401	133	348	80	202
Percentage reporting:							
Cover the head		66.4	54.9	62.4	63.8	56.2	54.4
The sun is good		53.8	54.9	63.9	51.1	68.7	48.0
Don't put baby to sleep in the sun		30.9	33.9	36.8	31.3	42.5	27.2
The sun gives vitamins		19.6	26.7	27.8	22.1	27.5	21.3
Good for the nerves		30.4	34.7	42.8	31.6	31.2	28.2
Good for the blood		18.3	25.7	24.1	23.3	20.0	19.3
Protects against illness		26.1	26.2	31.6	24.4	27.5	25.7
Other		7.3	4.2	5.3	4.6	10.0	5.9

Table 23

Mother's Nutrition Knowledge, Attitudes, and Practices
by Treatment Condition

DATA CATEGORY	STUDY DESIGN CONDITION		RADIO AND NONFORMAL EDUCATION (NFE) CONDITION			
	All Experimental MCH Centers	All Control MCH Centers	Both Radio and NFE	Radio Only	NFE Only	Neither NFE nor Radio
<u>GENERAL NUTRITION</u>						
<u>Foods mother feels she should feed family to keep them healthy</u> N	445	465	136	343	117	287
Percentage:						
Vegetables	89.0	83.7	89.0	87.5	86.3	85.4
Fruits	65.2	57.2	65.4	64.1	60.7	57.1
Legumineuses	38.2	31.8	45.6	35.6	39.3	29.6
Meat, fish and poultry	78.2	75.9	81.6	81.3	77.8	73.2
Milk or milk products	61.8	61.9	69.9	67.3	60.7	55.0
Eggs	52.8	53.8	66.2	57.1	50.4	46.0
Cereals	48.3	43.4	50.0	45.2	55.5	42.8
N-no data	19	11	3	24	7	12
<u>Number of meals mother says she should feed family daily</u> N	462	474	139	361	124	299
Percentage saying:						
Two	3.2	2.7	2.9	2.8	4.8	2.7
Three	78.1	82.3	77.7	77.8	82.3	84.6
Four	14.9	14.1	16.5	16.6	10.5	11.4
Five	3.7	0.8	2.9	2.8	2.4	1.3
Total	99.9	99.9	100.0	100.0	100.0	100.0
N-no data	4	2	0	6	0	0
<u>Number of meals mother says she does feed family daily</u> N	464	462	138	357	124	294
Percentage saying:						
One	0.2	-	-	-	-	0.3
Two	3.7	2.2	2.2	2.5	5.6	2.7
Three	79.3	82.7	77.5	77.3	83.9	86.7
Four	12.3	13.4	15.2	16.0	8.1	8.8
Five	3.9	1.5	5.1	3.1	2.4	1.4
Six	0.6	0.2	-	1.1	-	-
Total	100.0	100.0	100.0	100.0	100.0	99.9
N-no data	2	14	1	10	0	5
<u>VEGETABLES</u>						
<u>Mother feeds to the family</u> N	465	476	138	367	124	299
% Yes	87.7	89.5	93.5	94.0	79.8	83.6

Table 23 (Continued)

DATA CATEGORY	STUDY DESIGN CONDITION		RADIO AND NONFORMAL EDUCATION (NFE) CONDITION				
	All Experimental MCH Centers	All Control MCH Centers	Both Radio and NFE	Radio Only	NFE Only	Neither NFE nor Radio	
<u>VEGETABLES (Contd.)</u>							
<u>How often serve vegetables to the family?</u>	N	417	438	129	349	104	262
Percentage reporting:							
Every day		25.9	23.1	27.9	31.8	20.2	13.4
Almost every day		24.5	23.5	17.0	26.1	27.9	23.3
Every other day		12.5	16.2	18.6	13.5	14.4	14.1
Several times a week		34.5	32.8	33.3	26.6	33.6	43.5
Several times a month		2.4	3.4	3.1	1.1	2.9	5.3
Rarely		0.2	0.9	-	0.9	1.0	0.4
Never		-	-	-	-	-	-
Total		100.0	99.9	99.9	100.0	100.0	100.0
N-no data		49	38	10	18	20	37
<u>How often eat vegetables themselves?</u>	N	389	433	126	334	98	253
Percentage reporting:							
Every day		21.6	18.2	20.6	27.8	15.3	10.7
Almost every day		22.1	25.9	17.5	26.6	28.6	21.7
Every other day		13.4	14.1	17.5	12.3	10.2	15.0
Several times a week		36.5	33.2	37.3	28.7	34.7	41.9
Several times a month		2.8	6.5	4.8	1.8	7.1	7.9
Rarely		3.6	2.1	2.4	2.7	4.1	2.8
Never		-	-	-	-	-	-
Total		100.0	100.0	100.1	99.9	100.0	100.0
N-no data		77	43	13	33	26	46
<u>Why serve or not serve vegetables?</u>	N	442	463	135	355	117	286
Percentage reporting:							
For good health		58.6	73.9	78.5	70.4	61.5	57.7
Like them		63.3	47.9	57.0	59.7	49.6	51.7
Dr. Hakim advises		19.2	19.2	33.3	22.5	16.2	10.1
MCH Center advises		4.1	0.8	6.7	0.6	5.1	1.7
Insufficient money		7.9	6.9	3.0	3.1	16.2	11.2
Not available		-	0.2	-	0.3	-	-
Other		2.0	3.7	3.0	0.8	5.1	4.5
N-no data		24	13	4	12	7	13

Table 23 (Continued)

DATA CATEGORY	STUDY DESIGN CONDITION		RADIO AND NONFORMAL EDUCATION (NFE) CONDITION			
	All Experimental MCH Centers	All Control MCH Centers	Both Radio and NFE	Radio Only	NFE Only	Neither NFE nor Radio
MEAT						
<u>How often serve meat to the family?</u> N	463	472	139	364	123	296
Percentage reporting:						
Every day	13.8	11.4	14.4	17.6	8.9	7.4
Almost every day	8.4	7.4	11.5	9.6	7.3	4.7
Every other day	15.5	18.9	18.0	22.2	13.8	11.5
Several times a week	40.0	52.8	45.3	44.0	44.7	50.7
Several times a month	16.2	5.7	9.3	4.4	16.3	17.2
Rarely	5.6	3.6	1.4	2.2	6.5	8.4
Never	0.4	0.2	-	-	2.4	-
Total	99.9	100.0	99.9	100.0	99.9	99.9
N-no data	3	4	0	3	1	3
<u>Why serve or not serve meat?</u> N	462	472	138	362	124	297
Percentage reporting:						
For good health	61.7	70.3	76.1	68.8	64.5	58.6
Like it	56.3	48.5	56.5	55.8	52.4	45.1
Habit	14.7	24.2	18.1	22.9	16.1	18.2
Festive occasions	2.2	3.2	4.3	2.5	1.6	2.7
Dr. Hakim advises	11.0	12.3	23.9	12.1	13.7	4.4
Can't afford it	23.3	21.6	17.4	16.3	27.4	30.3
Not good	0.2	-	0.7	-	-	-
Other	0.9	1.3	0.7	0.3	3.2	1.3
N-no data	4	4	1	5	0	2
FISH						
<u>How often serve fish to the family?</u> N	455	470	139	362	122	290
Percentage reporting:						
Every day	0.4	0.4	-	0.5	-	0.7
Almost every day	3.3	0.9	1.4	2.2	-	2.8
Every other day	2.2	3.8	3.6	2.8	3.3	2.4
Several times a week	31.4	26.8	29.5	33.4	22.9	25.9
Several times a month	21.8	12.8	26.6	14.9	22.9	13.1
Rarely	32.3	49.8	35.2	43.9	36.1	43.8
Never	8.6	5.5	3.6	2.2	14.7	11.4
Total	100.0	100.0	99.9	99.9	99.9	100.1
N-no data	11	6	0	5	2	9

Table 23 (Continued)

DATA CATEGORY	STUDY DESIGN CONDITION		RADIO AND NONFORMAL EDUCATION (NFE) CONDITION				
	All Experimental MCH Centers	All Control MCH Centers	Both Radio and NFE	Radio Only	NFE Only	Neither NFE nor Radio	
<u>FISH (Contd.)</u>							
<u>Why serve or not serve fish?</u>	N	464	474	138	366	124	297
Percentage reporting:							
For good health		41.2	41.1	51.4	46.7	35.5	32.3
Like it		38.6	32.5	40.5	37.7	37.1	28.9
Habit		5.4	7.0	5.8	7.6	5.6	5.0
Festive occasions		1.5	1.5	2.2	1.4	0.8	1.7
Easy to prepare		5.2	7.6	9.4	7.1	8.1	3.7
Too expensive		21.8	47.3	32.6	36.3	27.4	37.0
Unavailable		36.2	15.0	23.2	18.6	38.7	30.0
Other		10.1	8.0	12.3	7.4	17.7	5.4
N-no data		2	2	1	1	0	2
<u>CHICKEN</u>							
<u>How often serve chicken to the family?</u>	N	464	475	139	365	124	298
Percentage reporting:							
Every day		0.9	-	1.4	0.3	-	0.3
Almost every day		3.7	0.8	2.9	3.6	-	1.3
Every other day		3.2	3.0	4.3	3.0	7.3	1.0
Several times a week		31.7	31.0	33.1	39.2	27.4	22.5
Several times a month		33.2	24.8	32.4	26.0	32.3	29.5
Rarely		21.5	33.4	23.0	25.5	20.2	35.2
Never		5.8	7.0	2.9	2.5	12.9	10.1
Total		100.0	100.0	100.0	100.1	100.1	99.9
N-no data		2	1	0	2	0	1
<u>Why serve or not serve chicken?</u>	N	457	469	139	360	123	292
Percentage reporting:							
For good health		47.0	49.9	54.7	51.9	43.9	43.5
Like it		44.4	39.9	55.4	44.4	40.6	33.9
Habit		7.4	11.1	10.1	13.3	8.1	7.2
Easy to prepare		9.8	11.9	19.4	11.7	12.2	5.1
A good buy		6.1	11.7	12.2	12.5	12.2	5.5
Too expensive		31.3	26.9	22.3	23.0	30.1	39.0
Don't like it		5.5	9.8	4.3	8.0	10.6	7.5
Other		3.9	6.4	5.7	3.9	5.7	6.2

Table 23 (Continued)

DATA CATEGORY	STUDY DESIGN CONDITION		RADIO AND NONFORMAL EDUCATION (NFE) CONDITION			
	All Experimental MCH Centers	All Control MCH Centers	Both Radio and NFE	Radio Only	NFE Only	Neither NFE nor Radio
EGGS						
<u>How often serve eggs to the family?</u> N	451	464	136	360	121	285
Percentage reporting:						
Every day	13.7	21.3	16.2	26.1	14.0	9.5
Almost every day	18.8	13.2	12.5	20.0	13.2	13.3
Every other day	10.9	19.6	17.6	15.0	9.1	17.2
Several times a week	35.9	29.7	37.5	28.3	33.1	35.4
Several times a month	7.8	5.8	10.3	5.3	12.4	4.6
Rarely	11.5	8.4	5.9	4.7	13.2	17.5
Never	1.3	1.9	-	0.6	5.0	2.5
Total	99.9	99.9	100.0	100.0	100.0	100.0
N-no data	15	12	3	7	3	14
<u>Why serve or not serve eggs?</u> N	458	468	139	361	121	292
Percentage reporting:						
For good health	68.3	80.6	81.3	78.4	70.2	68.5
Like them	64.8	51.7	58.3	65.1	55.4	50.3
Easy to prepare	19.9	20.5	30.9	22.4	19.8	12.3
A good buy	14.2	18.2	20.1	19.1	14.0	11.6
Advised to serve them	8.3	18.0	18.7	16.3	10.7	7.9
Not good	1.3	0.2	0.7	0.3	0.8	1.4
Don't like them	1.7	1.7	2.1	0.3	3.3	2.7
Other	7.2	4.3	5.7	2.8	9.1	8.2
<u>People mother thinks should not eat eggs.</u> N	446	472	136	362	123	284
% Yes	17.9	19.7	22.1	19.3	20.3	15.8
LEGUMINEUSES						
<u>How often serve legumineuses to family?</u> N	444	436	130	351	113	273
Percentage reporting:						
Every day	15.1	15.1	19.2	17.4	15.0	9.2
Almost every day	19.6	17.9	20.8	17.9	23.0	17.2
Every other day	16.2	14.5	19.2	15.1	16.8	13.9
Several times a week	34.0	33.9	28.5	36.2	26.5	37.0
Several times a month	4.5	4.4	3.8	3.7	3.5	6.2
Rarely	5.9	9.6	5.4	6.5	4.4	11.7
Never	4.7	4.6	3.1	3.1	10.6	4.8
Total	100.0	100.0	100.0	99.9	99.8	100.0
N-no data	22	40	9	16	11	26

Table 23 (Continued)

DATA CATEGORY	STUDY DESIGN CONDITION		RADIO AND NONFORMAL EDUCATION (NFE) CONDITION				
	All Experimental MCH Centers	All Control MCH Centers	Both Radio and NFE	Radio Only	NFE Only	Neither NFE nor Radio	
<u>FOOD CONSUMPTION BY PREGNANT AND LACTATING WOMEN (Contd.)</u>							
<u>Why mother should eat special foods while pregnant or lactating?</u>	N	374	364	113	299	100	215
Percentage reporting:							
To have strength, health		66.0	67.9	70.8	71.2	61.0	62.8
Health of the baby		63.9	73.1	71.7	68.9	63.0	68.4
To strengthen breast milk		40.6	42.0	40.7	43.1	41.0	39.1
To aid child birth		20.0	28.3	23.0	24.4	27.0	23.2
Dr. Hakim advises		11.0	16.5	22.1	15.7	9.0	8.8
Other		5.1	3.6	6.2	2.3	11.0	3.2
<u>Foods pregnant women should eat.</u>	N	404	408	127	320	113	241
Percentage reporting:							
Milk and milk products		79.5	86.0	87.4	86.2	75.2	79.7
Fruits		56.7	50.5	63.0	51.6	57.5	49.0
Vegetables		64.1	59.9	63.0	64.1	61.1	57.7
Legumineuses		22.8	24.0	33.1	25.6	23.9	15.3
Animal protein		65.6	63.5	73.2	65.6	55.7	62.6
Eggs		47.8	53.4	56.7	54.1	50.4	42.3
Doughs		16.8	11.3	15.7	10.9	25.7	11.6
Other		7.9	8.3	4.7	7.2	16.8	7.5
<u>Foods pregnant women should not eat.</u>	N	364	359	110	283	93	228
Percentage reporting:							
Doughs		45.6	42.6	49.1	41.7	43.0	44.7
Salt		88.7	58.8	63.3	59.4	69.9	59.2
Hot (spicy) foods		61.3	61.8	70.0	62.2	70.2	57.0
Tea		18.4	27.9	26.4	26.1	23.6	17.5
Bread		2.2	2.5	2.7	2.5	4.3	1.3
Heavy dishes		46.1	39.6	48.2	39.6	41.9	44.7
Other		9.9	16.4	14.5	12.7	17.2	9.6

Table 23 (Continued)

DATA CATEGORY	STUDY DESIGN CONDITION		RADIO AND NONFORMAL EDUCATION (NFE) CONDITION				
	All Experimental MCH Centers	All Control MCH Centers	Both Radio and NFE	Radio Only	NFE Only	Neither NFE nor Radio	
<u>EXPOSURE TO THE SUN (Contd.)</u>							
<u>Age (number of months) at which child should first be exposed to the sun.</u>	N	452	461	137	356	119	288
Percentage reporting:							
1 month or less		18.6	16.3	19.7	18.8	19.3	13.5
2 months		15.9	12.6	13.9	16.8	10.1	13.2
3 months		28.1	31.7	37.2	27.0	26.9	30.9
4 months		14.4	11.3	6.6	14.0	17.6	12.1
5-6 months		15.5	15.6	15.3	13.2	17.6	18.4
7-9 months		3.3	3.7	2.9	4.2	2.5	3.1
10-12 months		2.9	7.4	3.6	5.0	3.4	6.6
Greater than 12 months		1.3	1.5	0.7	0.8	2.5	2.1
Total		100.0	100.1	99.9	99.8	99.9	99.9
N-no data		14	15	2	11	5	11
<u>How should the baby be covered when exposed to the sun?</u>	N	416	434	127	336	108	268
Percentage reporting:							
Cover the head		77.9	67.0	78.0	68.4	77.8	72.0
Wet the head		1.0	1.8	0.8	0.9	1.8	2.2
Expose briefly		12.7	18.0	11.0	18.7	13.9	14.2
Expose progressively longer		3.1	6	3.9	5.6	3.7	4.1
Do not sleep		1.9	4.4	4.7	2.7	1.8	3.7
Do not cover		3.4	2.5	1.6	3.6	0.9	3.7
Total		100.0	99.9	100.0	99.9	99.9	99.9
N-no data		50	42	12	31	16	31

The interview with the mother also attempted to identify the changes the mother reported she had made recently with respect to her attitudes, knowledges, and behaviors relevant to the educational objectives of the program, as shown in Table 24. In general, mothers did not report having changed their attitudes or behaviors recently, but those who did were slightly more likely to have been exposed to the radio messages, to non-formal education in the MCH center, or to both than not. (The difference in reported frequency of change was significant only for the use of vegetables, at the .05 level of probability by Chi-square test.) Mothers who reported recent changes in attitudes or behaviors were also more likely to be in the control group than in the experimental group, but differences in these reported rates of change are not uniformly significant when tested by Chi-square. (Differences in using eggs and milk and in exposing the baby to the sun were significant at the .05 level of probability.)

Although very few mothers reported having changed their attitudes or behaviors, those who did provided a great amount of information about the types of changes they had made, most of these changes reflecting a greater openmindedness to more frequent use of food categories and a greater variety in usage. Some responses reflect specific message content, as for example, exposing the baby to the sun for five minutes and the child feeding emphasis on accustoming the young child to eating from a spoon. When mothers were asked why they had changed their attitudes or behavior, they gave Dr. Hakim at least partial credit with great regularity. However, when they were asked how long ago they had made these changes, they frequently reported time intervals greater than the duration of the message broadcast period.

One last area of inquiry was that of child-feeding practices. Results of these inquiries are presented by treatment condition in Table 25. There are no differences in child-feeding practices which can be unequivocally ascribed to treatment condition, i.e., differences here are very likely only a further reflection of the socioeconomic differences previously discussed.

Table 24

Changes in Mother's Nutritional Knowledge, Attitudes, and Practices
by Treatment Condition

DATA CATEGORY	STUDY DESIGN CONDITION		RADIO AND NONFORMAL EDUCATION (NFE) CONDITION				
	All Experimental MCH Centers	All Control MCH Centers	Both Radio and NFE	Radio Only	NFE Only	Neither NFE nor Radio	
VEGETABLES							
Made changes in feeding vegetables to family?	N	465	476	139	366	124	299
	N-Yes	58	75	29	52	20	30
	% Yes	12.5	15.8	20.9	14.2	16.1	10.0
What changes?	N	56	72	29	50	19	28
Percentage reporting:							
Serve them oftener		55.4	47.2	51.7	48.0	42.1	57.1
Serve more variety		33.9	15.3	31.0	30.0	5.3	14.3
Use "new" types		44.6	30.5	44.8	36.0	15.8	42.8
Eat more		28.6	27.8	37.9	28.0	15.8	25.0
Encourage greater consumption		8.9	2.8	3.4	10.0	-	3.6
Other		30.4	27.8	34.5	26.0	42.1	21.4
How long ago made changes?	N	37	59	22	38	15	19
Percentage reporting:							
1 month ago or less		8.1	15.2	4.5	7.9	26.7	21.0
2 months ago		21.6	16.9	22.7	15.8	20.0	21.0
3 months ago		10.8	11.9	4.5	15.8	13.3	5.3
4 months ago		10.8	15.2	9.1	15.8	26.7	-
5-6 months ago		8.1	8.5	13.6	7.9	-	10.5
7-8 months ago		8.1	11.9	13.6	5.2	6.7	21.0
9-12 months ago		16.2	13.6	4.5	15.8	6.7	10.5
More than 12 months ago		16.2	6.8	27.3	15.8	-	10.5
	Total	99.9	100.0	99.8	100.0	100.1	99.8
Why changed?	N	59	72	29	52	20	28
Percentage reporting:							
Personal conviction		59.3	44.4	58.6	44.2	65.0	46.4
Family influence		3.4	1.4	6.9	1.9	-	-
Friends/neighbor influence		-	2.8	-	1.9	-	3.6
Dr. Hakim		55.9	41.7	55.6	53.8	25.0	42.8
Radio		13.6	8.3	10.3	11.5	10.0	10.7
MCH Center		16.9	9.7	20.7	7.7	20.0	7.1
Other		13.6	20.8	10.3	21.1	25.0	14.3
EGGS							
Made changes in feeding eggs to family?	N	461	473	136	364	124	297
	N-Yes	28	49	15	28	12	20
	% Yes	6.1	10.4	11.0	7.7	9.7	6.7

Table 24 (Continued)

DATA CATEGORY	STUDY DESIGN CONDITION		RADIO AND NONFORMAL EDUCATION (NFE) CONDITION			
	All Experimental MCH Centers	All Control MCH Centers	Both Radio and NFE	Radio Only	NFE Only	Neither NFE nor Radio
<u>EGGS (Contd.)</u>						
<u>What changes?</u> N	30	52	16	30	12	22
Percentage reporting:						
Use more	33.3	36.5	37.5	33.3	66.7	22.7
Use in more ways	16.7	21.1	37.5	16.7	25.0	9.1
Change to a positive opinion	50.0	19.2	18.7	36.6	16.7	36.4
Like them more	20.0	7.7	31.2	13.3	8.3	40.9
Other	26.7	50.0	31.2	43.3	41.7	9.1
<u>How long ago made changes?</u> N	23	42	15	22	11	15
Percentage reporting:						
1 month ago or less	8.7	7.1	6.7	13.6	9.1	-
2 months ago	-	14.3	-	9.1	27.3	6.7
3 months ago	4.3	9.5	26.7	4.5	-	-
4 months ago	13.0	21.4	40.0	-	9.1	33.3
5-6 months ago	4.3	2.4	6.7	4.5	-	-
7-8 months ago	4.3	16.7	-	9.1	27.3	20.0
9-12 months ago	30.4	9.5	20.0	18.2	9.1	20.0
More than 12 months ago	34.8	19.0	-	40.9	18.2	20.0
Total	99.8	99.9	100.1	99.9	100.1	100.0
<u>Why changed?</u> N	30	49	16	29	12	20
Percentage reporting:						
Personal conviction	63.3	28.6	50.0	34.5	50.0	40.0
Family influence	16.7	6.1	18.7	13.8	-	5.0
Friends/neighbor influence	3.3	2.0	-	-	8.3	5.0
Dr. Hakim	43.3	36.7	56.2	41.4	25.0	35.0
Radio	13.3	6.1	6.2	-	8.3	10.0
MCH Center	13.3	14.3	37.5	6.9	8.3	10.0
Other	16.7	38.8	25.0	37.9	25.0	25.0
<u>LEGUMINEUSES</u>						
<u>Made changes in feeding legumineuses to family?</u> N	465	473	137	366	124	298
N-Yes	35	87	19	51	18	33
% Yes	7.5	18.4	13.9	13.9	14.5	11.1
<u>What changes?</u> N	36	85	21	49	19	31
Percentage reporting:						
Use more frequently	33.3	37.6	28.6	42.8	36.8	32.2
Use in more ways	27.8	15.3	23.8	18.4	31.6	6.4
Now like lentils	19.4	7.0	-	16.3	10.5	6.4
Now like legumineuses	16.7	4.7	14.3	10.2	10.5	-
Don't use--too expensive	19.4	17.6	19.0	16.3	10.5	25.8
Other	38.9	32.9	38.1	34.7	26.3	38.7

Table 24 (Continued)

DATA CATEGORY	STUDY DESIGN CONDITION		RADIO AND NONFORMAL EDUCATION (NFE) CONDITION				
	All Experimental MCH Centers	All Control MCH Centers	Both Radio and NFE	Radio Only	NFE Only	Neither NFE nor Radio	
<u>LEGUMINEUSES (Contd.)</u>							
<u>How long ago made changes?</u>	N	27	71	15	42	13	27
Percentage reporting:							
1 month ago or less		7.4	7.0	20.0	2.4	7.7	7.4
2 months ago		-	7.0	-	4.8	15.4	3.7
3 months ago		7.4	4.2	13.3	7.1	-	-
4 months ago		29.6	26.8	20.0	28.6	30.8	29.6
5-6 months ago		3.7	7.0	6.7	4.8	7.7	7.4
7-8 months ago		18.5	23.9	20.0	28.6	23.1	11.1
9-12 months ago		7.4	9.9	6.7	4.8	15.4	14.8
More than 12 months ago		25.9	14.1	13.3	19.0	-	25.9
Total		99.9	99.9	100.0	100.1	100.1	99.9
<u>Why changed?</u>	N	35	75	18	46	16	29
Percentage reporting:							
Personal conviction		51.4	33.3	55.5	41.3	25.0	34.5
Family influence		-	6.7	-	10.9	-	-
Friends/neighbor influence		2.9	4.0	-	4.3	-	6.9
Lr. Hakim		37.1	30.7	27.8	32.6	50.0	24.1
Radio		11.4	9.3	5.5	8.7	25.0	6.9
MCH Center		11.4	9.3	11.1	8.7	12.5	10.3
Other		42.9	37.3	38.9	39.1	43.7	37.9
<u>MILK</u>							
<u>Made changes in feeding milk to family?</u>	N	464	470	139	367	121	294
	N-Yes	28	46	11	31	11	21
	% Yes	6.0	9.8	7.9	8.4	9.1	7.1
<u>What changes?</u>	N	27	48	15	28	11	21
Percentage reporting:							
Use more frequently		74.1	41.7	33.3	64.3	54.5	52.4
Use in more ways		7.4	8.3	13.3	3.6	9.1	9.5
Appreciate more		22.2	18.7	13.3	21.4	18.2	23.8
Use less frequently		14.8	43.7	53.3	25.0	36.4	28.6
Other		22.2	2.1	13.3	7.1	18.2	4.8

Table 24 (Continued)

DATA CATEGORY	STUDY DESIGN CONDITION		RADIO AND NONFORMAL EDUCATION (NFE) CONDITION				
	All Experimental MCH Centers	All Control MCH Centers	Both Radio and NFE	Radio Only	NFE Only	Neither NFE nor Radio	
<u>MILK (Contd.)</u>							
How long ago made changes?	N	18	43	12	23	10	16
Percentage reporting:							
1 month ago or less		-	7.0	-	8.7	-	6.2
2 months ago		-	13.9	16.7	4.3	10.0	12.5
3 months ago		-	4.6	-	4.3	10.0	-
4 months ago		11.1	25.6	25.0	21.7	10.0	25.0
5-6 months ago		-	4.6	8.3	-	10.0	-
7-8 months ago		11.1	11.6	8.3	13.0	20.0	6.2
9-12 months ago		33.3	20.9	33.3	17.4	40.0	18.7
More than 12 months ago		44.4	11.6	8.3	30.4	-	31.2
Total		99.9	99.8	99.9	99.8	100.0	99.8
<u>Why changed?</u>							
Why changed?	N	26	48	14	28	11	21
Percentage reporting:							
Personal conviction		53.8	33.3	28.6	50.0	27.3	42.8
Family influence		15.4	6.2	7.1	7.1	18.2	9.5
Friends/neighbors influence		-	2.1	7.1	-	-	-
Dr. Hakim		50.0	22.9	14.3	35.7	36.4	38.1
Radio		7.7	14.6	7.1	7.1	36.4	9.5
MCH Center		26.9	18.7	21.4	25.0	36.4	9.5
Other		19.2	35.4	50.0	25.0	27.3	23.8
<u>FOODS FOR PREGNANT AND LACTATING WOMEN</u>							
Changes in ideas?	N	466	475	139	367	124	298
	N-Yes	41	51	11	34	17	28
	% Yes	8.8	10.7	7.9	9.3	13.7	9.4
<u>What changes?</u>							
What changes?	N	43	54	15	33	15	32
Percentage reporting:							
Eat more		34.9	55.5	46.7	45.4	53.3	40.6
Eat hearty foods		72.1	68.5	66.7	66.7	66.7	75.0
Eat milk/milk products		44.2	61.1	40.0	66.7	60.0	43.7
Eat vegetables		58.1	61.1	60.0	57.6	53.3	65.6
Eat legumineses		20.9	37.0	40.0	39.4	20.0	21.9
Eat animal protein		28.6	42.6	40.0	60.6	33.3	40.6
Eat doughs		14.0	25.9	26.7	24.2	20.0	15.6
Other		2.3	3.7	6.7	3.0	-	3.1

Table 24 (Continued)

DATA CATEGORY	STUDY DESIGN CONDITION		RADIO AND NONFORMAL EDUCATION (NFE) CONDITION			
	All Experimental MCH Centers	All Control MCH Centers	Both Radio and NFE	Radio Only	NFE Only	Neither NFE nor Radio
<u>FOODS FOR PREGNANT AND LACTATING WOMEN (Contd.)</u>						
How long ago made changes? N	15	41	6	28	8	14
Percentage reporting:						
1 month ago or less	-	2.4	16.7	-	-	-
2 months ago	-	4.9	33.3	-	-	-
3 months ago	6.7	2.4	-	3.6	-	7.1
4 months ago	6.7	9.8	-	7.1	-	21.4
5-6 months ago	-	-	-	-	-	-
7-8 months ago	6.7	12.2	-	14.3	12.5	7.1
9-12 months ago	6.7	19.5	-	14.3	37.5	14.3
More than 12 months ago	73.3	48.8	50.0	60.7	50.0	50.0
Total	100.1	100.0	100.0	100.0	100.0	99.9
Why changed? N	31	45	9	31	14	21
Percentage reporting:						
Personal conviction	29.0	37.8	11.1	35.5	50.0	33.3
Family influence	9.7	4.4	-	6.4	14.3	4.8
Friends/neighbors influence	-	2.2	-	-	-	4.8
Dr. Hakim	51.2	60.0	66.7	67.7	50.0	57.1
Radio	19.4	8.9	-	9.7	21.4	19.0
MCH Center	35.5	22.2	22.2	25.8	35.7	28.6
Other	6.5	2.2	-	6.4	7.1	-
<u>FEEDING BABIES AND YOUNG CHILDREN</u> N	460	473	138	364	122	296
Changes in ideas? N-Yes	59	80	22	64	14	36
% Yes	12.8	16.9	15.9	17.6	11.5	12.2
What changes? N	65	87	25	68	14	43
Percentage reporting:						
Accustom child to spoon	61.5	43.7	36.0	50.0	42.8	65.1
Accustom child to solid foods	61.5	56.3	48.0	69.1	50.0	51.2
Give fruits and vegetables	61.5	65.5	64.0	72.0	50.0	58.1
Give legumineuses	12.3	46.0	20.0	42.6	21.4	25.6
Give eggs	52.3	62.1	56.0	67.6	64.3	44.2
Give proteins	63.1	56.3	52.0	72.0	50.0	48.8
Give milk and milk products	46.2	59.8	40.0	67.6	57.1	41.9
Other	3.1	5.7	12.0	2.9	-	4.6

Table 24 (Continued)

DATA CATEGORY	STUDY DESIGN CONDITION		RADIO AND NONFORMAL EDUCATION (NFE) CONDITION				
	All Experimental MCH Centers	All Control MCH Centers	Both Radio and NFE	Radio Only	NFE Only	Neither NFE nor Radio	
<u>FEEDING BABIES AND YOUNG CHILDREN (Contd.)</u>							
How long ago made changes?	N	44	74	18	58	10	31
Percentage reporting:							
1 month ago or less		-	5.4	-	-	20.0	6.4
2 months ago		-	4.0	-	3.4	-	3.2
3 months ago		-	2.7	-	-	-	6.4
4 months ago		4.6	14.9	16.7	12.1	10.0	6.4
5-6 months ago		4.6	4.0	16.7	1.7	10.0	-
7-8 months ago		4.6	17.6	22.2	15.5	10.0	3.2
9-12 months ago		22.7	17.6	27.8	20.7	20.0	12.9
More than 12 months ago		63.6	33.8	16.7	46.5	30.0	61.3
Total		100.1	100.0	100.1	99.9	100.0	99.8
Why changed?	N	63	76	22	64	14	38
Percentage reporting:							
Personal conviction		46.0	60.5	45.4	60.9	64.3	42.1
Family influence		14.3	2.6	9.1	6.2	14.3	7.9
Friends/neighbors influence		1.6	1.3	-	3.1	-	-
Dr. Hakim		58.7	44.7	68.2	50.0	35.7	50.0
Radio		9.5	7.9	13.6	7.8	-	10.5
MCH Center		39.7	27.6	50.0	25.0	35.7	36.8
Other		6.3	-	4.5	4.7	-	-
<u>EXPOSING BABIES TO THE SUN</u>	N	465	474	138	367	123	298
Changes in ideas?	N-Yes	87	119	39	87	23	55
	% Yes	18.7	25.1	28.3	23.7	18.7	18.5
What changes?	N	91	116	39	87	24	55
Percentage reporting:							
Necessary to expose baby to the sun		73.6	64.6	56.4	73.6	66.7	72.7
Protects against germs		9.9	37.9	23.1	31.0	29.2	18.2
Should leave baby in the sun for 5 minutes		33.0	54.3	51.3	49.4	58.3	27.3
The sun helps the baby to grow		33.0	46.5	56.4	40.2	41.7	30.9
The sun fights illness		35.2	42.2	56.5	40.2	41.7	23.6
Other		8.8	7.7	10.2	4.6	20.8	5.4

Table 24 (Continued)

DATA CATEGORY	STUDY DESIGN CONDITION		RADIO AND NONFORMAL EDUCATION (NFE) CONDITION			
	All Experimental MCH Centers	All Control MCH Centers	Both Radio and NFE	Radio Only	NFE Only	Neither NFE nor Radio
EXPOSING BABIES TO THE SUN (Cont.)						
How long ago made changes? N	79	112	39	76	25	50
Percentage reporting:						
1 month ago or less	15.2	7.1	2.6	6.6	32.0	10.0
2 months ago	15.2	14.3	23.1	14.5	16.0	8.0
3 months ago	8.9	16.1	12.8	11.8	12.0	16.0
4 months ago	10.1	17.9	20.5	17.1	-	14.0
5-6 months ago	11.4	26.8	23.1	22.4	20.0	16.0
7-8 months ago	39.2	17.9	17.9	27.6	20.0	36.0
9-12 months ago	-	-	-	-	-	-
More than 12 months ago	-	-	-	-	-	-
Total	100.0	100.1	100.0	100.0	100.0	100.0
Why changed? N	95	124	41	92	26	58
Percentage reporting:						
Personal conviction	30.5	29.0	43.9	30.4	30.8	17.2
Family influence	7.4	2.4	2.4	2.2	-	10.3
Friends/neighbors influence	1.1	7.2	4.9	6.5	7.7	-
Dr. Hakim	67.4	64.5	68.3	63.0	65.4	70.7
Radio	15.8	11.3	14.6	8.7	19.2	17.2
MCH Center	28.4	17.7	34.1	16.3	30.8	20.7
Other	5.3	5.6	2.4	6.5	3.8	5.2

Table 25
 Child-Feeding Practices
 by Treatment Condition

DATA CATEGORY	STUDY DESIGN CONDITION		RADIO AND NONFORMAL EDUCATION (NFE) CONDITION				
	All Experimental MCH Centers	All Control MCH Centers	Both Radio and NFE	Radio Only	NFE Only	Neither NFE nor Radio	
<u>Child's Age (Months)</u>	N	458	474	137	364	123	295
	Mean	18.75	19.36	18.35	18.64	19.89	19.56
	Std. Dev.	14.79	14.30	15.58	13.73	15.67	14.64
	Range	1-72	1-72	1-72	1-72	1-72	1-72
	N-no data	8	2	2	3	1	4
<u>Child's Sex</u>	N	458	465	139	361	117	293
	% Male	55.5	53.8	50.4	55.1	52.1	57.7
	% Female	44.5	46.2	49.6	44.9	47.9	42.3
	N-no data	8	11	0	6	7	6
<u>Child was breastfed yesterday?</u>	N	463	475	139	365	124	297
	% Yes	36.9	49.5	43.9	43.1	33.1	47.1
<u>Child is weaned?</u>	N	463	472	139	365	122	296
	% Yes	53.4	50.4	51.8	52.6	62.3	47.0
<u>Why child is weaned?</u>	N	232	250	77	190	77	132
Percentage:							
Too old - < 1 year		4.7	14.0	7.8	10.5	3.9	11.4
Too old - 1-2 years		14.2	19.6	11.7	14.2	18.2	24.2
Too old - > 2 years		30.6	26.8	33.8	26.3	32.5	17.4
Mother pregnant		12.9	18.0	6.5	20.5	9.1	27.3
Mother working		0.9	1.6	1.3	1.6	2.6	18.2
Mother has no milk		37.1	23.2	36.4	26.3	37.7	25.0
Other		4.7	3.6	6.5	4.2	5.2	2.3
<u>Child was bottle fed yesterday?</u>	N	463	474	139	363	124	298
	% Yes	42.5	39.0	40.1	44.6	40.3	37.0
<u>Child was given other food yesterday?</u>	N	452	458	133	353	121	290
	% Yes	90.7	87.1	90.2	90.1	90.9	85.9

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APPENDIX A

MESSAGE TEXTS AND BROADCAST SCHEDULE

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Introductory Message

Studies conducted by the National Institute of Nutrition have shown that many of the maladies in our country are due to malnutrition. Actually, many people neither know how to eat nor how to feed their children. In order to preserve your health, you need to know how to prepare and eat foods--for good growth of your children. A well nourished body stays healthy and resists illness. I advise you to listen to this new program prepared by the Division of Nutrition Education of the National Institute of Nutrition, a program presented every day by a nutrition specialist--Dr. Hakim. This program consists of advice and information about nutrition of interest to everybody--and particularly for children and expectant and nursing mothers.

Listen! When you hear this music Dr. Hakim speaks. (Music) Listen every day to the Dr. Hakim broadcast. He talks to you about a manner of eating which will be beneficial for you and your family. (Times of broadcast announced.)

Message #1

All foods meet a precise need of the organism and varied food consumption is beneficial to the body. For example, the couscous which represents our country contains many valuable ingredients. This dish is even better for us when we add vegetables and when we finish our meal with fruit, a raw salad, or both. Chakchouka is also beneficial because it is balanced; it consists of vegetables, chick peas, and eggs. It's even better when we conclude this meal with salad, fruit, or both. In truth, our cuisine is good; it does not lack green vegetables and fruit.

Message #2

Fruits and vegetables are absolutely necessary for everyone--the young and the old! Eat fresh vegetables and fresh fruits because they are very useful to the body and above all, do not neglect to give them to your children. However, before eating fruits and vegetables, it is good to wash them in order to not suffer intestinal trouble! I insist: washing vegetables in clean water is absolutely essential.

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Message #3

Just the same as fruits, vegetables are very useful to the body and contain many vitamins. Eat green vegetables to protect against illness and to give color to your skin. You have all heard it said that carrots are good for you and that they improve eyesight!

All fruits and vegetables are useful for many things: skin, teeth, the blood! Do not deprive yourself! Each day--you and your children--eat fruits, vegetables, both of them. Here is a proverb: in function is the means. (We procure according to our resources.)

Message #4

By the "grace of God" one finds fruits and vegetables in our country, throughout the year. Each season has its own fruits and vegetables; in winter there are carrots, fennel, salad greens, turnips, artichokes, oranges and tangerines. In summer there are cucumbers, peppers, tomatoes, water-melons, melons and grapes. Everyone can procure fruits and vegetables according to their means! Fruits and vegetables of the season are more flavorful, more beneficial, and are cheaper.

Message #5

To retain the benefits of vegetables, it is important to buy them fresh and not spoiled, If you want to profit from the vitamins contained in vegetables, do not soak them in water because a prolonged soaking in water removes their strength. It is desirable, also, to not throw away the better half with the peelings. It is good to wash vegetables before cooking them so that they do not make you sick.

Message #6

Raw vegetables are good and benefit the body--the young and the old. Cooked vegetables are also beneficial when one conserves their value. It is not necessary to cook them too much. They should cook slowly over a low fire for best preparation. The pot should be covered. And do not put vegetables into the water until the water comes to a boil. In this way, the vitamins are retained.

Message #7

Thank God, vegetables are not lacking in our country and they are varied! A little salad each day does not cost very much! One can prepare a salad with peppers and tomatoes; one can also use fennel and carrots. And don't forget to wash the vegetables well. Vegetables are even better when we enhance their taste with salt and lemon. There are also vegetables which one can eat without seasoning, such as artichokes, romaine, fennel, and cucumbers.

Message #8

Chick peas, broad beans, and lentils are very good for the body. I'll tell you why--they contain the nutrients which give good color to the skin and which develop the body. Chick peas, broad beans, and lentils are always available and everybody can afford to buy them. The accomplished homemaker can buy them at the time when they are plentiful--for saving and using throughout the year. Chick peas, broad beans, lentils, and also white beans diversify the diet; that is very useful.

Message #9

Everybody ought to eat chick peas, lentils, and white beans. They are beneficial for the young and the old. It is for this reason that I advise you to augment your meals with chick peas, lentils, and white beans. These foods give good color to the skin, develop the bodies of infants, and preserve those of adults! Chick peas, broad beans, lentils, and white beans should be served at each meal. And don't forget that they give a good taste to "dishes."

Message #10

Eggs are a valuable food and do not cost a great amount. Why not take advantage? In fact, many people ignore the value of eggs and some believe they should be avoided. They are wrong because eggs are beneficial to everyone. Eggs contribute to development of children's bodies and assure their health. They also preserve the health of adults. I encourage you to eat eggs. You and your children. The proverb says: one yolk of an egg is worth more than a piece of meat.

Message #11

An egg provides many benefits when it is cooked. We know that raw eggs are difficult to digest and their value to the body is incomplete. When eggs are fried they tire the liver. To conserve their nutritive value and their taste as well, one should boil them in water or use them in other "dishes." They can be used to enhance a bouillon or a soup. In any case, we know that eggs can be used in spicy and sweet "dishes."

Message #12

Raising poultry is easy for all families who have a small space for this. One can thus gain eggs and enhance food consumption. Do not deprive yourself: eat the eggs from your poultry farm. When one raises chickens one is never deprived because one always has fresh eggs and meat readily available.

Message #13

Broad beans, chick peas, white beans, and lentils are good for everybody: they keep adults in good health and contribute to the development of children. They also purify the blood. It is desirable to eat a little of these foods each day--one day some broad beans, another some chick peas, and yet another some lentils. One can always find them in the market and the accomplished homemaker always stores them in sufficient quantity.

Message #14

To gain the full benefit of broad beans, chick peas, lentils and white beans, it is necessary to soak them in water overnight. The next day it is necessary to throw away that water and to cook them for a long time without, however, allowing them to become too soft. Thus, it is not necessary to use bicarbonate of soda either for soaking or for cooking. One obtains, then, a food item which gives profitable benefit for the young as well as for the old.

Message #15

Usually, in our Tunisian "dishes" we use broad beans and chick peas as, for example, in vegetable stew and soup. Lentils can also be put in such "dishes": they are prepared in the same manner as white beans and

chick peas. One can put lentils in ragout or in vegetable stew to which one adds an egg. One can also put them, as the chick peas, in the soup "Lablabi,"¹ with some cumin. Also, they can be used in salad: soak them in water and then add a fresh tomato, parsley, salad greens, and olives. Their taste can be enhanced with lemon. Many people do not know the good taste of lentils and their food value. I advise you to try them.

Message #16

The nutritive value of broad beans, chick peas, white beans, and lentils is very great. They are beneficial for the body because they purify the blood and eliminate skin pallor. I advise you to eat broad beans, chick peas, white beans, and especially lentils because they purify the blood better than the others. Particularly, I advise pregnant women to eat lentils once or twice a week because lentils are beneficial for them and the child.

Message #17

The sun is beneficial for everybody, young and old. It is the source of life and it destroys germs. The sun preserves health, fortifies bones, gives strength and protects against disease. The sun is a great wealth granted by God. A free gift! Tourists who come to our country profit greatly from it; we ought to do likewise. But pay attention! Do not stay a long time in the sun, especially in summer. And if you expose yourself to the sun, cover your head.

Message #18

The body has a need for the sun as well as for nourishment. It is necessary to expose babies to the sun because it is beneficial for them. We can put the baby in the sun in the morning because it is not too strong then. In the winter, when the sun shines, choose a sunny spot in the house, beside an open window or door, and place the baby there. It will be necessary to uncover the legs and arms. And don't forget to cover the head. You can leave the baby to play in this manner--to expend energy--for about five minutes in the sun. Five minutes--the time it takes to peel and eat an orange.

¹A soup of chick peas, spices, oil, sometimes an egg.

Message #19

In our country there is a very old tradition which consists of swaddling babies. In fact, it is preferable not to do this--to permit the baby to benefit from the sun. In this fashion, the child's body develops better because he becomes accustomed to moving his legs and arms and his bones grow stronger. Swaddling is not a good thing: it fosters illness, does not permit the body to develop, and does not allow the baby to jiggle his legs and amuse himself. It also constrains breathing. Having his hands tied, the swaddled infant cannot get used to his fingers and cannot grab hold of things. In addition, his bones remain soft and his legs become curved or twisted.

Message #20

The sun is a good thing for children and the more one exposes them to it, the better it is. For this reason, I advise you to expose your children to the sun as early as the first week!

The first few days, put the baby in the sun for two or three minutes. After that, each time, prolong the duration a little until you end up at ten minutes or a quarter of an hour. Do not exceed this limit. When the baby grows enough and walks alone, you must pay attention and do not allow him to sleep in the sun after having eaten.

Message #21

I advise you to always consume milk, cheese, yogurt, and curd because they are beneficial for the body. All the family ought to eat these things--young and old, sick and healthy, men and women. Milk, cheese, yogurt and curd aid the growth of children and maintain the bones of older people. They are suitable for the pregnant woman and assist production of milk for the mother who is breastfeeding. Drink milk every day and at any time. But do not forget to boil it.

Message #22

We can find milk anywhere and at any time. Milk and all its derivations such as yogurt, curd, and cheese are essential for human life. Those who wish to protect their health and to fortify their bones must drink milk each day. It is preferable to consume milk every day, after it has been boiled. It is absolutely necessary to boil the milk in order to kill the germs. If the milk is to be saved for the next day, it must be kept cold.

Message #23

The benefits of milk are very great. Those who drink it strengthen their bones, protect their teeth, their hair and their nails. Milk provides another advantage, especially for women: it maintains their beauty, softens their skin, and preserves their youthfulness. Yogurt, curds and whey, and cheese possess the same food values as milk. Those who consume much of these foods protect their bones, their teeth, their hair and their nails. The body stays healthy all the time.

Message #24

Some people think that you should not give milk to children who are sick. That's an error, because milk is absolutely necessary for everybody, young and old. For those who do not like milk, it can be replaced by milk derivatives, such as curds and whey, ricotta cheese, and yogurt. All these things are good and as beneficial as milk.

Message #25

I advise all mothers to breastfeed their babies, because breastmilk has no equal for the baby. Breastmilk is clean, hygienic, natural, and fosters growth. In addition, breastmilk is especially suited to nourishing to protect against illness. It is more convenient than all the other milks. What's more, it doesn't cost anything. Free and requires no preparation! The infant nourished at the breast is more affectionate and is better able to resist illness.

Message #26

I continue to advise mothers to breastfeed their babies because breastmilk is always in women! There is no breastmilk "fable" as some women think. On the contrary, mother's milk is always good. It is essential that each mother breastfeed her baby, because in addition to the benefits to the health and mental development of the baby, the woman's breasts and the body are well preserved, especially if she increases her own food consumption a little. In this case her milk is always abundant--and I affirm to you again--once more--that the mother's milk is good, whatever its color.

Message #27

I would like to warn those women who are nursing and to advise them to pay attention to the weaning of their baby. If you wean your baby all at once you expose him to illness! Why? Because he will be undernourished, especially if you have not accustomed him to other foods. Without even counting that you deprive him of the affection of his mother. It is essential to accustom the baby to eat solid foods because breastmilk alone is not sufficient. As soon as the baby is five or six months old, the mother must nurse him and also give him other foods.

Message #28

One should give the breastfed baby other foods--more than just milk. After the first few days one can give the baby fruit juice in a teaspoon, for example, orange juice. At a little later age, he can take vegetable bouillon. Gradually as he grows, one can add other foods: an egg in the bouillon, some chopped meat, some fish without bones, or some chicken. It is necessary to diversify the baby's diet: one time some bouillon, another time some bouillon with milk and a spoonful of oil or butter. One can also give him some "Bsissa"² with milk. In this manner, each time you give him some solid food, you reduce the breastmilk until he has been weaned without noticing it.

Message #29

The benefits of milk are considerable for everyone and especially for young children who have an even greater need for it. Milk quenches the thirst of children, strengthens their bones, and gives them good teeth. It also improves eyesight. Consequently, instead of giving confections which have a disastrous effect on teeth, give children more milk. Have them drink a half liter each day if possible. If the child does not accept milk, give him some cheese, some yogurt, or some ricotta cheese. They have the same nutritive value as milk.

Message #30

Fresh eggs are beneficial for everybody and children have a need to benefit from them also. Eggs promote the growth of the child, develop intelligence, and improve eyesight. After six months of age, you can give the infant half of an egg every day or two. You can then continue with a

² "Bsissa" is powdered cooked barley mixed with a little sugar or honey, a little oil, and usually a little water or milk.

whole egg each day after he has become accustomed to it. That is very good for his development. Eggs do not constrain development of language and do not provoke fever as some people think! I assure you, on the contrary, that they are very good for children.

Message #31

Broths are very good for everybody and not only for those who are ill. They are equally appropriate for young children. You can make broths (bouillon) with the vegetables of the season: carrots, turnips, a bit of potato, a little pumpkin, a tomato, a little onion, and some parsley. Wash the vegetables well and put them on to cook in cold water. When the cooking is finished, drain the vegetables and add a little salt, two drops of lemon juice and a small spoonful of butter. You can give bouillon twice a day to a child of three months. You should increase the quantity day by day. The cooked vegetables can be given to the child--mashed with their liquid. From the age of four months you can strengthen the bouillon with pasta, some chick peas, lentils, eggs and meat.

Message #32

Children have a great need for fruits because they are beneficial to them and protect them. Do not overlook the infant's share of fruit. If he is still very young, you can give it to him in the form of juice, such as orange, lemon, watermelon. You can also give cooked fruits. After the child becomes accustomed to feeding himself, you can give him fruit to munch on. Fruit is good for children and it protects against illness.

Message #33

I have given you good advice to eat vegetables. I think that I have not done enough. They are full of vitamins, especially when they are raw. Vegetables are beneficial for the young as well as for adults. Consequently, it is recommended to give them to growing infants as soon as they start to have teeth. This can be in the form of salad--some carrot or some fennel to chew on. All of this is beneficial for the health of the child.

Message #34

Usually, when the child has grown a little and he begins to share in the family meal, one is not so busy with him. From this time on he chances eating those foods which can harm him, such as sweets which promote dental

caries, and peppers which are bad for his stomach. Well, the infant is more open to illness than the adult. Therefore, we must be attentive to the food consumption of the infant as well as of the adult. It is necessary also to concern ourselves with the infants' hygiene: bodily cleanliness, cleanliness of the clothing and of the containers from which they eat. In this way the baby develops well, resistant to illness and better adjusted to school.

Message #35

Raising children and nourishing them are things which interest all women. We know that mother's milk is very good for the baby, yet when the baby reaches four months of age, mother's milk is not sufficient. He must have other things in addition. I advise you to give your infants "farine SAHA"³ when they reach the age of three months. As the name indicates, SAHA gives health to the child! It contains fortificants, it gives good color to the skin, promotes growth and protects the child against illness. Moreover, it is not expensive: one box of SAHA costs less than a pack of cigarettes! Farine SAHA helps the mother to wean her child, because at the age of one year, having become accustomed to eating from a spoon, the child can eat the family dishes.

Message #36

A mother should accustom her child to eating from a spoon. For this there is a cereal (farine) very good and inexpensive called "SAHA." You can give SAHA to a baby at three months. From six months of age you can give it twice a day, continuing also to breastfeed. Here is how to prepare farine SAHA for a baby of three months: dilute three level spoonfuls of SAHA in a cup of cold water so that it does not form lumps. You cook this mixture the same as bouillon de Droo.⁴ When the infant reaches six months you can give him five spoonfuls a day. Farine SAHA is very good for the young and the old alike! You can give it from the age of three months until entrance to school. I also advise the expectant mother and those who are breastfeeding to eat farine SAHA because this is good for both the mother and the child.

³SAHA is a weaning food prepared and marketed under the auspices of the Tunisian National Office of Cereals, an agency of the Government of Tunisia. The term SAHA is Arabic for "good health."

⁴A bouillon made of ground sorghum.

Table 26

Identification of Message Themes and Numbers

Message Series Number	Message Theme	Message Number
1	Program introduction	37
	Fruits and vegetables	1 - 7
	Eggs and legumes	8 - 16
	The sun	17 - 20
	Milk and milk products	21 - 24
	Infant feeding:	
	Breastfeeding	25 - 28
	Other feeding	29 - 36
2	Vitamin C	38
	Food hygiene	39
	Water as a beverage	40
	Obesity	41
	Canned tomatoes - handling	42
3	Balanced diet	43
	Proteins - animal and vegetable	44
	Energy foods	45
	Protective foods	46
	Protein foods equivalents	47
	Energy foods equivalents	48
	Tea	49
	Coffee	50
	Handling meat - hygiene	51
	Preparation of meat	52
	Use of "leftovers"	53
4	Dental caries	54
	Honey	55
	Tobacco	56
	Water as a food	57
	Canned foods	58
	Artichokes	59
	Desires of the expectant mother	60
	Breakfast	61
	Problems of weaning	62
	Smen (a strong Arabic butter)	63
	Fish	64

Table 27

Message Broadcast Schedule

Note: During the period 25 November 1977 through 2 February 1978, two messages were broadcast three times a day, as follows:

First message - 7:00 AM
 12:45 PM
 5:00 PM

Second message - 8:00 AM
 2:00 PM
 9:00 PM

During the period 3 February through 25 March, four messages were broadcast once a day, as follows:

First message - 8:00 AM
 Second message - 12:45 PM
 Third message - 2:00 PM
 Fourth message - 5:00 PM

Thereafter, two messages were broadcast twice a day, as follows:

First message - 8:00 AM
 2:00 PM

Second message - 12:45 PM
 5:00 PM

Week	Day	Date	Message Sequence			
			First	Second	Third	Fourth
1	Friday	25 November	37	37	No Messages Scheduled	
	Saturday	26 November	37	37		
	Sunday	27 November	37	37		
	Monday	28 November	37	2		
	Tuesday	29 November	1	37		
	Wednesday	30 November	37	1		
	Thursday	1 December	2	37		
2	Friday	2 December	37	3		
	Saturday	3 December	2	37		
	Sunday	4 December	37	5		
	Monday	5 December	1	37		
	Tuesday	6 December	37	4		
	Wednesday	7 December	6	37		
	Thursday	8 December	37	7		

Table 27 (Continued)

Week	Day	Date	Message Sequence			
			First	Second	Third	Fourth
3	Friday	9 December	5	1	No Messages Scheduled	
	Saturday	10 December	2	6		
	Sunday	11 December	3	7		
	Monday	12 December	4	2		
	Tuesday	13 December	7	5		
	Wednesday	14 December	1	3		
	Thursday	15 December	6	4		
4	Friday	16 December	16	9		
	Saturday	17 December	9	8		
	Sunday	18 December	16	15		
	Monday	19 December	13	14		
	Tuesday	20 December	8	12		
	Wednesday	21 December	14	11		
	Thursday	22 December	18	26/24		
5	Friday	23 December	32	30		
	Saturday	24 December	21	22		
	Sunday	25 December	27	25		
	Monday	26 December	19	17		
	Tuesday	27 December	36	29		
	Wednesday	28 December	34	6		
	Thursday	29 December	26	28		
6	Friday	30 December	24	23		
	Saturday	31 December	17	20		
	Sunday	1 January	35	31		
	Monday	2 January	25	27		
	Tuesday	3 January	23	22		
	Wednesday	4 January	33	32		
	Thursday	5 January	11	10		
7	Friday	6 January	23	24		
	Saturday	7 January	28	26		
	Sunday	8 January	20	18		
	Monday	9 January	29	30		
	Tuesday	10 January	34	35		
	Wednesday	11 January	25	28		
	Thursday	12 January	10	9		
8	Friday	13 January	31	32		
	Saturday	14 January	18	17		
	Sunday	15 January	22	21		
	Monday	16 January	21	15		
	Tuesday	17 January	27	26		
	Wednesday	18 January	32	30		
	Thursday	19 January	24	23		

Table 27 (Continued)

Week	Day	Date	Message Sequence			
			First	Second	Third	Fourth
9	Friday	20 January	33	35	No Messages Scheduled	
	Saturday	21 January	19	18		
	Sunday	22 January	9	10		
	Monday	23 January	12	15		
	Tuesday	24 January	3	7		
	Wednesday	25 January	16	12		
	Thursday	26 January	16	29		
10	Friday	27 January	10	18		
	Saturday	28 January	27	10		
	Sunday	29 January	34	19		
	Monday	30 January	20	7		
	Tuesday	31 January	35	25		
	Wednesday	1 February	13	17		
	Thursday	2 February	33	22		
11	Friday	3 February	4	42	8	6
	Saturday	4 February	41	9	17	11
	Sunday	5 February	40	15	28	31
	Monday	6 February	21	39	20	35
	Tuesday	7 February	30	23	38	22
	Wednesday	8 February	32	41	40	19
	Thursday	9 February	38	14	36	34
12	Friday	10 February	5	12	22	24
	Saturday	11 February	8	42	41	27
	Sunday	12 February	42	26	36	11
	Monday	13 February	38	40	29	31
	Tuesday	14 February	16	21	39	20
	Wednesday	15 February	40	38	14	26
	Thursday	16 February	33	28	23	36
13	Friday	17 February	34	31	15	29
	Saturday	18 February	22	4	12	39
	Sunday	19 February	38	8	21	41
	Monday	20 February	11	36	40	28
	Tuesday	21 February	19	30	42	14
	Wednesday	22 February	36	33	38	39
	Thursday	23 February	20	41	31	21
14	Friday	24 February	17	34	36	31
	Saturday	25 February	32	5	39	12
	Sunday	26 February	41	35	16	42
	Monday	27 February	6	42	8	9
	Tuesday	28 February	14	11	33	40
	Wednesday	1 March	15	36	18	38
	Thursday	2 March	39	19	20	30

Table 27 (Continued)

Week	Day	Date	Message Sequence			
			First	Second	Third	Fourth
15	Friday	3 March	21	14	23	26
	Saturday	4 March	28	40	34	22
	Sunday	5 March	12	38	5	31
	Monday	6 March	30	41	21	33
	Tuesday	7 March	38	42	36	8
	Wednesday	8 March	40	11	19	20
	Thursday	9 March	29	39	15	27
16	Friday	10 March	24	30	22	42
	Saturday	11 March	31	21	14	41
	Sunday	12 March	33	39	29	15
	Monday	13 March	20	12	41	5
	Tuesday	14 March	19	38	42	4
	Wednesday	15 March	8	39	11	36
	Thursday	16 March	22	40	28	34
17	Friday	17 March	11	36	24	21
	Saturday	18 March	27	33	42	39
	Sunday	19 March	29	32	38	14
	Monday	20 March	36	31	12	28
	Tuesday	21 March	5	18	39	41
	Wednesday	22 March	4	8	40	42
	Thursday	23 March	9	17	8	11
18	Friday	24 March	15	23	30	26
	Saturday	25 March	14	19	42	38
18	Sunday	26 March	1	7	No Messages Scheduled	
	Monday	27 March	3	4		
	Tuesday	28 March	8	5		
	Wednesday	29 March	7	11		
	Thursday	30 March	9	1		
19	Friday	31 March	10	8		
	Saturday	1 April	6	2		
	Sunday	2 April	4	3		
	Monday	3 April	2	6		
	Tuesday	4 April	5	9		
	Wednesday	5 April	11	10		
	Thursday	6 April	8	1		
20	Friday	7 April	Worldwide Day of Health--Special Message on Hypertension			
	Saturday	8 April	10	4	No Messages Scheduled	
	Sunday	9 April	6	11		
	Monday	10 April	9	2		
	Tuesday	11 April	8	5		
	Wednesday	12 April	3	7		
	Thursday	13 April	8	10		

Table 27 (Continued)

Week	Day	Date	Message Sequence			
			First	Second	Third	Fourth
21	Friday	14 April	1	9	No Messages Scheduled	
	Saturday	15 April	11	7		
	Sunday	16 April	3	38		
	Monday	17 April	7	1		
	Tuesday	18 April	6	2		
	Wednesday	19 April	3	39		
	Thursday	20 April	10	11		
22	Friday	21 April	40	41		
	Saturday	22 April	42	2		
	Sunday	23 April	1	8		
	Monday	24 April	39	3		
	Tuesday	25 April	42	7		
	Wednesday	26 April	41	40		
	Thursday	27 April	9	6		
23	Friday	28 April	38	8		
	Saturday	29 April	10	1		
	Sunday	30 April	3	11		
	Monday	1 May	7	42		
	Tuesday	2 May	39	38		
	Wednesday	3 May	6	9		
	Thursday	4 May	40	41		
24	Friday	5 May	2	10		
	Saturday	6 May	8	3		
	Sunday	7 May	54	56		
	Monday	8 May	60	59		
	Tuesday	9 May	58	63		
	Wednesday	10 May	55	57		
	Thursday	11 May	61	62		
25	Friday	12 May	63	64		
	Saturday	13 May	60	54		
	Sunday	14 May	56	60		
	Monday	15 May	59	58		
	Tuesday	16 May	57	55		
	Wednesday	17 May	62	61		
	Thursday	18 May	64	63		
26	Friday	19 May	60	56		
	Saturday	20 May	54	59		
	Sunday	21 May	58	63		
	Monday	22 May	60	57		
	Tuesday	23 May	55	62		
	Wednesday	24 May	61	64		
	Thursday	25 May	63	54		

(Preparation of new messages and their broadcast continues at this publication date.)

APPENDIX B.
QUESTIONNAIRE

11. (If "Yes" to Question #10) What is your husband's occupation? □
24

	<u>Code</u>		<u>Code</u>
_____ Farmer	(1)	_____ Regular workman	(6)
_____ Herder	(2)	_____ Artisan	(7)
_____ Day laborer	(3)	_____ Other _____	(8)
_____ Merchant	(4)	_____ Unknown, no answer	(9)
_____ Clerk	(5)		

12. What is the highest level of school you have completed? □
25

	<u>Code</u>		<u>Code</u>
_____ Religious instruction only	(1)	_____ Secondary school, complete	(5)
_____ Primary school, incomplete	(2)	_____ Higher education, incomplete	(6)
_____ Primary school, complete	(3)	_____ Higher education, complete	(7)
_____ Secondary school, incomplete	(4)	_____ None	(8)
		_____ Unknown, no answer	(9)

13. Have you attended any other education classes?
 _____ Yes _____ No □
26

14. (If "Yes" to Question #13) What were you learning? □ □ □
27 28 29

	<u>No.</u>	<u>Answer</u>		<u>No.</u>	<u>Answer</u>
(Check each answer given)	_____	1. None attended		_____	5. Sewing
	_____	2. Literacy		_____	6. Crafts
	_____	3. Nutrition		_____	7. Growing a garden
*Use Code	_____	4. Health		_____	8. Other _____
Identifica- tion Key				_____	Unknown, no answer = 999

15. What is the highest level in school anyone in your family has completed? □
30

	<u>Code</u>		<u>Code</u>
_____ Religious instruction only	(1)	_____ Secondary school, complete	(5)
_____ Primary school, incomplete	(2)	_____ Higher education, incomplete	(6)
_____ Primary school, complete	(3)	_____ Higher education, complete	(7)
_____ Secondary school, incomplete	(4)	_____ None	(8)
		_____ Unknown, no answer	(9)

16. In what type of area is your home located? □
31

	<u>Code</u>		<u>Code</u>
_____ Small group of houses	(1)	_____ Village	(4)
_____ Farm	(2)	_____ Rural town	(5)
_____ Suburbias	(3)	_____ Town/city	(6)
		_____ Unknown, no answer	(9)

17. How many roomes does your home have? □ □
32 33

*Refers to a combination code key provided to each interviewer.

18. How many windows does your home have? _____ 34 35

19. Which of these things do you have in your home? _____ 36 37 38

- | | No. | Answer | No. | Answer |
|---------------------------|-------|---------------------|-------|--------------------------|
| (Check each answer given) | _____ | 1. None of these | _____ | 5. Refrigerator |
| | _____ | 2. Electricity | _____ | 6. Radio |
| | _____ | 3. Running water | _____ | 7. Television |
| *Use Code | _____ | 4. Separate kitchen | _____ | Unknown, no answer = 999 |
| Identifica-
tion Key | | | | |

[Indicate the sex of the child described in this report. 39
1 = Male, 2 = Female, 9 = Unknown, no data]

20. Do you own or rent your home? _____ 40

- | | | Code |
|--------------------|------------------------------------|------|
| (Check one answer) | _____ Owned by husband, wife | (1) |
| | _____ Owned by other family member | (2) |
| | _____ Rented | (3) |
| | _____ Furnished by employer | (4) |
| | _____ Other _____ | (8) |
| | _____ Unknown, no answer | (9) |

21. How much land do you have? (hectares) _____ 41 42

22. How much of that land is cultivated? (hectares) _____ 43 44
(Crops are grown) _____

23. Do you raise any animals? _____ Yes _____ No 45

24. (If "Yes" to Question #23) What animals do you raise? _____ 46 47 48

- | | No. | Answer | No. | Answer |
|-------------------------|-------|------------------------|-------|--------------------------|
| (Check each answer) | _____ | 1. None raised | _____ | 5. Poultry |
| | _____ | 2. Cattle (cows) | _____ | 6. Pigs (hogs) |
| | _____ | 3. Sheep | _____ | 7. Camels |
| *Use Code | _____ | 4. Horse, donkey, mule | _____ | 8. Other |
| Identifica-
tion Key | | | _____ | Unknown, no answer = 999 |

ASSESSMENT OF ECONOMIC STATUS

Considering the responses to Questions #16-#25 and observation how would you rate the economic condition of this family? 49

- | | Code | | Code |
|---------------------------|------|--------------------------|------|
| _____ Very superior | (1) | _____ Below average | (4) |
| _____ Moderately superior | (2) | _____ Very inferior | (5) |
| _____ Average | (3) | _____ Unknown, no answer | (9) |

25. How far do you travel to the _____ MCH Center? _____ km. 50 51

*Refers to a combination code key provided to each interviewer.

26. How do you travel to the MCH Center?

	<u>Code</u>		<u>Code</u>
<input type="checkbox"/> By foot (walk)	(1)	<input type="checkbox"/> Combination of (1) and (2)	(5)
<input type="checkbox"/> Public vehicle (bus)	(2)	<input type="checkbox"/> Other combination	(6)
<input type="checkbox"/> Taxi or private vehicle	(3)	<input type="checkbox"/> Unknown, no answer	(9)
<input type="checkbox"/> Animal	(4)		

52

27. How long does it take you to come to the _____ MCH Center?

	<u>Code</u>		<u>Code</u>
<input type="checkbox"/> 15 minutes or less	(1)	<input type="checkbox"/> About an hour	(3)
<input type="checkbox"/> More than 15 minutes but less than 30 minutes	(2)	<input type="checkbox"/> About 2 hours	(4)
		<input type="checkbox"/> More than 2 hours	(5)
		<input type="checkbox"/> Unknown, no answer	(9)

53

28. How long have you been coming to the _____ MCH Center?
 _____ Years (Less than 1 year = 01)

54 55

29. Do you belong to any groups or clubs? Yes No

56

30. (If "Yes" to Question #29) To what type of organizations do you belong?

	<u>No.</u>	<u>Answer</u>
(Check each answer given)	<input type="checkbox"/>	1. Don't belong to any
	<input type="checkbox"/>	2. Community group
	<input type="checkbox"/>	3. Religious group
*Use Code	<input type="checkbox"/>	4. Women's group
Identifica-	<input type="checkbox"/>	8. Other _____
tion Key	<input type="checkbox"/>	Unknown, no answer = 999

57 58 59

31. Do any members of your family belong to groups or clubs?
 Yes No

60

32. (If "Yes" to Question #31) Which members of your family belong?

	<u>No.</u>	<u>Answer</u>
(Check each answer given)	<input type="checkbox"/>	1. None belong
	<input type="checkbox"/>	2. Husband
	<input type="checkbox"/>	3. Child or children
*Use Code	<input type="checkbox"/>	4. Parents
Identifica-	<input type="checkbox"/>	8. Other _____
tion Key	<input type="checkbox"/>	Unknown, no answer = 999

61 62 63

33. (If "Yes" to Question #32) To what type of organization do they belong?

	<u>No.</u>	<u>Answer</u>		<u>No.</u>	<u>Answer</u>
(Check each answer given)	<input type="checkbox"/>	1. None belong		<input type="checkbox"/>	6. Women's Union
	<input type="checkbox"/>	2. Community group		<input type="checkbox"/>	7. Cultural club
	<input type="checkbox"/>	3. Religious association		<input type="checkbox"/>	8. Other _____
*Use Code	<input type="checkbox"/>	4. Sporting association		<input type="checkbox"/>	Unknown, no answer = 999
Identifica-	<input type="checkbox"/>	5. Trade Association			
tion Key	<input type="checkbox"/>				

64 65 66

*Refers to a combination code key provided to each interviewer.

Part B: Child's Food Consumption Report

34. What is this child's birth date? (Calculate and enter age in months.) _____
87 88

35. What is this child's present weight? _____ kg. (Record only measured weight--do not use mother's estimate. Enter weight to one decimal point or to nearest whole kg. using __ . 0)
69 70

36. Are you usually responsible for feeding this child?
 _____ Yes _____ No 71

37. Were you responsible for feeding this child yesterday?
 _____ Yes _____ No 72

NOTE: If answer to Question #37 is "No," find the person who was responsible for feeding the child yesterday.

38. Was this child breast fed yesterday? _____ Yes _____ No
73

39. Is this child weaned (off the breast)? _____ Yes _____ No
74

40. (If "Yes" to Question #39) Why is this child weaned?

- | | <u>No.</u> | <u>Answer</u> |
|---------------------------|------------|----------------------------|
| (Check each answer given) | _____ 1. | Not weaned |
| | _____ 2. | Too old--under 1 year |
| | _____ 3. | Too old--1 to 2 years |
| *Use Code | _____ 4. | Too old--more than 2 years |
| Identifica- | _____ 5. | Mother pregnant |
| tion Key | _____ 6. | Mother working |
| | _____ 7. | Problem breast feeding |
| | _____ 8. | Other _____ |
| | _____ | Unknown, no answer = 999 |

75 76 77

LEAVE BLANK
78 79 80

Data Field No.
1

PMI
2 3 4 5

Mother
6 7 8

41. Was this child bottle fed yesterday? _____ Yes _____ No
9

42. (If "Yes" to Question #41) What type of bottle feeding was given.
10 11 12

- | | <u>Code</u> |
|---|-------------|
| _____ Fresh milk, own animals | (1) |
| _____ Fresh milk, purchased | (2) |
| _____ Powdered milk or formula, purchased | (3) |
| _____ Powdered milk or formula, supplied by Center/Clinic, etc. | (4) |
| _____ Other _____ | (8) |
| _____ Unknown, no answer | (9) |

*Refers to a combination code key provided to each interviewer.

43. Did this child eat any other food yesterday? Yes No

13

44. (If "Yes" to Question #43) What other foods did this child eat yesterday?

READ: "Start with the first feeding yesterday and tell me each food that was eaten by this child. I need to know how each food was prepared, what the ingredients were, and how much of each ingredient was used. I'll show you some containers to help determine amounts. I also need to know how many times the food was eaten and how much was eaten."

NOTE: If tea is mentioned, ask about amounts of sugar and amount and type of milk/cream. If bread is mentioned, ask about amount and type of butter/other spread.

FOOD ITEM	AMOUNT OF INGREDIENTS PREPARED/GIVEN	AMOUNT EATEN	TIME PERIOD

PROBE: "Did the child eat anything else in the morning? In the afternoon? Between meals--any sweets, soft drinks, etc.? Before bed? Any other snacks? Fruits? Did the child wake up in the night? Did the child eat anything then?"

45. Was what this child ate yesterday the way he/she usually eats?
 Yes No 14

46. (If "No" to Question #45) Why was it different?

15

	<u>Code</u>		<u>Code</u>
<u> </u> Child was sick	(1)	<u> </u> Mother (other person)	
<u> </u> Mother (responsible person) sick	(2)	<u> </u> not home	(4)
<u> </u> Other illness in family	(3)	<u> </u> Holiday	(5)
		<u> </u> Other _____	(8)
		<u> </u> Unknown, no answer	(9)

47. How does this child's eating usually take place?

16	17	18

- | | | |
|---------------------------------|------------|--|
| | <u>No.</u> | <u>Answer</u> |
| (Check each appropriate answer) | _____ | 1. None of the following |
| | _____ | 2. Supervised by mother or other adult |
| | _____ | 3. Alone--feeds self |
| *Use Code | _____ | 4. With rest of family--feeds self |
| Identifica- | _____ | 5. At regular times |
| tion Key | _____ | 6. On demand |
| | _____ | 7. From the family "pot" |
| | _____ | 8. With own special eating utensils |
| | _____ | Unknown, no answer = 999 |

48. Has this child had any severe or prolonged illness during the past 2 months? _____ Yes _____ No

19

49. (If "Yes" to Question #48) What was this illness?

20	21	22

- | | | |
|---------------------------------|------------|---|
| | <u>No.</u> | <u>Answer</u> |
| (Check each appropriate answer) | _____ | 1. None of the following |
| | _____ | 2. Childhood/infectious disease (measles, whooping cough, etc.) |
| *Use Code | _____ | 3. Gastroenteritis (diarrhea, dysentery) |
| Identifica- | _____ | 4. Respiratory disease |
| tion Key | _____ | 5. Malnutrition/worms |
| | _____ | 6. Fever |
| | _____ | 7. Eye or skin infection |
| | _____ | 8. Other _____ |
| | _____ | Unknown, no answer |

50. Did you receive any food to take home for the child at the MCH Center the last time you were there? _____ Yes _____ No

23

51. (If "Yes" to Question #50) Were you given SAHA? _____ Yes _____ No

24

52. (If "No" to Question #51) Have you ever been given SAHA at the MCH Center? _____ Yes _____ No

25

*Refers to a combination code key provided to each interviewer.

Part C: Mother's Food Consumption Report

Now I'd like to ask some questions about what you ate yesterday.

53. READ: "Starting with the first thing you ate yesterday, please tell me everything you ate or drank. I need to know how each food was prepared, and about things like sugar in tea, and so forth. I also need to know the amount eaten. I will show you some containers and ask you to show me how much you used."

FOOD ITEM	AMOUNT PREPARED	AMOUNT EATEN	TIME PERIOD

PROBE: "Did you eat anything else during the day? Between meals... snacks...before you went to bed? Sweets...soft drinks... fruits, etc. Sugar and milk with tea...butter, other spreads with bread, etc.?"

54. Was the way you ate yesterday typical for you? Yes No

26

55. (If "No" to Question #54) Why was it different?

27

<input type="checkbox"/> Was ill yesterday	<u>Code</u> (1)	<input type="checkbox"/> Holiday	<u>Code</u> (4)
<input type="checkbox"/> Other illness in family	(2)	<input type="checkbox"/> No money or no food	(5)
<input type="checkbox"/> Not at home	(3)	<input type="checkbox"/> Other _____	(8)
		<input type="checkbox"/> Unknown, no answer	(9)

56. Are you pregnant now? Yes (1) No (2)
(Do not ask if answer is obvious)

28

I think I am (3) I think I am not (4)
 I don't know (5) No answer (9)

57. Are you nursing your baby now? Yes No
(Do not ask if answer is obvious)

29

NUTRITIONIST'S ASSESSMENT OF CHILD'S DIET

(See Questions #39 and #44, #34 and #35, and #47)

Considering the age and health status of this child, how adequate was this diet?

(Check the appropriate rating)	_____	Extremely poor diet	<u>Code</u>	(1)	Enter Code <input type="text" value="30"/>
	_____	Poor or insufficient diet		(2)	
	_____	Adequate diet		(3)	
	_____	Good diet		(4)	
	_____	Excellent diet		(5)	
	_____	Not enough information to judge; don't know		(9)	

If above rating is 1, 2, 3, or 4, what is required to improve the diet?

	<u>No.</u>	<u>Answer</u>
(Check each appropriate answer)	_____	1. Nothing required, diet is good.
	_____	2. Vegetables
	_____	3. Fruits
*Use Code	_____	4. Legumineuses
Identifica-	_____	5. Eggs
tion Key	_____	6. Milk or milk products
	_____	7. Cereal or grain
	_____	8. Weaning food (SAHA)
	_____	Unknown, no answer = 999

Did child consume any of the following foods?

	<u>Yes</u>	<u>No</u>	
Vegetables	_____	_____	<input type="text" value="34"/>
Fruits	_____	_____	<input type="text" value="35"/>
Legumineuses	_____	_____	<input type="text" value="36"/>
Eggs	_____	_____	<input type="text" value="37"/>
Milk or Milk products	_____	_____	<input type="text" value="38"/>
SAHA or other weaning food	_____	_____	<input type="text" value="39"/>

*Refers to a combination code key provided to each interviewer.

NUTRITIONIST'S ASSESSMENT OF MOTHER'S DIET

(See Question #53, #56 and #57)

Considering the health status of this mother, how adequate was this diet?

		<u>Code</u>	
(Check the	_____	Extremely poor diet	(1)
appropriate	_____	Poor or insufficient diet	(2)
rating)	_____	Adequate diet	(3)
	_____	Good diet	(4)
	_____	Excellent diet	(5)
	_____	Not enough information to	(9)
		judge; don't know	

Enter Code

If above rating is 1, 2, 3, or 4, what is required to improve the diet?

	<u>No.</u>	<u>Answer</u>
(Check each	_____	1. Nothing required, diet is good
appropriate	_____	2. Vegetables
answer)	_____	3. Fruits
	_____	4. Legumineuses
*Use Code	_____	5. Eggs
Identifica-	_____	6. Milk or milk products
tion Key	_____	7. Cereal or grain
	_____	8. Meat, fish, or poultry
	_____	Unknown, no answer = 999

Did the mother consume any of the following foods?

	<u>Yes</u>	<u>No</u>	
Vegetables	_____	_____	<input type="text" value="44"/>
Fruits	_____	_____	<input type="text" value="45"/>
Legumineuses	_____	_____	<input type="text" value="46"/>
Eggs	_____	_____	<input type="text" value="47"/>
Milk or milk products	_____	_____	<input type="text" value="48"/>

*Refers to a combination code key provided to each interviewer.

Part D: Nutrition Knowledge and Attitudes

58. What kinds of foods do you think you should feed your family to keep them healthy?

49	50	51

- | | | | | | | | | | | | | | | | | | | | | | |
|---|---|------------|---------------|----------|---------------------------------|----------|------------|----------|--------|----------|--------------|----------|-----------------------|----------|-----------------------|----------|------|----------|---------|-------|--------------------------|
| (Check each appropriate answer)

*Use Code Identification Key | <table border="0"> <tr> <td style="text-align: right;"><u>No.</u></td> <td style="text-align: left;"><u>Answer</u></td> </tr> <tr> <td style="text-align: right;">_____ 1.</td> <td>None of the following mentioned</td> </tr> <tr> <td style="text-align: right;">_____ 2.</td> <td>Vegetables</td> </tr> <tr> <td style="text-align: right;">_____ 3.</td> <td>Fruits</td> </tr> <tr> <td style="text-align: right;">_____ 4.</td> <td>Legumineuses</td> </tr> <tr> <td style="text-align: right;">_____ 5.</td> <td>Meat/fish, or poultry</td> </tr> <tr> <td style="text-align: right;">_____ 6.</td> <td>Milk or milk products</td> </tr> <tr> <td style="text-align: right;">_____ 7.</td> <td>Eggs</td> </tr> <tr> <td style="text-align: right;">_____ 8.</td> <td>Cereals</td> </tr> <tr> <td style="text-align: right;">_____</td> <td>Unknown, no answer = 999</td> </tr> </table> | <u>No.</u> | <u>Answer</u> | _____ 1. | None of the following mentioned | _____ 2. | Vegetables | _____ 3. | Fruits | _____ 4. | Legumineuses | _____ 5. | Meat/fish, or poultry | _____ 6. | Milk or milk products | _____ 7. | Eggs | _____ 8. | Cereals | _____ | Unknown, no answer = 999 |
| <u>No.</u> | <u>Answer</u> | | | | | | | | | | | | | | | | | | | | |
| _____ 1. | None of the following mentioned | | | | | | | | | | | | | | | | | | | | |
| _____ 2. | Vegetables | | | | | | | | | | | | | | | | | | | | |
| _____ 3. | Fruits | | | | | | | | | | | | | | | | | | | | |
| _____ 4. | Legumineuses | | | | | | | | | | | | | | | | | | | | |
| _____ 5. | Meat/fish, or poultry | | | | | | | | | | | | | | | | | | | | |
| _____ 6. | Milk or milk products | | | | | | | | | | | | | | | | | | | | |
| _____ 7. | Eggs | | | | | | | | | | | | | | | | | | | | |
| _____ 8. | Cereals | | | | | | | | | | | | | | | | | | | | |
| _____ | Unknown, no answer = 999 | | | | | | | | | | | | | | | | | | | | |

59. How many meals do you think you should feed your family each day?

52

60. Who usually goes to the market to buy the food for your family?

53

- | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--|----------------------------|-------------|-------------|-----|-------|---------|-----|--|-------|--------|-----|--|-------|--------|-----|--|-------|-------|-----|--|---|-------|----------------------------|-------------|-----|-------|--------------------------|-----|--|-------|-------|-----|--|-------|--------------------|-----|--|
| <table border="0"> <tr> <td style="text-align: right;">_____</td> <td>Myself</td> <td style="text-align: center;"><u>Code</u></td> <td style="text-align: center;">(1)</td> </tr> <tr> <td style="text-align: right;">_____</td> <td>Husband</td> <td style="text-align: center;">(2)</td> <td></td> </tr> <tr> <td style="text-align: right;">_____</td> <td>Mother</td> <td style="text-align: center;">(3)</td> <td></td> </tr> <tr> <td style="text-align: right;">_____</td> <td>Father</td> <td style="text-align: center;">(4)</td> <td></td> </tr> <tr> <td style="text-align: right;">_____</td> <td>Child</td> <td style="text-align: center;">(5)</td> <td></td> </tr> </table> | _____ | Myself | <u>Code</u> | (1) | _____ | Husband | (2) | | _____ | Mother | (3) | | _____ | Father | (4) | | _____ | Child | (5) | | <table border="0"> <tr> <td style="text-align: right;">_____</td> <td>Other female family member</td> <td style="text-align: center;"><u>Code</u></td> <td style="text-align: center;">(6)</td> </tr> <tr> <td style="text-align: right;">_____</td> <td>Other male family member</td> <td style="text-align: center;">(7)</td> <td></td> </tr> <tr> <td style="text-align: right;">_____</td> <td>Other</td> <td style="text-align: center;">(8)</td> <td></td> </tr> <tr> <td style="text-align: right;">_____</td> <td>Unknown, no answer</td> <td style="text-align: center;">(9)</td> <td></td> </tr> </table> | _____ | Other female family member | <u>Code</u> | (6) | _____ | Other male family member | (7) | | _____ | Other | (8) | | _____ | Unknown, no answer | (9) | |
| _____ | Myself | <u>Code</u> | (1) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| _____ | Husband | (2) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| _____ | Mother | (3) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| _____ | Father | (4) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| _____ | Child | (5) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| _____ | Other female family member | <u>Code</u> | (6) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| _____ | Other male family member | (7) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| _____ | Other | (8) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| _____ | Unknown, no answer | (9) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

61. Do you feed your family fresh vegetables? _____ Yes _____ No

54

62. Why, or why not?

55	56	57

[Open-ended multiple response question similar to Question #58.]

63. (If "Yes" to Question #61) How often do you prepare fresh vegetables for your family?

58

- | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--|-----------------------|-------------|-------------|-----|-------|------------------|-----|--|-------|-----------------|-----|--|---|-------|----------------------|-------------|-----|-------|-----------------------|-----|--|-------|--------------------|-----|--|
| <table border="0"> <tr> <td style="text-align: right;">_____</td> <td>Every day</td> <td style="text-align: center;"><u>Code</u></td> <td style="text-align: center;">(1)</td> </tr> <tr> <td style="text-align: right;">_____</td> <td>Almost every day</td> <td style="text-align: center;">(2)</td> <td></td> </tr> <tr> <td style="text-align: right;">_____</td> <td>Every other day</td> <td style="text-align: center;">(3)</td> <td></td> </tr> </table> | _____ | Every day | <u>Code</u> | (1) | _____ | Almost every day | (2) | | _____ | Every other day | (3) | | <table border="0"> <tr> <td style="text-align: right;">_____</td> <td>Several times a week</td> <td style="text-align: center;"><u>Code</u></td> <td style="text-align: center;">(4)</td> </tr> <tr> <td style="text-align: right;">_____</td> <td>Several times a month</td> <td style="text-align: center;">(5)</td> <td></td> </tr> <tr> <td style="text-align: right;">_____</td> <td>Unknown, no answer</td> <td style="text-align: center;">(9)</td> <td></td> </tr> </table> | _____ | Several times a week | <u>Code</u> | (4) | _____ | Several times a month | (5) | | _____ | Unknown, no answer | (9) | |
| _____ | Every day | <u>Code</u> | (1) | | | | | | | | | | | | | | | | | | | | | | |
| _____ | Almost every day | (2) | | | | | | | | | | | | | | | | | | | | | | | |
| _____ | Every other day | (3) | | | | | | | | | | | | | | | | | | | | | | | |
| _____ | Several times a week | <u>Code</u> | (4) | | | | | | | | | | | | | | | | | | | | | | |
| _____ | Several times a month | (5) | | | | | | | | | | | | | | | | | | | | | | | |
| _____ | Unknown, no answer | (9) | | | | | | | | | | | | | | | | | | | | | | | |

64. How often do you yourself eat fresh vegetables?

59

- | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--|-----------------------|-------------|-------------|-----|-------|------------------|-----|--|-------|-----------------|-----|--|---|-------|----------------------|-------------|-----|-------|-----------------------|-----|--|-------|--------------------|-----|--|
| <table border="0"> <tr> <td style="text-align: right;">_____</td> <td>Every Day</td> <td style="text-align: center;"><u>Code</u></td> <td style="text-align: center;">(1)</td> </tr> <tr> <td style="text-align: right;">_____</td> <td>Almost every day</td> <td style="text-align: center;">(2)</td> <td></td> </tr> <tr> <td style="text-align: right;">_____</td> <td>Every other day</td> <td style="text-align: center;">(3)</td> <td></td> </tr> </table> | _____ | Every Day | <u>Code</u> | (1) | _____ | Almost every day | (2) | | _____ | Every other day | (3) | | <table border="0"> <tr> <td style="text-align: right;">_____</td> <td>Several times a week</td> <td style="text-align: center;"><u>Code</u></td> <td style="text-align: center;">(4)</td> </tr> <tr> <td style="text-align: right;">_____</td> <td>Several times a month</td> <td style="text-align: center;">(5)</td> <td></td> </tr> <tr> <td style="text-align: right;">_____</td> <td>Unknown, no answer</td> <td style="text-align: center;">(9)</td> <td></td> </tr> </table> | _____ | Several times a week | <u>Code</u> | (4) | _____ | Several times a month | (5) | | _____ | Unknown, no answer | (9) | |
| _____ | Every Day | <u>Code</u> | (1) | | | | | | | | | | | | | | | | | | | | | | |
| _____ | Almost every day | (2) | | | | | | | | | | | | | | | | | | | | | | | |
| _____ | Every other day | (3) | | | | | | | | | | | | | | | | | | | | | | | |
| _____ | Several times a week | <u>Code</u> | (4) | | | | | | | | | | | | | | | | | | | | | | |
| _____ | Several times a month | (5) | | | | | | | | | | | | | | | | | | | | | | | |
| _____ | Unknown, no answer | (9) | | | | | | | | | | | | | | | | | | | | | | | |

65. Do you have a garden where you grow vegetables? _____ Yes _____ No

60

*Refers to a combination code key provided to each interviewer.

74. How often do you feed your family fish?

40

- | | | | | | | | |
|-------|------------------|-------------|-----|-------|-----------------------|-------------|-----|
| _____ | Every day | <u>Code</u> | (1) | _____ | Several times a week | <u>Code</u> | (4) |
| _____ | Almost every day | | (2) | _____ | Several times a month | | (5) |
| _____ | Every other day | | (3) | _____ | Unknown, no answer | | (9) |

LEAVE BLANK

41

75. Why do you serve or not serve fish?

42 43 44

[Open-ended multiple response question similar to Question #58.]

76. How often do you feed your family chicken?

45

- | | | | | | | | |
|-------|------------------|-------------|-----|-------|-----------------------|-------------|-----|
| _____ | Every day | <u>Code</u> | (1) | _____ | Several times a week | <u>Code</u> | (4) |
| _____ | Almost every day | | (2) | _____ | Several times a month | | (5) |
| _____ | Every other day | | (3) | _____ | Unknown, no answer | | (9) |

77. Why do you serve or not serve chicken?

46 47 48

[Open-ended multiple response question similar to Question #58.]

78. Do you raise any chickens? _____ Yes _____ No

49

79. (If "Yes" to Question #78) Do your chickens lay eggs?
_____ Yes _____ No

50

80. Do you feed eggs to your family? _____ Yes _____ No

51

81. Why do you (or don't you) feed eggs to your family?

52 53 54

[Open-ended multiple response question similar to Question #58.]

82. (If "Yes" to Question #81) How often do you serve eggs to your family?

55

- | | | | | | | | |
|-------|------------------|-------------|-----|-------|-----------------------|-------------|-----|
| _____ | Every day | <u>Code</u> | (1) | _____ | Several times a week | <u>Code</u> | (4) |
| _____ | Almost every day | | (2) | _____ | Several times a month | | (5) |
| _____ | Every other day | | (3) | _____ | Unknown, no answer | | (9) |

83. Are there people (in your family) that you think should not eat eggs? _____ Yes _____ No

56

84. (If "Yes" to Question #83) Who are they and why shouldn't they eat eggs?

<u>Person</u>	<u>Reason</u>	<u>Person</u>	<u>Reason</u>
_____	_____	<input type="text"/>	<input type="text"/>
		57	58
_____	_____	<input type="text"/>	<input type="text"/>
		59	60
_____	_____	<input type="text"/>	<input type="text"/>
		61	62

85. Have you made any changes lately in feeding eggs to your family? Yes No 83

(If "No" to Question #85, go on to Question #89)

86. (If "Yes" to Question #85) What changes have you made? 64 65 66

[Open-ended multiple response question similar to Question #58.]

87. Do you remember when you first made that (those) change(s)? 67 68
How many months ago? _____ Months

88. Do you know why you changed? What made you change? 69 70 71

[Open-ended multiple response question similar to Question #58.]

89. Do you use "legumineuses" in your family meals? Yes No 72

90. (If "Yes" to Question #89) How often do you use "Legumineuses?" 73

	<u>Code</u>		<u>Code</u>
<input type="checkbox"/> Every day	(1)	<input type="checkbox"/> Several times a week	(4)
<input type="checkbox"/> Almost every day	(2)	<input type="checkbox"/> Several times a month	(5)
<input type="checkbox"/> Every other day	(3)	<input type="checkbox"/> Unknown, no answer	(9)

91. Have you made any changes lately in feeding legumineuses to your family? Yes No 74

(If "No" to Question #91, go on to Question #95)

92. (If "Yes" to Question #91) What changes have you made? 75 76 77

[Open-ended multiple response question similar to Question #58.]

93. Do you remember when you first made that (those) change(s)? 78 79
How many months ago? _____ Months

LEAVE BLANK 80

Data Field No. 4 1

PMI 2 3 4 5

Mother 6 7 8

94. Do you know why you changed? What made you change? 9 10 11

[Open-ended multiple response question similar to Question #58.]

95. Do you give milk to any members of your family? 12
 Yes No

96. (If "Yes" to Question #95) Who do you give milk to? 13 14 15

[Open-ended multiple response question similar to Question #58.]

97. Do you use milk in preparing any of your family meals? 16
_____ Yes _____ No

98. (If "Yes" to Question #97) How often do you use milk in preparing meals? 17

_____ Every day	<u>Code</u> (1)	_____ Several times a week	<u>Code</u> (4)
_____ Almost every day	(2)	_____ Several times a month	(5)
_____ Every other day	(3)	_____ Unknown, no answer	(9)

99. Have you made any changes lately in feeding milk to your family? _____ Yes _____ No 18
(If "No" to Question #99, go on to Question #103)

100. (If "Yes" to Question #99) What changes have you made? 19 20 21
[Open-ended multiple response question similar to Question #58.]

101. Do you remember when you first made that (those) change(s)? 22 23
How many months ago? _____ Months

102. Do you know why you changed? What made you change? 24 25 26
[Open-ended multiple response question similar to Question #58.]

103. Do you think pregnant and lactating women should eat any differently than women who are not pregnant or lactating? 27
_____ Yes _____ No

104. Why, or why not? 28 29 30
[Open-ended multiple response question similar to Question #58.]

105. Are there any foods in particular that you think pregnant women should eat? _____ Yes _____ No 31

106. (If "Yes" to Question #105) What are they? 32 33 34
[Open-ended multiple response question similar to Question #58.]

107. Are there any foods in particular that you think pregnant women should not eat? _____ Yes _____ No 35

108. (If "Yes" to Question #107) What are they? 36 37 38
[Open-ended multiple response question similar to Question #58.]

109. Are there any foods in particular that you think lactating women should eat? _____ Yes _____ No 39

110. (If "Yes" to Question #109) What are they?
40 41 42

[Open-ended multiple response question similar to Question #58.]

111. Are there any foods in particular that you think lactating women should not eat? Yes No
43

112. (If "Yes" to Question #111) What are they?
44 45 46

[Open-ended multiple response question similar to Question #58.]

113. Have you changed your ideas lately about what pregnant or lactating women should eat? Yes No
47

LEAVE BLANK
48 49

(If "No" to Question #113, go on to Question #117)

114. (If "Yes" to Question #113) What different ideas do you now have?
50 51 52

[Open-ended multiple response question similar to Question #58.]

115. Do you remember when you first changed your ideas this way?
53 54
How many months ago? _____ Months

116. Do you know why you changed your ideas? What made you change?
55 56 57

[Open-ended multiple response question similar to Question #58.]

117. How long do you think a baby should breast feed?
58 59
_____ Months

118. When should the baby start taking other liquids?
60 61
_____ Months

119. What kind of liquids would you give the baby then?
62 63 64

- | | <u>No.</u> | <u>Answer</u> |
|---------------------------|------------|---|
| (Check each answer given) | _____ | 1. Would not give other liquid |
| | _____ | 2. Water/sugar water |
| *Use Code | _____ | 3. Fruit juice |
| Identifica- | _____ | 4. Cow's milk, powdered milk, etc. |
| tion Key | _____ | 5. Infant formula |
| | _____ | 6. Porridge/cereal |
| | _____ | 7. Soft drink (e.g., Coca Cola, other carbonated beverages) |
| | _____ | 8. Other _____ |
| | _____ | Unknown, no answer = 999 |

120. When should the baby start taking solid foods? _____ Months
65 66

*Refers to a combination code key provided to each interviewer.

121. What kind of solid foods would you give the baby then?

87	88	89

- | | | |
|---------------------------|------------|--|
| | <u>No.</u> | <u>Answer</u> |
| (Check each answer given) | _____ | 1. Would not give solid food |
| | _____ | 2. Tubers or roots |
| *Use Code | _____ | 3. Fruits or vegetables |
| Identifica- | _____ | 4. Soup |
| tion Key | _____ | 5. Cereal |
| | _____ | 6. Legumineuses and other vegetables high in protein |
| | _____ | 7. Animal protein |
| | _____ | 8. Other _____ |
| | _____ | Unknown, no answer = 999 |

122. At what age should a baby be taken off the breast?
_____ Months

70	71

123. How should the baby be taken off the breast? All at once or gradually?

72

- | | | |
|-------------------------|---|-------------|
| | | <u>Code</u> |
| (Check one answer only) | _____ All at once | (1) |
| | _____ Gradually, no time period specified | (2) |
| | _____ Gradually, over less than one month | (3) |
| | _____ Gradually, over more than one month | (4) |
| | _____ Other _____ | (8) |
| | _____ Unknown, no answer | (9) |

124. What foods do you think are especially good for a very young child (toddler)?

73	74	75

[Open-ended multiple response question similar to Question #58.]

LEAVE BLANK

76	77	78	79	80

Data Field No.

5

PMI

2	3	4	5

Mother

8	7	8

125. What foods do you think very young children (toddlers) should not eat? Why?

<u>Food</u>	<u>Reason</u>	<u>Food</u>	<u>Reason</u>				
_____	_____	<table border="1"><tr><td></td></tr><tr><td>9</td></tr></table>		9	<table border="1"><tr><td></td></tr><tr><td>10</td></tr></table>		10
9							
10							
_____	_____	<table border="1"><tr><td></td></tr><tr><td>11</td></tr></table>		11	<table border="1"><tr><td></td></tr><tr><td>12</td></tr></table>		12
11							
12							
_____	_____	<table border="1"><tr><td></td></tr><tr><td>13</td></tr></table>		13	<table border="1"><tr><td></td></tr><tr><td>14</td></tr></table>		14
13							
14							

126. Have you changed your ideas lately about what babies and young children should be fed? _____ Yes _____ No

15

(If "No" to Question #126, go on to Question #130)

*Refers to a combination code key provided to each interviewer.

127. (If "Yes" to Question #126) What different ideas do you now have?
16 17 18

[Open-ended multiple response question similar to Question #58.]

128. Do you remember when you first changed your ideas about this?
How many months ago? _____ Months
19 20

129. Do you know why you changed your ideas? What made you change?
21 22 23

[Open-ended multiple response question similar to Question #58.]

130. Do you think babies should be exposed to the sun?
_____ Yes _____ No
24

131. Why or why not?
25 26 27

[Open-ended multiple response question similar to Question #58.]

132. At what age should a baby or child begin to be exposed to the sun? _____ Months
28 29

133. At that age, how long should the baby or child be exposed?
_____ Minutes
30

134. How should you cover the baby or child for the sun at that age?
31

[Open-ended multiple response question similar to Question #58.]

135. Have you changed your ideas lately about exposing young babies to the sun? _____ Yes _____ No
32

(If "No" to Question #135, go on to Question #139)

136. (If "Yes" to Question #135) How are your ideas different now?
33 34 35

[Open-ended multiple response question similar to Question #58.]

137. Do you remember when you first changed your ideas this way?
How many months ago? _____ Months
33

138. Do you know why you changed your ideas? What made you change?
37 38 39

[Open-ended multiple response question similar to Question #58.]

Part E: Media Exposure

139. Do you have a radio at home? _____ Yes _____ No
40

140. Do you listen to the radio anywhere else? _____ Yes _____ No
41

PROBE: If you are sure she never listens to the radio, go on to Question #161.

141. How often do you usually listen to the radio?

42

	<u>Code</u>		<u>Code</u>
<input type="checkbox"/> Every day	(1)	<input type="checkbox"/> Several times a month	(4)
<input type="checkbox"/> Almost every day	(2)	<input type="checkbox"/> Very seldom	(5)
<input type="checkbox"/> Several times a week	(3)	<input type="checkbox"/> Never	(6)
		<input type="checkbox"/> Unknown, no answer	(9)

142. How much do you listen to the radio? (Form most appropriate question based on response to Question #145)

Time Period

<u>Time Period</u>	<u>Code</u>
<input type="checkbox"/> Day	(1)
<input type="checkbox"/> Week	(2)
<input type="checkbox"/> Month	(3)
<input type="checkbox"/> Unknown, no answer	(9)

Amount of Time
(Hours) 43 44

(1 Hour or less = 01)

143. At what times during the day do you usually listen?

45 46 47

	<u>No.</u>	<u>Answer</u>
(Check each appropriate answer)	<input type="checkbox"/>	1. Does not listen
	<input type="checkbox"/>	2. All day
	<input type="checkbox"/>	3. Early morning
*Use Code	<input type="checkbox"/>	4. Mid-morning
Identifica-	<input type="checkbox"/>	5. Mid-day
tion Key	<input type="checkbox"/>	6. Afternoon
	<input type="checkbox"/>	7. Early evening
	<input type="checkbox"/>	8. Late evening
	<input type="checkbox"/>	Unknown, no answer = 999

144. Have you heard any information on the radio about how to buy food? Yes No

48

145. (If "Yes" to Question #144) Can you tell me what you heard?

49 50 51

[Open-ended multiple response question similar to Question #58.]

146. Have you heard any information on the radio about what you should feed your family? Yes No

52

147. (If "Yes" to Question #146) Can you tell me what you heard?

53 54 55

[Open-ended multiple response question similar to Question #58.]

148. Have you heard any information on the radio about how to feed or what you should feed young children? Yes No

56

149. (If "Yes" to Question #148) Can you tell me what you heard?

57 58 59

[Open-ended multiple response question similar to Question #58.]

*Refers to a combination code key provided to each interviewer.

150. Have you heard any information on the radio about breast feeding babies? Yes No
80

151. (If "Yes" to Question #150) Can you tell me what you heard?
81 82 83
[Open-ended multiple response question similar to Question #58.]

152. Is there any other information about food that you have heard on the radio? Yes No
84

153. (If "Yes" to Question #152) What is it that you heard?
85 86 87
[Open-ended multiple response question similar to Question #58.]

154. Have you heard any information on the radio about the sun, especially about the sun for babies? Yes No
88

155. (If "Yes" to Question #154) Can you tell me what you heard?
89 90 91
[Open-ended multiple response question similar to Question #58.]

156. When you heard this information on the radio, do you remember who was speaking?
92

	<u>Code</u>		<u>Code</u>
<u> </u> A man	(1)	<u> </u> Identified male speaker	(5)
<u> </u> A woman	(2)	<u> </u> Identified female speaker	(6)
<u> </u> A doctor	(3)	<u> </u> Other _____	(8)
<u> </u> Dr. Hakim	(4)	<u> </u> Unknown, no data	(9)

157. Can you tell me who was responsible for presenting the radio messages?
93

	<u>Code</u>		<u>Code</u>
<u> </u> Specifically identified Nutrition Institute	(1)	<u> </u> The Radio (RTT)	(3)
<u> </u> Vaguely identifies the Nutrition Institute	(2)	<u> </u> Another institution	(4)
		<u> </u> Other _____	(8)
		<u> </u> Unknown, no data	(9)

158. Do you remember when you first started hearing these radio messages? How many months ago? _____ Months
94 95

159. Have you talked about these radio messages with anybody?
96
 Yes No

160. (If "Yes" to Question #159) Who have you talked to?
97 98 99
[Open-ended multiple response question similar to Question #58.]

LEAVE BLANK
100

Data Field No.

PMI

Mother

161. When you visited the PMI, did anybody tell you about the radio messages? Yes No

162. (If "Yes" to Question #161) Who told you about them?

[Open-ended multiple response question similar to Question #58.]

163. When you visited the PMI, did anybody there give you advice about feeding your baby or your family? Yes No

(If "No" to Question #163, go on to Question #166)

164. (If "Yes" to Question #163) What did they give you advice or instruction about?

[Open-ended multiple response question similar to Question #58.]

165. What instruction do you think was most helpful to you?

[Open-ended multiple response question similar to Question #58.]

166. (Omit this question if respondent has not heard the radio messages or received any instruction in the PMI.)

Which do you think was more helpful to you--the radio messages or the instruction in the PMI?

<input type="checkbox"/> Radio message	<u>Code</u> (1)	<input type="checkbox"/> Neither helpful	<u>Code</u> (4)
<input type="checkbox"/> PMI instruction	(2)	<input type="checkbox"/> Unknown, no answer	(9)
<input type="checkbox"/> Both the same	(3)		

167. What other people listen to the radio in your home?

- | | | |
|---------------------------------|-----------------------------|-----------------------------|
| | <u>No.</u> | <u>Answer</u> |
| (Check each appropriate answer) | <input type="checkbox"/> 1. | DO NOT USE] |
| | <input type="checkbox"/> 2. | Husband |
| | <input type="checkbox"/> 3. | Children |
| | <input type="checkbox"/> 4. | Adult female relative(s) |
| *Use Code | <input type="checkbox"/> 5. | Adult male relative(s) |
| Identifica- | <input type="checkbox"/> 6. | Own friends/neighbors |
| tion Key | <input type="checkbox"/> 7. | Husband's friends/neighbors |
| | <input type="checkbox"/> 8. | Other _____ |
| | <input type="checkbox"/> | Unknown, no answer = 999 |

*Refers to a combination code key provided to each interviewer.

168. When do they usually listen to the radio?

22	23	24

- | | <u>No.</u> | <u>Answer</u> |
|---------------------------------|------------|--------------------------|
| (Check each appropriate answer) | _____ | 1. Do not listen |
| | _____ | 2. All day |
| | _____ | 3. Early morning |
| *Use Code | _____ | 4. Mid-morning |
| Identifica- | _____ | 5. Mid-day |
| tion Key | _____ | 6. Afternoon |
| | _____ | 7. Early evening |
| | _____ | 8. Late evening |
| | _____ | Unknown, no answer = 999 |

169. Do you have a television set in your home? _____ Yes _____ No

25

170. How many meals do you usually serve your family each day?

26

Thank the respondent for her help.

Date of the interview:

Month

27	28

Day

29	30

Place of the interview: Respondent's home Code (1)
Other _____ (2)

31

Interviewer

32	33

LEAVE BLANK

34

Reviewed by

35	36

*Refers to a combination code key provided to each interviewer.

Part F: Activities at the MCH Center

Period of time covered: _____ Months

37

Number of visits made to the MCH Center _____

38	39

Number of nutrition education sessions given to the mother _____

40	41

Content of the nutrition education sessions. Indicate the number of times each theme was included.

Fruits and vegetables

42	43

Legumineuses

44	45

Eggs

46	47

Breast feeding

48	49

Feeding the baby

50	51

Milk and milk products

52	53

Balanced diet

54	55

The sun

56	57

Other _____

58	59

Which of the following persons have given the instruction?

60	61	62

- | | <u>No.</u> | <u>Answer</u> |
|---------------------------------|------------|------------------------|
| (Check each appropriate answer) | _____ | 1. Midwife |
| | _____ | 2. Nurse |
| | _____ | 3. Nursing aide |
| | _____ | 4. Nutritionist |
| *Use Code | _____ | 5. Doctor |
| Identifica- | _____ | 8. Other _____ |
| tion Key | _____ | Unknown, no data = 999 |

How much time overall was given to nutrition education?

63	64	65

_____ Minutes

LEAVE BLANK

66	67	79	80

*Refers to a combination code key provided to each interviewer.