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With Special Reference to Mothers and Children

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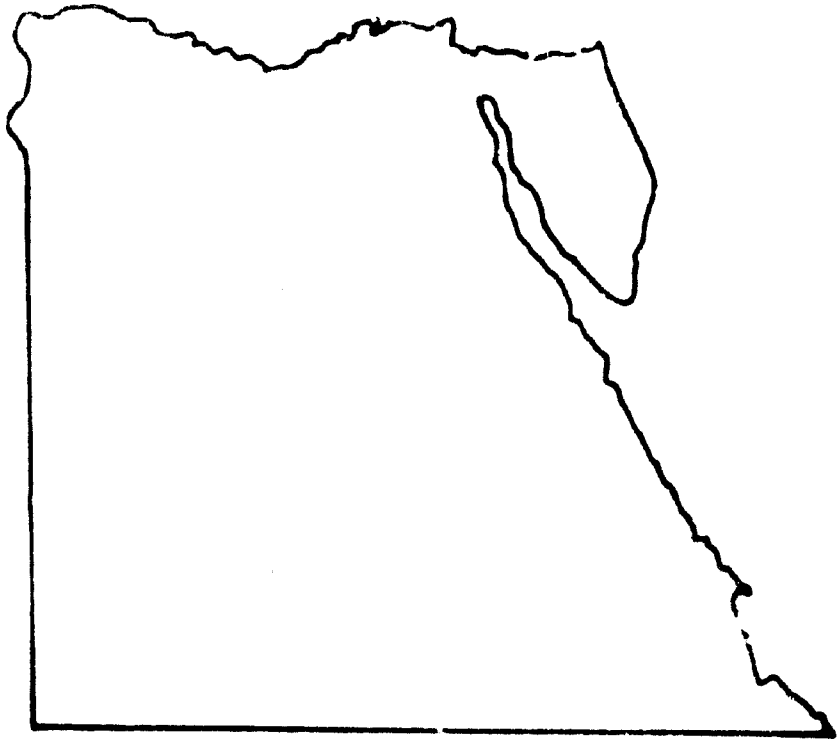

Office of Nutrition
Development Support Bureau
Agency for International Development
Washington, D.C. 20523

WORKSHOP

on

Nutrition and Health in Egypt
With Special Reference to
Mothers and Children

Cairo, October 20-22, 1979

Nutrition Institute, 1057 Kornish El-Nil

Under the Patronage of

Her Excellency Egypt's First Lady

Mrs. Jihan El-Sadat

Chairman: H.E. The Minister of Health, Dr. Mamdouh Gabr.

Scientific Committee: Dr. M. Rashid Barakat
Dr. Mohamed Mahmoud Abdel Kader
Dr. Ahmed Safwat Shukry
Dr. Farag Rizk Hassan
Dr. Hekmat El Sayed
Dr. Mervat El-Rafie
Consultants to USAID.

Executive Committee: Dr. Saad El-Din Foad (Chairman)
Dr. Ramsis Gomaa
Dr. A. Akkad
Mr. Mohamed El-Kadi
Mr. Kamal Ismail

Secretary General: Dr. Lutfy El-Sayad

The Workshop is under the auspices of the Egyptian Ministry of Health and the U.S. AID Mission to Egypt.

TABLE OF CONTENTS

TABLE OF CONTENTS

WORKSHOP PROGRAM

Saturday, October 20

0800 Registration.

0900 INAUGURAL SESSION.

- His Excellency the Minister of Health, Dr. Mamdouh Gabr.
- The Deputy Chief of Mission of the U.S. Embassy in Egypt, Minister-Counselor H. Freeman Matthews.
- Her Excellency Egypt's First Lady, Mrs. Jihan El-Sadat.

1000 Tea Break.

1030 PLENARY SESSION I.

"The Nutrition Institute/Center for Disease Control (NI/CDC Nutrition Status Survey of 1978."

Co-Chairmen: Dr. Rashid Barakat, Al Azhar University.*
Dr. John O. Field, Tufts University.

Rapporteurs: Dr. Aza Mansour, Nutrition Institute.
Dr. Fikri El Mahri, Nutrition Institute.

Speakers:
- Dr. Hekmat El-Sayed, Nutrition Institute.
- Dr. Amin Kamel Said, Nutrition Institute.
- Dr. Mohamed El-Ghorab, Nutrition Institute, on behalf of Dr. Ahmed Dakroury, Nutrition Institute.

1115 Discussion.

1145 Break.

1200 PLENARY SESSION II.

Other Nutritional Assessments Made in Egypt.

Co-Chairmen: Dr. Farag Rizk Hassan, Nutrition Institute Board of Directors.
Dr. Milton Nichaman, Center for Disease Control.

Rapporteurs: Dr. Mohamed Amr Hussein, Nutrition Institute.
Dr. Mohamed El-Ghorab, Nutrition Institute.

"The MIT-Cairo University Health Care Delivery System."

- Dr. Shafika Nasser, Cairo University, on behalf of Dr. Ibrahim Fouad Khalil, Cairo University.

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* For convenience, affiliations are noted for workshop participants listed in the Program; titles and departments are shown in the List of Participants.

Saturday, October 20 (continued)

"Baragil Project Community Development Programme."

- Dr. Laila M. Kamel, Cairo University, on behalf of Dr. Mervat El-Rafie, Cairo University.

"Malnutrition in Pre-School Children."

- Dr. Laila M. Kamel.

"Malnutrition in School Children."

- Dr. Sawsan Fahmi, High Institute of Public Health, Alexandria.

"The Nutritional Status of the Egyptian Child During a Quarter of a Century (1952-1977)."

- Dr. Farouk Shaheen, Nutrition Institute.

1330 Discussion.

1400 Lunch in the Nutrition Institute.

1530 PLENARY SESSION III.

Comments and Discussion.

Co-Chairmen: Dr. Ahmed Safwat Shukry, Cairo University.
Dr. James Cook, University of Kansas Medical Center.

Rapporteurs: Dr. Mervat El-Rafie.
Dr. Laila M. Kamel.

"Comments on the Nutritional Assessments Made Recently in Egypt."

- Dr. M. Rashid Barakat.

Discussion, opened by:

- Dr. Milton Nichaman.

Concluding remarks by:

- Dr. Ahmed Sawfat Shukry.

1700 ADJOURN.

Sunday, October 21

0900 PLENARY SESSION IV.

"Feasible Interventions."

Co-Chairmen: Dr. M.M. Abdel Kader, Nutrition Institute Board of Directors.
Dr. Samir Basta, World Bank (IBRD).

Rapporteurs: Mrs. Joyce King, Consultant to USAID.
Mrs. Nandita Kielmann, Consultant to USAID.

Sunday, October 21 (Continued)

Speakers: - Mrs. Carol Adelman, AID/Washington.

- Dr. Joe Wray, Harvard School of Public Health.

1000 GROUP WORKSHOPS (Three simultaneous working groups)

A. PRACTICAL APPROACHES FOR IMPROVING FOOD CONSUMPTION AND FEEDING HABITS ACCORDING TO IDENTIFIED PRIORITIES.

Co-Chairmen: Dr. Hekmat El-Sayed.
Dr. Dudley Titus, Mallinckrodt Inc., Missouri.

Rapporteurs: Dr. Amin Kamel Said.
Mr. Steve Allen, Catholic Relief Services, Cairo.

B. IMPROVEMENT OF HEALTH DELIVERY IN RELATION TO NUTRITION SERVICES.

Co-Chairmen: Dr. Lutfy El-Sayad.
Dr. Carol Waslien, LIFE, Washington, DC.

Rapporteurs: Dr. Laila M. Kamel.
Dr. John O. Field.

C. IMPROVING ENVIRONMENTAL FACTORS TO ENHANCE NUTRITIONAL STATUS: COMBATTING NUTRITION/HEALTH RELATED PROBLEMS, NOTABLY GASTRO-ENTERITIS AND PARASITISM.

Co-Chairmen: Dr. Fawzi Gadalla, Al Azhar University.
Dr. John McKigney, AID/Washington.

Rapporteurs: Dr. Wafa Moussa Antonios, Nutrition Institute.
Ms. Diana de Treville, Save the Children Fund.

1130 Tea Break.

1200 GROUP WORKSHOPS continue discussion.

1400 Lunch in the Nutrition Institute workshop rooms.

1530 Rapporteurs prepare draft reports for each Workshop.

1700 GROUP WORKSHOPS discuss and finalize reports.

1800 ADJOURN.

Monday, October 12

0900 PLENARY SESSION V.

Presentation and Discussion of Group Reports A, B, and C.

Co-Chairmen: Dr. A. Akkad, Ministry of Health.

Dr. Milton Nichaman.

Rapporteurs: Dr. Mostafa Mansour, Naval Medical Research Unit.

Dr. Mahasen Abd El-Fattah, Cairo University.

0900 Presentation and Discussion of Report Prepared by Group A.

0945 Presentation and Discussion of Report Prepared by Group B.

1030 Presentation and Discussion of Report Prepared by Group C.

1130 Break.

1200 Meeting of the Scientific Committee to finalize the Workshop Report.

1400 Luncheon given by H.E. the Minister of Health at the Meridian Hotel.

1800 CLOSING CEREMONIES.

Presentation of Final Workshop Report:

- Dr. M. Rashid Barakat.

Remarks by:

- Mr. Donald S. Brown, Director of USAID Mission to Egypt.
- H. E. the Minister of Health, Dr. Mamdouh Gabr.

LIST OF PARTICIPANTS*

Workshop on Nutrition and Health in Egypt
With Special Reference to Mothers and Children
Cairo, October 20-22, 1979

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Dr. Mohammed M. Abd El Kadr, Board of Directors.

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* Includes the names of those who participated in the three-day workshop, not those who were invited to the Inaugural Session only.

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Dr. Aza Mansour.
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Dr. Fikri El Nahri.
Dr. Mounir Z. Awad Allah.
Dr. Farouk Shaheen.
Dr. Mohammed El-Ghorab.
Dr. Salah Abd El Fattah.
Dr. Ihab Zaki.
Dr. Kamal G. Mikhail.
Dr. Narges Bassily.
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INAUGURAL SESSION

H.E. The Minister of Health, Dr. Mamdouh Gabr, opened the Workshop by thanking the First Lady for agreeing to hold this meeting under her patronage, one of her many efforts sponsored on behalf of Egyptian children during 1979, the International Year of the Child. Referring to the damage done by maternal and child malnutrition in high infant and child mortality rates and effects on functional, immunological and mental capabilities, Dr. Gabr pointed out that of total deaths in Egypt, one half occur among children under five years of age and one half of those are directly or indirectly related to malnutrition. The Minister noted the severity of the problem despite marked reduction in mortality rates in recent years and despite a comprehensive network of health services available to Egyptians. He hoped that the Workshop would suggest answers to the more pressing problems such as the inadequacies in infant supplementary feeding practices, whether through education, or improving the quality and safety of homemade mixtures, or by promoting Supramine. Dr. Gabr suggested that this joint effort by the Ministry of Health and USAID to bring together Egyptian and international experts could complement the program already launched by the President, "Food for All and Food Security". He was aware that the task is complicated by the fact that nutrition is not the responsibility of one discipline, but wished the group success in first ascertaining the dimension of the problems by studying the different studies and surveys and then finding suitable interventions.

Minister-Counselor H. Freeman Matthews represented the U.S. Ambassador to Egypt and expressed the support of the U.S. Government in the Workshop goals of improving maternal and child health status. He quoted Dr. Horowitz' recent assessment that "25% of the world population has a dietary energy intake of less than 80% of requirements" noting that problems of these dimensions must arouse us to alter this appalling toll. And while the numbers of acutely malnourished in Egypt are not so high as in the developing world, the problems that do exist among vulnerable groups are sufficient to cause us to act in ways that are more urgent and more adequate to meet the needs. Egypt cannot afford the drain on its other resources and on its human potential that are taken by malnutrition and malnutrition-related problems. Mr. Matthews concluded that while the Workshop is delineating the nature of the problem in Egypt, it is more importantly, emphasizing action programs that can be implemented in the very near future, designed to suit the socioeconomic and cultural Egyptian scene.

H.E. Egypt's First Lady officially inaugurated the Workshop, noting that this International Year of the Child is an especially suitable time to make greater efforts on behalf of children. Health is an economic investment, said Mrs. Jihan El-Sadat for healthy, productive human beings are the main source of wealth in a society. Recognition of the need to cover the food needs of the people--despite the economic burden it imposes--has caused the President to give top priority to a broad program to increase food availability which includes: large subsidies for essential foods; increased agricultural production through land reclamation, introduction of high-yielding crop varieties improved irrigation and use of fertilizers. She added that the 2% population increase adds one million people annually. Thus family planning is a vital adjunct to efforts to meet food needs, even though this subject is a sensitive and complex one.

High mortality rates among preschool age children attest to poor nutritional and health-related nutritional practices which threaten normal physical and mental development. The First Lady said that we need to give mothers basic knowledge about proper infant feeding, maximal breastfeeding, the right kinds and amounts of supplements, and sanitary food handling and preparation. Especially among new arrivals to urban areas, women are ceasing the breastfeeding of infants earlier, depriving the infant of nutrients and the special protection of breastmilk. She cautioned that it was more than breastfeeding that caused problems for infants at several months of age--mothers must also learn that breastfeeding becomes inadequate as sole nutrient source as the child grows and requires added nutrients.

Women now get three months paid leave following delivery (Civil Service Law No. 47, 1978); these are limited to three during a lifetime; and they have the right to one year of non-paid leave; the purpose of this legislation is to permit mothers to give proper infant care, including breastfeeding.

The international agencies have helped to improve the nutritional status of Egyptian children and women--particularly WHO, FAO, UNICEF and WFP. One example was assistance in producing the supplement Supramine, an effort which started in 1973; by 1979 production is expected to reach 900 tons. USAID has also assisted MCH attendees with blends of wheat, soya flour, bulgur and oil, helping some 700,000 vulnerable persons.

The First Lady concluded that eliminating the causes of malnutrition must be the objective of all of us.

PLENARY SESSION I. "The NI/CDC Nutrition Status Survey of 1978."

Dr. Hekmat El-Sayed made the first of three presentations devoted to analyzing the findings of the Egyptian National Nutrition Survey. Dr. Hekmat described briefly the methodology of the 1978 study and recalled the basic objective in mind when the survey design was decided--that of getting as quickly as possible a picture of the most important nutrition problems among the preschool population. She noted that the survey was carried out in winter, a time when the prevalence of infant and childhood diarrhea is at a minimum. Dr. Hekmat's paper begins on page 46, and explains the Survey's findings regarding anthropometric indicators of infant and child nutritional status and dietary information. Briefly, she notes the following results: children, 6-23 months of age are the most severely affected, especially in terms of acute undernutrition or wasting; delayed introduction of supplemental foods and the presence of catabolic diseases add to the dangers of this critical period; stunting shows up a little later, at about one year and lasts through about 36 months of age before beginning to improve--(stunting refers to retarded linear growth, children who are less than 90% of their expected height for age); undernutrition is more prevalent in rural populations, particularly those of Upper Egypt, and more specifically, those in the Governorates of Giza, El Fayoum, Beni Suief and El Menia; among the disadvantaged families living in large cities, prevalences are higher than in other urban areas and are similar to rural sectors; wasting (defined as the status of childrenwho are less than 80% of their expected weight for height) affects 0.6% of the Egyptian children, or approximately 30,000; stunting occurs in perhaps one million of the preschool population (more than 20%); among children with a recent fever or diarrhea history, acute undernutrition is measurably more common; there is a correlation between mothers' recall of their children's recent dietary intake in amount and variety and the indicators of malnutrition.

Dr. Amin Kamel Said, in the second presentation on the Survey findings (paper on page 60) analyzed the socio-economic characteristics affecting growth in preschoolers, on infant feeding practices and clinical signs of nutrition deficiency. He noted that: urban sample children showed a lower live birth order than rural sample children; there is a gradual but small increase in the prevalence of wasting and stunting as the live birth order increases; household size which averages 7.2 persons in the rural areas, decreases as urbanization increases--average city household size was 6.2 persons; no correlation was seen between nutritional status and household size; the literacy rate among survey fathers was 42.7%; normal children had higher percentages of literate and educated fathers compared with wasted and stunted children; malnourished children had fathers with lower occupational ratings; children in rural

and less privileged areas are breastfed longer and are completely weaned at a later age than urban children; 60% of the Survey children were weaned between 6 and 23 months of age; infants exclusively breastfed in the 6-11 month age group showed the lowest prevalence of wasting and the highest prevalence of obesity; those exclusively breastfed in the 12-23 month old age group showed the highest prevalences of wasting and stunting; cessation of breastfeeding before 12 months was correlated with acute undernutrition; stunting was correlated with a history of breastfeeding for less than three months or delay in completing the weaning process beyond 18 months of age. 80-90% of the children, based on the mothers' recall, received their first semi-solids after six months of age. The only nutrition-related clinical signs recorded were: pedal edema; three signs of Vitamin A deficiency; six signs for rickets; and angular stomatitis. These signs were infrequently observed in the Survey children. The highest prevalences noted were 3% for frontal bossing and 2.9% for angular stomatitis. The very low prevalences of nutritional signs of deficiency might be explained by the winter season in which the Survey was conducted inasmuch as other nutrition surveys show higher prevalences of nutrient deficiencies among Egyptian vulnerable groups.

Dr. Mohamed El Ghorab gave the third paper, prepared by Dr. Ahmed M. Dakroury, which dealt with the prevalence of anemia. Hemoglobin concentration by the Cyanmethemoglobin method was determined for 20% (1609) of the Survey children, 1478 mothers, and for a sub-sample of socio-economically advantaged preschool age children living in Cairo. Summary of the results, detailed in the full paper which appears on page 67, follows: anemia is an important problem among preschool children throughout Egypt; it is less prevalent in urban areas than rural areas; urban small cities are least affected except of course for the special group of children of socio-economically advantaged families where prevalence is lowest; Universes 4 (Beheira) and 5 (Giza, El Fayoum, Beni Suief and El Menia) are more affected than other geographic areas; the highest prevalence of severe anemia and the lowest mean hemoglobin levels occur in the 12-23 month age group and the problem decreases thereafter with increasing age. The survey data on women is not representative of the general population since only women with at least one 6-71 month old child were included. Criteria for anemia in non-pregnant women, lactating or not, are Hb value of less than 12 gm/100 ml. In pregnant women, it is a value less than 10 gm/100 ml. A value of less than 9.5 gm/100 ml indicates severe anemia. Among lactating mothers more than 25% have Hb values of less than 12 gm/100 ml, a problem of major proportions. Anemia prevalence in women is higher in the rural universes (where women breastfeed longer and undergo a reduction in iron stores); Universe 11, women from disadvantaged areas of Alexandria, shows the greatest anemia prevalence; non-pregnant women had less anemia than pregnant or lactating women.

Principal points of discussion (and direct replies when made, in parentheses).

The sampling is very small in proportion to the population in each universe. (What matters is that samplings be representative and weighted according to the population of the homogenous universe.)

The breakout for age groups is too broad to reflect precise stress points over the critical weaning period; it would be preferable to examine what happens at shorter intervals, say six-month intervals rather than the 12-23 month period or the 6-23 month period. (The raw data are available and could be analyzed in this way.)

Other research shows that the prevalence of anemia is high even in the first few months of life. Serum of pregnant women was examined in a study mentioned by Dr. Mahassen Abd El Fattah and the results showed a decrease in Ca/P ratio and an increase in alkaline phosphatase. If more attention were given to the health status of pregnant and lactating women, the health of infants would improve.

In future data-taking, clinical and anthropometric information should be supplemented by biochemical investigations.

The dietary information lacks usefulness; it would be more interesting to know the proteins and caloriesand other nutrients in nearly exact amounts rather than noting the values of food groups and whether or not they have been consumed.

The age at which infants require supplemental foods is a debatable subject, which may vary from mother to mother, and depend on different circumstances.

It was stated that the completed survey constitutes a base for setting out the nature and magnitude of malnutrition in Egypt.

PLENARY SESSION II. "Other Nutritional Assessments Made in Egypt."

Dr. Shafika Nasser, on behalf of Dr. Ibrahim Fouad Khalil, who prepared the paper which appears on page 74, summarized the "MIT-Cairo University Health Care Delivery System Project." Dr. Nasser stated that the study had as as its principal aim to examine the rural health delivery system using nutritional status as a parameter, and that it included three principal sections: impressions of the rural health doctor about the magnitude of malnutrition; the actual vital statistics obtained by the center over the past five years; the weighing exercise, carried out by the staff of the health units in 17 centers. The weighing exercise was conducted in April 1978. Infants were self-selected in that those who were brought to the center or unit in question for one reason or another were those included in the study. Preschoolers came on call, having been identified from birth registers. The sample included at least 30 children in each annual age cohort with a total of 4327. Characteristics of malnutrition prevalence were:

on a weight for height basis, 6.2% of the children had acute undernutrition (or a measurement under 80% of the standard) and 13.8% were overweight. Chronic undernutrition (a height for age below 90% of the standard) or stunting affected 40% of the children. Based on weight for age, only 40% were normal and 18.2% were in second degree malnutrition and 5.4% in third degree. Children 12-23 months old showed the highest rates of malnutrition on a weight for age basis; and hardest hit generally are infants and children below 36 months of age; their status improves after that time. Rural areas of Upper Egypt were somewhat worse off than Lower with regard to wasting(Upper, 6.3%; Lower, 5.9%) but Lower Egypt revealed more stunting, 19.8% compared with a prevalence of 13.9% in Upper Egypt; and on a weight-for-age basis, Lower Egypt had a 28% prevalence of second and third degree malnutrition while Upper Egypt had 18.1%. When compared with the results of the National Nutrition Survey, the MIT-Cairo University study show much higher prevalences of undernutrition according to all of the anthropometric indices. Particularly is it evident when we note that MIT-CU had two and a half times the incidence of second and third degree and seven times the incidence of third degree malnutrition. The sampling bases were, however, quite different, as were the seasons.

Dr. Laila M. Kamel then presented her paper on "Malnutrition in Preschool Children." which appears on page 84, which involved cross sectional surveys made in two villages in the Governorate of Giza, Manshaat El Bakary and Saft El Laban. Two high density areas of Cairo were also included--El Assal and Ein El Sira. Further, a longitudinal study was done in Kerdasa Village in Giza Governorate. A brief summary of the results follows: nutritional problems were in the order of prevalence, protein- energy malnutrition (PEM), rickets which is associated with diarrhea, and then anemia in rural and urban areas; the range of PEM assessed on a weight for age basis was from 61% to 71% (years were 1955-1969); prevalence of rickets ranged from 10.0% to 19.7% and showed up most predominantly in the 1-2 year old age group; more than 50% of the examined groups in Kerdasa village had hemoglobin levels under 10 gms/100 ml; breastfeeding generally continued through the first year but with nearly 70% and 76% still offering the breast in the two villages of Giza at 23 months; a new pregnancy was the important reasons for weaning; with regard to PEM and breastfeeding, it was found that infants who breastfed during the first year were better off then non-breastfed infants, but during the second year of life, the weaned children had better chances of being better nourished. Intervention programs in the form of nutrition education helped to improve weight for age.

Dr. Sawsan Fahmi presented a paper on "Malnutrition Among School Children in Egypt," which appears on page 90 . After noting that the number of 6-18 year olds recently reached 11.5 million of which seven million are in schools with the majority, or four million, in primary schools, Dr. Fahmi said that malnutrition in this group always has the same appearance: children look stunted for their age. And studies confirmed that the weights and heights of Egyptian children in this age group are below those of American (Harvard scale) children. Dr. Fahmi said her studies also showed that anemia (hemoglobin levels of less than 12 gm/100 ml) affects 22% of the 6-18 year old group. Its pattern among both sexes is to drop off sharply between 6-8 years, then to rise up to 10 years, and drop off again up to 18 years. Parasitic infections were significantly higher in the anemic than among the non-anemic children. Adverse effects of anemia on physical growth (height and weight) were measurable. The question of which comes first, anemia or parasitic infection, is difficult to answer. But clear is the adverse effect of anemia and/or parasitism on school achievement. Dr. Fahmi said that their studies showed Vitamin A deficiency to be prevalent among all social classes, though at lower rates among higher strata; that children in the rural sector were more severely affected, especially males; that riboflavin deficiency was more prevalent among ruralmale students; and that niacin deficiency was confined almost exclusively to rural boys, at a very low prevalence rate, and among boys of lower social strata.

Dr. Laila M. Kamel, on behalf of Dr. Mervat El Rafie, sketched the "Baragil Community Development Programme" which appears in its entirety on page 96 . A systematic random sample representing one fifth of the population of Baragil, just outside Cairo, was taken for a study made in 1976. Heights were taken on 237 preschool children and weights on 250. The results revealed: 43% of the children were normal or above, on a weight for age base, and 5.6% were severely malnourished; 72% of the children were under the "standard" which is stated to be 95% +; another cutoff is at 87.5% of standard; using this latter height-for-age standard, 45% of the children are above it and 55% are under 87.5%. (Editor's addition.) The pattern of linear growth is a gradual deviation from standard through the second year, a sharp decrease in the 24-35 month old period and a progressive climb back towards standard thereafter. Nearly 10% of the children examined showed positive bilharziasis. Some 25.7% of this age group is affected by parasitic infestation, ranging from 9.3% ascaris to 2.6% H. nana. In relating bilharziasis to nutritional status, it was found that twice as many cases of second and third degree malnutrition appeared in its presence than did among the first degree and better. Intestinal parasites showed similar correlations.

Dr. Farouk Shaheen gave a presentation on "The Nutritional Status of the Egyptian Child During a Quarter of a Century (1952-1977) which is printed on page 106. Dr. Shaheen summarized findings over this 25 years of nutritional history: growth progress begins to deviate from the reference standard levels as early as the third month; in both rural and less privileged urban areas, the peak of PEM was found by the end of the second year of the second year; rural areas have consistently shown more severe PEM and greater prevalences of mild and moderate PEM. Most PEM cases in Egypt belong to the "nutritional dwarfing" category. Anemia prevalence in 1965 was 84% among rural 0-2 year olds; 75% among urban 0-2 year olds; and it was 65% among rural 2-6 year olds and 68% among urban 2-6 year olds; among school age children, it appeared that girls, school children were less frequently affected than boys, non-educated and less privileged urban children. In 1956, a 13% rate of rickets' prevalence among 0-2 year olds; in 1965, the rate in the same age group was 11-14%. Goitre in 1960 was endemic in the New Valley (52% among 6-18 year olds in Kharga and Dakhla Oases. The 1965 Beheira study showed a very low prevalence of goiter among preschool children both urban and rural, from 1 to 2.8%. Signs suggestive of Avitaminosis A such as follicular keratosis and Bitot's spots are not common among preschool children--.5% occuring mostly in rural areas. Ariboflavinosis indicated by cheilosis and angular stomatitis is common among both sexes in most parts of Upper Egypt. The 1965 Beheira study showed prevalences of 2% and 4% in urban and rural 2-6 year olds.

Principal points of discussion (and direct replies when made, in parentheses).

All of the studies followed different methodologies and the people who collected information were different; the differences that are apparent should not prevent our defining the basic problems in Egypt.

A clarification was requested with regard to the parasitology results on preschool children in Baragil community. (9.6% of them showed positive Bilharziasis.)

Surprise was expressed about the high levels of obesity. (MIT-CU found very high levels of obesity, increasing with age; percentages of weight-for-height by age group are: 9.8%, 24-35 months; 12%, 36-47 months; 16.5%, 48-59 months, and 43.7% for 60 months and older; girls showed greater obesity than boys particularly over five years of age where overweight prevalence for girls was 50% compared with 39.6% for boys. In Alexandria, obesity is present among 20% of the children; in the study cited above, school girls weighed almost the same as 10 year old school boys and at 11 years of age, the girls weighed more, 33.5 kg.. compared to 31.7 kg. for boys. The Baragil study showed 10.9% of the preschoolers overweight or "above normal" on a weight-for-age basis (McLaren's classification). Dr. Kamel has observed obesity among adolescent urban school girls to be more prevalent than among other school age children.

It was noted that the final report on the MIT-Cairo University Health Care Delivery Systems Project will be available very soon. Among other things, it will show the unusual awareness of malnutrition on the part of those who work in the community, an awareness which has not, however, been translated into prevention. Birthweights are available for some 75% of the children who are registered, but only one third of these new borns are weighed and followed up to 15 months of age. This means that contact is lost with most children shortly after birth. Anthropometric data analyses are complex and easily distorted, and screening/control procedures need to be simplified and standardized.

PLENARY SESSION III. "Comments and Discussion."

Dr. M. Rashid Barakat presented comments on the most important aspects of the four most recent studies, noting the principal differences and suggesting reasons for them. As these comments constitute central discussion points for the Workshop, they are included within the main body of the report, beginning on the following page. Dr. Barakat made further observations on the significance of seasonal differences in Egypt and their effect on child health and nutritional status as reported in the different studies: the measles season begins in April; infant mortality rates (IMR) are far higher during the summer than the winter (for the period January to April, a midpoint in February reveals an IMR at 3.9 while for the period April to October, a midpoint in July shows an IMR of 14.45); inasmuch as 53 to 59% of that IMR is due to gastroenteritis, we can speculate on the seasonal effect upon surveys made in winter as opposed to summer.

Editor's Note: for additional information on infant mortality rate, see Appendix 10. Presented below are recent data obtained by the MIT-CU team and distributed during the Workshop (from Part II, Health Questionnaire, Question 4.)

Infant Mortality Rates by month (%)

	Winter			Spring			Summer			Autumn		
	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov
Lower Egypt	5.8	4.7	4.2	5.4	6.7	8.7	15.1	14.6	12.9	7.6	8.3	5.9
		15%			21%			43%			22%	
Upper Egypt	5.4	6.5	4.6	5.6	8.2	10.3	13.4	12.7	10.5	7.3	9.5	6.1
		17%			24%			37%			23%	
Sample	5.6	5.4	4.4	5.5	7.3	9.4	14.4	13.8	11.9	7.5	8.8	6.0
		15%			22%			40%			22%	

"Comments on the Nutritional Assessments Made Recently in Egypt."

by Dr. M. Rashid Barakat, Nutrition Advisor, International Islamic Centre for Population Studies and Research, Al Azhar University.

During the last few years, two nutrition surveys and two health surveys with nutrition components were carried out in Egypt. This paper will comment on the methodology of the surveys and compare the results. The surveys are:

1) Shukry, A.S. et al. (1972). "An Epidemiological Study of Protein Calorie Malnutrition in Egypt."[1,2]

2) Badran, I.G., et al. (1976). "Community Development Project of Baragil Village."[3]

3) MIT-Cairo University (1978). Health Care Delivery System Project.[4]

4) Nutrition Institute/CDC National Survey (1978. Nutrition Status Survey 1978.[5]

General Features of the Surveys. Shukry's survey was conducted in two villages during May-October in two successive years, covering all the children 0-71 months of age in the population of one village, and 50% of the 0-71 months old children in the other, with a total sample of 2241 children. Badran's survey covered 20% of the total population of one village and the sample included 248 children aged 0-60 months. The MIT-CU survey was carried out as an operational feasibility study in 17 villages for two weeks in April 1978 to assess the weight of children 0-71 months (4084 children) and the height of children 24-71 months (2260). The sample was "call" children who attended the exercise. The NI/CDC Survey covered seven rural and two urban universes from 17 governorates. The sample of 9899 children was carefully chosen from the child population aged 6-71 months. The survey was carried out during the period January to April. It is important to note that the NI/CDC Survey was carried out during the winter, while the others were carried out mainly during the summer. Shukry's survey included hemoglobin, biochemical and parasitological assessments on a 5% sub-sample, while the NI/CDC Survey included hemoglobin assessments of a 5% sub-sample, but no biochemical or parasitological assessments.

The characteristics of the four surveys are summarized in Table 1.

Table 1. General Features of the Surveys.

	Shukry	Badran	MIT-CU	NI/CDC
Year:	1972	1976	1978	1978
Season:	May-Oct.	?	April	Jan-mid April
Location:	Rural	Rural	Rural	Rural & Urban
Sample No.:	2241	248	a) 4084 (Wt.) b) 2260 (Ht.)	9899
Age (Mos.):	0-71	0-60	a) 0-71 b) 24-71	6-71
Representation:	Repr.	Repr.	Non-Repr.	Repr.
Laboratory work:	HB; biochemical; parasites	Hb; parasites	None?	Hb

Anthropometry

Weight for Age Assessments. Using the Gomez classification, the results of all the surveys except the NI/CDC Survey were similar. The NI/CDC Survey results do not match with either recent or older surveys carried out in the country, and appear to be in contradiction with the high child mortality rates reported for Egypt. Table 2 compares weight for age results of the four studies.

Table 2. Percentage Distribution of Weight for Age of Preschool Children Using Gomez' classification.

Survey	Third degree <60	Second and First degree 60 - 89.9	Normal 90+
Shukry	4.8	56.8	33.6
Badran	5.5	52.0	42.6
MIT-CU	5.4	54.5	40.0
NI/CDC	0.8	46.5	52.0

Weight for Height. The NI/CDC and MIT/CU surveys did not use the same ranges for the definition of "moderate undernutrition" and "normal" classes. The NI/CDC survey considered weight for height as normal when it falls between 85.0% and 119.9% while the MIT/CU survey has taken 80.0-119.9% as normal. The two surveys are compared in Table 3.

Table 3. Percentage Distribution of Preschool Children by Weight for Height.

	Acute Undernutrition		Normal	Overweight
	Severe	Moderate		
Survey	<80.0	80-84.9	85-119.9	120+
NI/CDC	0.6	1.7	94.7	3.1
		96.7		
MIT/CU	6.1			13.8
		80,1		

Applying the Waterlow classification, Table 4, the two reports were also contradictory in the levels of "wasting," stunting," and "wasting and stunting."

The other two surveys have recorded weights and heights but have not analyzed their data similarly.

Table 4. Percentage Distribution of Preschool Children by Waterlow Classes.

Survey	Normal	Wasting	Stunting	Wasting & Stunting
NI/CDC	78.6	0.3	20.8	0.3
MIT/CU	55.9	4.0	38.6	1.4

Prevalence of Pedal Edema. Prevalence of edema was reported as 0.2% in the NI/CDC survey, 6.4% by Shukry, and 5.22% by Badran, obviously divergent findings.

Prevalence of Anemia. The MIT/CU preliminary report does not contain hemoglobin levels. The other surveys used different hemoglobin levels for the diagnosis of anemia. The NI/CDC survey reported the lowest prevalence of anemia among preschool children. Table 5 compares the three surveys for which hemoglobin levels were available.

Table 5. Prevalence of Anemia Among Preschool Children.

Survey	HB Level, gm/100 ml	Percent Anemic
Shukry	below 10.2	56.4
Badran	below 10.0	93.0
NI/CDC	below 11.0	38.4

The NI/CDC survey reported a much lower prevalence of Bitot's spots than other surveys, but a comparable figure for corneal scarring, Table 6 below.

Table 6. Prevalence of Signs of Vitamin A Deficiency, Percent Dist.

Survey	Bitot's Spots	Corneal Scarring	Night Blindness	Dry Conjunctiva
Shukry	1.34	0.13	-	4.68
Badran	0.41	-	-	-
NI/CDC	0.04	0.16	0.4	-

With regards to rickets, prevalence of three or more signs was reported as 0.2% by NI/CDC, 19.7% by Shukry, and 4.8% by Badran.

For signs suggestive of riboflavin deficiency, a higher prevalence of angular stomatitis was reported by Shukry who also reported cheilosis and angular scars that were not reported by the NI/CDC Survey:

Table 7. Percentage Prevalence of Signs Suggestive of Riboflavin Deficiency.

Survey	Angular stomatitis	Angular Scars	Cheilosis
Shukry	7.9-12.7*	1.94-2.27	2.28-15.79
NI/CDC	2.9	-	-
Badran	---------- 1.64 ----------		7.34

Parasitic Infestation. While the NI/CDC survey did not include an assessment for parasitic infestation among preschool children, Shukry and Badran have reported a high prevalence of bilharzia, ascaris and hymenolepis, and 51% of the children were infested with one parasite or another. Assessment of parasitic infestation should be a component of any nutrition survey in Egypt.

Table 8. Percentage Prevalence of Parasitic Infestation Among Preschool Children.

Parasite	Shukry	Badran
Urinary bilharzia	3.4	20.0
Ascaris	39.5	13.9
H. nana	12.9	not detected
Ankylostoma	3.4	not detected
Enterobuis	2.0	12.2
Total infested	51.0	?

Biochemical Assessment. No biochemical assessment was included in any of the surveys, other than Shukry's reporting the levels of serum protein and serum albumin in a sub-sample of his universe.

Comments on the Disparities of Reported Malnutrition and Deficiencies. A possible explanation for such disparity in the level of malnutrition reported in the NI/CDC Survey as compared to other reports is that the NI/CDC survey was

carried out during the winter while the MIT/CU and Shukry surveys were carried out during the late spring or summer when there is a much higher prevalence of gastroenteritis, which is known to increase the prevalence of malnutrition and infant mortality. If this reason is accepted, the differences in the prevalence and severity of malnutrition between one period of the year and another gives us an estimate of the effect of gastroenteritis as a precipitating factor for malnutrition in Egypt.

Other comments on the surveys:

1. The MIT/CU full report is not yet available although the survey was carried out in April 1978. Such a delay undermines its value and delays action programs dependent upon this report.

2. The MIT/CU and NI/CDC reports have used the term "undernutrition" to replace "malnutrition" and have used "undernutrition" in a way different to the definitions given by Jelliffe[6] and Scrimshaw[7] which is rather confusing.

3. The NI/CDC survey should have been extended to cover some period during the summer when malnutrition in children is at its highest peak in order to present a true picture of the problem in Egypt.

4. It is regrettable that the NI/CDC report did not include biochemical and parasitological assessments in spite of the facilities available; this lack has undermined its value.

5. The NI/CDC report has noted (p. 31) that "wasting" among preschool children, being 0.3% (plus 0.3% stunting & wasting) "is not a public health problem". Can this statement be accepted in the light of MIT/CU reporting that 23.6% of children are below 75% of standard weight for age and Shukry reporting a figure of 56.8%? And is it not contradictory to the statement made on page 95 of the same report that "although the prevalence of wasted body mass among the survey children is generally low, it is considerably high in the 6 to 24 month age group, and since this condition clearly presents a serious health problem..."

6. Attempting to give an explanation for a higher prevalence of anemia among rural than among urban lactating mothers, the NI/CDC report on page 52 notes that "several confounding factors cloud this association" (of anemia and length of lactation), "the most important factor however being dietary differences between rural and urban mothers." Can this statement have meaning in the absence of dietary and parasitological assessment components in the survey?

7. The weight and height records of Shukry and Badran should be analyzed and presented in the same way as the NI/CDC and MIT/CU figures so that the data can be

compared more meaningfully.

8. Though the results of Badran's survey match closely with those of Shukry and MIT/CU, they should be taken with caution due to the small sample covered.

Recommendations.

1. No more nutrition surveys per se should be allowed. The data now available are adequate to define the nutrition problems, their priorities and the population groups most at risk. Even surveys designed as preliminary steps for "future" intervention programs should not be accepted. Nutrition surveys should be allowed if part of a package deal with an intervention program. It is inhuman to expand, repeat, or verify nutrition surveys for science sake while the Egyptian children are registering one of the highest mortality rates in the world.

2. There is an urgent need for operational research, intervention programs and training programs for the control of malnutrition in Egypt directed toward the population groups most at risk. Plans for pilot intervention programs are strongly recommended, and the Ministry of Health is asked to take the lead and responsibility in this respect.

3. A principal objective of any nutrition intervention program must be that of making nutrition control a primary and integrated daily function of the basic health services. The ultimate goal is to interfere effectively with child morbidity and mortality and bring about child health improvement.

[1]Kamel, L.M. (1969). "Protein Malnutrition of Early Childhood among rural Populations." Ph.D. Thesis, Cairo University

[2]Shukry, A.S., et al. (1972). "An epidemiological study of protein calorie malnutrition in Egypt." Gaz. Egypt. Paed. Assn. 20:1:150-167.

[3]Badran, I.G. et al. (1976). "Community Development Project of Baragil Village, Medical Report." Cairo University.

[4]MIT-Cairo University (1978). "Health Care Delivery Systems Project, Health Systems Questionnaire, Part IIa, Weighing Exercise (Preliminary Report).

[5]Arab Republic of Egypt (1979). "Nutrition Status Survey, 1978, Nutrition Institute/Center for Disease Control, AID/Washington, D.C.

[6]Jelliffe, D.B. (1966). "The assessment of the nutritional status of the community." WHO Monograph Series No. 53, p. 8.

[7]Scrimshaw, N.S., C. E. Taylor, and J.E. Gordon (1968). "Interactions of Nutrition and Infection." WHO Monograph Series No. 57, p. 19.

Dr. Milton Nichaman opened the discussion with a critique of the Egyptian National Nutrition Survey: it lacks parasitology data in the face of all available information suggesting a high rate of infestation among preschool children in Egypt; and it needs correction for seasonality having been carried out in the winter inasmuch as known diarrhea prevalence is much higher in the summer as are corresponding infant and child mortality rates. He said that these shortcomings could be corrected through sub-sample followups in one or two universes, repeating the anthropometric and clinical examinations and adding the biochemical work, then comparing results. Dr. Nichaman then observed that we know a great deal about the pattern of malnutrition in Egypt. Despite data inconsistencies with regard to nutrition indices, common threads run through the findings from the different studies: three basic nutrition problems exist in Egypt, wasting, stunting and anemia, the latter not only among preschoolers but also among women. The analyses just presented of the Egyptian National Nutrition Survey have pinpointed nutrition problems further. Who is malnourished? Wasting is most acutely apparent in the last half of the first year of life and in the second year among the 6-23 months old group; stunting occurs more frequently in somewhat older preschoolers, among the 12-47 months age group; anemia is a problem for infants and children from 6-47 months of age and among women, most severely felt among lactating mothers. We know where it occurs and how severely. Rural areas suffer more than urban areas and rates are higher in Upper Egypt than in Lower Egypt. More stunting is apparent in Universe 5 than in the other geographic areas and Universe 5 along with Universe 4 show the highest anemia prevalence. PEM wasting and stunting are more evident in Cairo and Alexandria than in other urban areas. The best place to live, nutritionally, in Egypt is in the smaller cities, those with a population under 50,000 which benefit from the lowest rates of wasting and stunting. How much PEM do we have? About 5% of the 6-23 month age group suffer from severe or moderate undernutrition of the acute type, or wasting; the range of stunting prevalence in the 12-47 month old group is from 22.6% - 26.5%; anemia prevalence is highest in the 24-35 month preschool group in which 41% are affected; more than 25% of lactating women are anemic as are 22% of pregnant women and 17% of other women.

Principal points of discussion (and direct replies, when made, in parentheses.)

Anemia rates are not exceedingly high in Egypt if compared with figures from other developing countries. In Latin America, overall prevalence is about 25-30%. In other countries, among children, rates are 38% and higher. It is true that compared with rates in the U.S., anemia in Egypt is two to two and half times more prevalent.

We should consistently use the WHO criteria for diagnosis. (According to WHO criteria, 38% of Egyptian children are anemic, based on the 1978 Survey.)

With this kind of prevalence, the first question should be what is causing the anemia. Undertaking a further survey to determine the causes might cost $100 per person and it risks getting bogged down. In all but a few instances worldwide, anemia is due to iron deficiency. If this is a valid hypothesis to test in Egypt, it could be done through serum feric determinations. These assays, similar to ones made for bone marrow, involve a few drops of blood and cost $5-$10 per determination. Anemia may be masquerading infection. If this is likely, it may be wise to select an area and provide therapeutic iron supplementation, checking to see whether hemoglobins change.

With regard to evidence of rickets, the results of a house-to-house survey, checked against laboratory findings, revealed that noting two clinical signs one of which should be enlarged wrist epiphysis, was adequate for proper diagnosis. A mid-sixties study revealed a 12% prevalence of rickets, peaking in the spring and summer, showing up least in the autumn and winter. Rickets has declined over the years. In 1972 Shukry reported a prevalence of 19.7% and 30 years earlier, a prevalence of 50 -70% was reported in the pediatric wards. A study is under way over the next six months to learn the appropriate education messages for mothers by means of learning what she understands regarding sunning her infants.

The studies show that hemoglobin values are low in the vulnerable groups. More food is needed for adequate blood formation. Rather than study causes, why not provide the needed nutrients and see what changes occur. (Dietary surveys will not give answers about the cause of anemia. In order to undertake the most effective intervention for anemia, you must learn the cause first.)

We can consider some of the causative factors for the PEM and anemia we know to be present in Egypt. These include: diarrhea, infection, parasitism, and inadequate or inappropriate weaning foods. We need no more sophisticated surveys, but rather practical interventions.

Egypt has one of the most developed outreach health delivery systems in the developing world, but one of the highest infant mortality rates. The personnel are available and aware of the problem of malnutrition, but they do not succeed in combatting the problem. A lot of the data they collect is never utilized so they get in the habit of filling in whatever information they please. This is caused by lack of supervision and lack of followup use of data obtained.

Perhaps the "clinical" signs of Avitaminosis A should be referred to rather as "suggestive' since they may be misleading; in India, exposure to dust simulated Vitamin A deficiency. Serum retinols would be surer indications.

A quicker means of finding at risk children is to relate arm circumference to height, regardless of age. It is easier and less time-consuming.

Prevalence of anemia among preschool children in countries recently surveyed was from the highest to lowest: Togo, 65%; Egypt, 38%; Haiti, 33%; Sierra Leone, 25%, Lesotho, 25% and Nepal, 24%.

The anthropometry in the most recent surveys seems overly complex with new definitions and combinations of indicators; should we not find something more simple? (Whether one uses weight for age or weight for height would depend first on the age of the child. Weight for age is valid for very young children, giving a fairly accurate nutritional picture until about age three. After that, there is often the need to distinguish between short-statured and tall thin children. Anthropometry should be simple for field screening, but the various parameters contribute to a more precise definition of the nutrition problem when it is a question of making a survey.)

Weight for age predicts mortality accurately, it has been shown in Egypt, in the Strengthening Rural Health Services Delivery System project. It is an adequate measure for the strategic group to be screened, between the ages of 6-23 months. In following progress of intervention programs, weight-for-height changes are not very demonstrable, whereas weight changes are more sensitive.

In fact the "nutrition teachers" have not been clear about the lessons field personnel should know for dealing with such problems as nutrition screening. The teachers should be clear in their own minds before expecting students to do the correct thing. Let us consider what is reasonable to do given the conditions in Egypt. What is feasible and how much does it cost?

Through the interviews carried out in the MIT-CU study, it was learned that doctors know a great deal about medicine but very little about health care delivery. When asked what was lacking in their training, the doctors replied that they had never been taught how to manage the health facility nor how to relate to rural people.

Dr. Shukry closed the discussion noting that we had now diagnosed our principal nutrition problems and looked into some of the causes; that our next effort must be to focus on determining the priorities for intervention programs.

PLENARY SESSION IV. "Feasible Interventions."

Ms. Carol Adelman and Dr. Joe Wray presented part of the paper which appears in Appendix 9, page 111. Dr. Wray added the following remarks: The full report, from which the paper was prepared, considered several studies in different countries. It was part of a larger effort to evaluate feasible intervention programs

designed to improve infant maternal health. Most of the studies used the measurement of infant mortality rate (IMR). Utilization of IMR as an indicator of programmatic impact presents problems because IMR is going down all over the world with or without the intervention in question. Thus it is difficult to separate the results of an intervention from the effects of socio-cultural development. In deciding desirable interventions for Egypt, some of the following points might be kept in mind:

1. The Strategic Cohort. For humanistic reasons, many programs concentrate on second and third degree malnutrition. Hoping that we can cure second and third degree cases is a large assumption. 70% of third degree children die. By the time the children are showing malnutrition, we are too late; the numbers have become unmanageable. And every year produces its new crop of second and third degree malnourished. Up to six months, most babies grow normally. At the end of six months, babies in most developing countries start to fall behind the standard for growth in American children. Thereafter a steady decline is apparent, the length of which varies according to the set of circumstances in a particular country. A wiser approach would be to focus our screening on the very dangerous period of 6-12 months. Then our chances of success increase. Our limited resources should be used to save this strategic cohort of toddlers as they pass through the 6-12 months age period of danger and thereby prevent later problems. In a population of 1000 the number would be 40, a manageable number.

2. Interventions to reach the Strategic Cohort.

a. Supplementation. When food supply is a problem, there are three possible causes: the food is not available; the food is available but mothers do not know how to use it properly; or it is a combination of the first two. When the problem is food supply we need to decide how to fill the gap. In Egypt, you may be considering Supramine; if so, a number of questions should be asked--is it available? Is it economically feasible? Is production adequate? Is it culturally acceptable? Is it inexpensive enough to ensure access to the needy groups? Is it marketable? etc. In deciding how to fill the gap, you will also want to consider home-based weaning food mixtures.

b. Nutrition education. Most nutrition education programs have proved ineffective because they are impractical, time-consuming, long-term and encounter too many obstacles in attempting to reach their target. No studies confirm their effectiveness. It would appear easier to use something like Supramine than to change habits. This is especially true when women are under severe time constraints.

c. Maternal nutrition. Intervention during the prenatal period

affects the child's future health. A Peru study showed that mothers' adipose tissue and muscle mass is most closely correlated to length and birthweight of infants. A Guatemala study showed that the addition of calories only during pregnancy improved maternal nutritional status. In a U.S. study of 80,000 women, it was shown that birthweights increased with improved maternal nutrition.

3. Evaluation. Baseline data should be built into any intervention program. In determining a program's efficacy, it should be kept in mind that effectiveness of a program is a function of the technology that goes into the program and the coverage--or expressed in a formula: E = function (technology) x function (coverage). Even if the technology is 100%, effectiveness will be poor if there is inadequate coverage.

4. Screening for the Cohorts. We must find the way to ensure that the vulnerable group, 6-12 months, is covered. Different screening techniques may be used: health workers may identify them; mothers may do their own screening--this was done successfully in Bangladesh; or a community-based group of workers such as village women, might take on the task. At the village level, all that is needed to protect the child is weight-for-age data.

The goal is to catch the new crop of vulnerable babies and put them under surveillance and prevent them from becoming at-risk and in need of treatment.

Informal discussion on Dr. Wray's observations concentrated on the strategic age for screening which would appear to be later in Egypt based on the information available in the National Survey about malnutrition prevalence and infant feeding practices. In most developing countries, healthy babies who are breastfed until 12 months of age begin to fall short at the time of weaning and exposure to environmental infection. Second year mortality in Egypt is estimated to be 40.

Maternal malnutrition in Egypt is not certain. The 14% of babies with low birthweights cited from a study is comparable to figures among poor black mothers in the U.S. In other developing countries, such as India, the rate is around 30%.

GROUP WORKSHOPS

Participants selected workshops with co-chairmen and rapporteurs as shown in the Program. The subjects included in the three, simultaneous, workshops are listed on the next page.

WORKSHOP A. PRACTICAL APPROACHES FOR IMPROVING FOOD CONSUMPTION AND FEEDING HABITS ACCORDING TO IDENTIFIED PRIORITIES.

Range of Subjects: Deciding the priorities in terms of nutritional needs and age/population segments.

Providing additional nutrients through: supplementation; fortification; targeting the distribution of subsidized foods (including weaning foods) to the most nutritionally vulnerable.

Assuring adequate consumption through education/motivation. Programs at national, governorate, village levels (mass media; person-to-person; participatory) in such areas as weaning/supplemental foods from locally available ingredients, ideal infant feeding practices--breastfeeding, introduction of solids, lengthening pregnancy intervals, harmful child care practices stemming from traditions.

WORKSHOP B. IMPROVEMENT OF HEALTH DELIVERY SYSTEM IN RELATION TO NUTRITION SERVICES.

Range of Subjects: Establishment of guidelines for identification of high at-risk groups and individuals.

Motivating personnel and mothers to attend clinics; correct examination of infants/children; ante- and post-natal women; adequacy of equipment; attitudinal aspects; proper referral, recognition of PEM, dehydration.

System of record-keeping and use of records kept.

WORKSHOP C. IMPROVING ENVIRONMENTAL FACTORS TO ENHANCE NUTRITIONAL STATUS: COMBATTING NUTRITION/HEALTH RELATED PROBLEMS, NOTABLY GASTRO-ENTERITIS AND PARASITISM.

Range of Subjects: Water supply, sanitation, hygiene.

Control of infestation, infectious diseases, dehydration.

PLENARY SESSION VI. Summary of Workshop and Recommendations.

Dr.M. Rashid Barakat presented the final recommendations, appending the reports from the three workshops and the Egyptian nutrition analysis sheet.

Malnutrition is a commanding subject. It is an indicator of underdevelopment and a barrier to development. Malnutrition constrains human competence and productivity while inhibiting a society's capacity for change. It has been said that "Malnutrition does much to lock people into the very state of deprivation from which it is derived." Malnutrition is a key ingredient of poverty, and combatting malnutrition is an important, if not sufficient, step for breaking out of poverty.

In our three-day meeting of international experts and Egyptians from different institutions concerned with nutrition, we have focussed this time on the health aspects of the problem because we consider this a rational first step toward improving nutritional status of vulnerable groups in Egypt. At a later date, we will want to look at nutrition in its broader character and study the significance of the myriad of inter-connecting parts that affect nutritional status. For now, we limit our consideration to a stated awareness of the multi-disciplinary character our subject has.

In our meetings we have devoted our efforts to deciding the nature of malnutrition in Egypt today--the questions of: What kind of malnutrition? Who is affected? How severely affected? Where geographically and ecologically is it most prevalent? The studies that we examined did not always converge and we analyzed the strengths and weaknesses of each, with special emphasis on the one most recently completed by the Nutrition Institute in cooperation with the Center for Disease Control. Despite the disparities--not always easy to determine exactly when the studies used different methodologies and examined different populations--the consensus was that we know what our problems are from the information available to us today. And there are common threads throughout the different surveys: PEM hits the 6-23 month old group hardest and these vulnerable preschoolers are our priority concern. Rural areas are more severely affected than urban areas except for the underprivileged large city areas; Upper Egypt rural populations suffer more than Lower Egypt rural populations; anemia is common among our infants and preschool children and among women, particularly lactating women and pregnant women. Our analysis sheet on Who, What, Why, Where, How Much, What to do, How, Who, and When is attached to this paper.

4. Prior to instituting specific interventions, appropriate screening is necessary. Therefore, the workshop recommends that an information system be built on sound and tested procedures including the following:

a. The MOH should immediately institute the routine use of growth charts at the clinic level and ensure that clinic personnel have the necessary skills to use this technique as an effective diagnostic tool.

b. A monitoring and surveillance system, including data recording, reporting, analysis and feedback, should be developed and implemented. The system should be a routine part of the health care delivery system.

c. The MOH should immediately investigate ways of improving birth and death registration as well as the recording of appropriate birth information such as birthweight.

5. The Ministry of Health should design, test and implement education programs for the provision of nutrition education to improve nutritional status among women, infants and children. This education should include information regarding:

a. Breastfeeding.

b. The appropriate use of food supplements with regard to type and time of introduction. Emphasis should be given to the improved use of familiar and home-available foods and resources.

c. Home and food sanitation and environmental cleanliness.

d. The use of specific food supplements for pregnant women. This should include the evaluation of specific vitamin/mineral preparations.

e. Family planning, especially child spacing and also limitation of family size.

6. Inasmuch as anemia was identified by the group as a key problem, we recommend the following action steps:

a. Conduct the necessary studies to determine the primary causes of the anemia.

b. Conduct intervention trials to test the most effective solutions.

We also delved into the causes for existing malnutrition and found agreement on the major synergistic ingredients that combine with malnutrition to bring about the excessive morbidity and infant and second year mortality: parasitism, gastroenteritis and infectious diseases.

As background to the recommendations I shall now list, it should be stated that it was also the consensus of the workshop that research for the sake of research must be superseded by operational research. This does not mean that we will stop adding to our knowledge about the nature of malnutrition and related problems in Egypt. Indeed there remain gaps in our knowledge. But operational research, for proper measurement of its effectiveness, must have baseline and evaluative data. It only means that we opt for action programs, or interventions as we have called them here, and this type of "research" will continue to refine our knowledge but give primary attention to the corrective "operation."

The recommendations made by each workshop are appended to this summary. I am listing below the final agreed points made by the Scientific Committee for this Workshop.

1. The Ministry of Health should immediately identify and implement nutritional services as an integral component of basic health services and develop appropriate guidelines for the prevention and treatment of malnutrition.

2. Inasmuch as an effective maternal and child care system is a prerequisite for the implementation of effective nutrition intervention programs, we recommend that the Ministry of Health continue to upgrade basic health services in the following areas:

   a. Improve the outreach to target populations through whatever methods, including an effective monitored system of home visits.
   b. Attain greater immunization coverage.
   c. Treat gastroenteritis earlier, particularly with the use of oral rehydration.
   d. Add nutrition services notably screening, food supplementation and referral, mother education.
   e. Better health education in all respects.
   f. Family planning, particularly child spacing.

3. As a prerequisite to developing and implementing nutrition interventions, adequately trained professionals must be available. This training should take place in medical schools, schools of nursing, the Nutrition Institute, schools of social work, etc.

7. The Ministry of Health shall create a Task Force of senior Ministry officials and appropriate experts to examine the general approaches identified and the specific recommendations made, and it should then develop plans for testing and evaluating the effectiveness of different interventions and/or combinations of interventions in a number of specific areas. The global proposal, now being developed, will be discussed by the Task Force as soon as the first draft is available.

The above interventions will be coordinated with, or complement, such programs already approved as the World Bank's Population and Community Health Program, the Rural Health Delivery Systems Program, the Urban Health Delivery system being planned, and the Catholic Relief Services' educational program for which training has begun. Highest priority will be given to selecting geographic areas where these existing or planned health care improvement projects exist.

Report of Workshop A. Practical Approaches for Improving Food Consumption and Feeding Habits According to Identified Priorities.

The group discussed three problems and their main causes:

A. Maternal Undernutrition
   Unavailability of adequate diets, and
   Lack of nutrition information.

B. Infant and Child Undernutrition (defined as acute undernutrition occurring between the ages of 6-23 months, and chronic undernutrition occurring between 12-47 months of age due to
   Unavailability of adequate diets, and
   Infections.

C. Anemia
   Low iron intake,
   Parasites, and
   Other causes.

A. Maternal Undernutrition. Before addressing this problem, the prevalence of low birthweight must be ascertained so as to identify the percentage of mothers whose undernutrition during pregnancy leads to low birthweight and higher risk of infant death. The correct weighing of all newborns at hospitals, health units, or in homes, could assist in identifying those newborns at highest risk and would also serve in evaluation. No practical suggestions were agreed as to how this could be achieved. Before a maternal supplementation program is undertaken in an area, a representative sample of birthweights should be collected and analyzed as to the proportion of low birthweight babies and their mean weights. If there is a significant problem, then these data can serve as baseline for the evaluation of the effect of a maternal supplementation program.

At present in Egypt there is a very limited program of food aid and special care offered to pregnant or lactating women at the health unit. Several people were concerned that the poorest and neediest never went to the health facility. Some members of the group concluded, however, that if there were a palatable and attractive food supplement available, then mothers would soon hear and come to the unit.

The identification of high risk pregnant/lactating women could be on the basis of weight /height. Standards are presently being developed. The feasibility of carrying out such measurements was questioned but not explored at length. It was

suggested that the design of programs to provide food supplements for at-risk women should be based on family planning objectives as well as nutritional ones.

Other considerations were: the importance of nutrition education with regard to the food needs of women while pregnant; existing problems of intra-family distribution; and the fact that the poorest women may not attend the clinics.

Recommendations

1. Assessment should be made of the proportion of low birthweight infants infants in the area prior to designing a program.

2. Feasible methods for early detection of maternal malnutrition should be attempted (e.g. monitoring the body weight of the pregnant mother) and the data gathered with awareness of its use in future evaluation.

3. If maternal malnutrition exists, then maternal supplements to pregnant women attending MCH centers and units should be given; especially recommended are nonfat dried milk, Corn-Soya-Blend (CSM) or products that might be developed for the utilization of both mother and infant.

4. The existing commercial weaning foods should be evaluated, with the aim of determining their feasibility and the possible need of a new product; concerns should include taste, content, cost and coverage potential and professional marketing should be employed.

5. Different strategies for effective distribution of food to pregnant and lactating women should be considered, e.g., use of the existing ration card system for increased food allotment for these women.

6. Nutrition education of mothers should accompany any and all approaches.

7. These recommended approaches should be field tested, with different components, in different areas and should include clinic outreach programs or alternatives which would identify key health/nutrition/family planning promoters within villages capable of extending health services beyond the clinic or of motivating the poorest women to come to the clinic.

B. Infant and Child Undernutrition. Different kinds of "weaning foods" were discussed; and it was thought that rather than referring to "weaning foods" we might more correctly call these products supplementary or pre-weaning foods since they are used while the infant is still breastfeeding. Infant and child supplementation might come from two principal sources: 1) homemade weaning foods from locally available foods, in which case, existing recipes should be checked and ways of improving their quality and effective use should be taught to mothers at clinics of through outreach programs (mehallabia--milk, water, sugar and powdered rice or starch--was specifically discussed); 2) new weaning foods which might serve as both maternal and child food supplement, in which case, product details or criteria for development should be developed such as whether instant, semi-cooked, etc. and correct marketing for consumer image; and it was stressed that

any food supplement should be given in addition to breast milk.

It was pointed out that Supramine production was very limited and the opportunity for the development of another local supplemental food might therefore be questionable. Production has been an unsurmountable problem for Supramine, and its potential coverage far below projected needs. Assuming that 10% of the population of preschool children and pregnant and lactating women in Egypt are in need of supplementary food, some 37,000 metric tons would be needed annually. The goal for Supramine production in 1979 was 1000 metric tons and probably only half of that was produced.

Recommendations

1. Mothers should be educated on the value of breast feeding and when, how and why to use supplements, whether homemade mixtures or manufactured products. It was agreed that the age of the first supplement should be no later than six months, unless medical advice or clinic observation based on the individual infant's weight deviation from the standard dictates otherwise.

2. Homemade mixtures now being prepared should be evaluated and recommendations made for more effective preparation and utilization.

3. New supplemental foods that are protein-rich, supply calories and contain available iron should be considered.

4. Growth charts in clinics or communities should be used to screen and identify infants and children at risk; since this is not the current practice, it would entail the provision of additional health services.

5. Nutrition rehabilitation for severe PEM should be considered and conducted in existing centers such as the rehydration centers or hospitals.

C. Anemia. Before an anemia program is undertaken, the extent of anemia and its causes should be simply determined on a sub-sample of the area by serum ferritins (test of highest validity), and by giving iron pills to a group and assessing the hemoglobin value compared with a placebo group. If iron-deficiency anemia is identified, then an action program might: 1) increase iron intake; 2) treat parasitic burdens and 3) treat other causes such as folate deficiency. Since parasitism was the subject of another group Workshop A members felt it unnecessary to discuss its causes contenting itself with the clear recommendation for the necessary steps to determine its relation to anemia. As for increasing iron intake among the vulnerable groups, three ways were suggested: 1) increased consumption of iron-rich natural foods; iron supplements, and 3) fortification of a common vehicle with iron.

Pregnant and Lactating Women. It was thought that if iron intake were increased during pregnancy, then further supplementation would not be necessary. Members noted that dietary alteration--the increased consumption of iron-rich foods would not seem to be feasible in Egypt at this time since the only means of increasing iron intake through consumption is by eating animal protein and by consuming ascorbic acid (which enhances iron absorption). Thus, education for the poorest, pregnant women without means to buy the iron-rich foods was not a feasible solution. Fortifying some vehicle such as sugar, salt or wheat (among others discussed) would not have a dramatic, immediate effect on pregnant women though, for longer-term effectiveness, this approach might be valid, coupled with iron supplements. Given the special needs of pregnant women, then, the special needs of pregnant women, then, the remaining suggestion was iron supplementation. The potential side effects (gastritis and constipation or diarrhea) were mentioned, as was the relationship between dosage and side effects. Discussed also were times of ingestion--before eating, between meals, and with tea after meals.

Folic acid deficiency is a common problem in pregnancy in many other countries and has been shown to have a significant impact on birth weight. Folic acid deficiency may play an important role in anemia. It was suggested that a folic acid supplementation program to all pregnant and lactating women together with iron supplementation could only benefit the recipients while the pilot study results were being compiled inasmuch as these supplements have no harmful side effects and iron deficiency anemia is often associated with folic acid deficiency.

Infants and Young Children. Iron drops should be given to premature babies and it was further recommended that for the premature infants, drops be given starting at two months and for the full-term infants, at four months of age. For infants and children, education of mothers for dietary alteration is not practicable as discussed above. Iron fortification of a vehicle such as bread consumed by infants and young children as supplements--e.g. bread soaked in milk, which is already commonly given by mothers--might have some more immediate impact on this vulnerable group.

Use of existing specially prepared weaning foods(corn-soya milk, wheat-soya-blend, etc.) will not provide sufficient absorbable iron for this group and research is needed on the sequestering of iron in these products which are already fortified if they were to serve as the main source of iron.

Finally, it was questioned whether home-made weaning foods could contain sufficient iron. The addition of molasses or dates was suggested as one approach but another member of the discussion group had found low absorbability of iron.

Recommendations

1. The existance and cause of anemia have to be determined by laboratory procedures and field testing of iron pills and placebos as the anemia may not be due only to iron deficiency in the diet. If the cause of anemia is iron deficiency, then: a) treatment of parasites in both pregnant mothers and in infants and children is recommended; b) distribution of iron pills to women during pregnancy is recommended; and c) folate can be added to the iron at very low cost and distributed with the iron pills.

2. This should be accompanied by nutrition education concerning: a) the importance of prolonging breast feeding since breast milk enhances iron absorption; and b) use of Vitamin C-rich foods and animal protein-rich foods where this is sensible.

3. Commercial weaning foods distributed to 6-24 month old children should be supplemented with iron. The effect of molasses, dates, and other traditional foods on anemia should be explored and if the results are ineffective, supplementation with enriched commercial weaning foods should be considered.

4. Possibilities should be explored for the correct vehicle for iron fortification; this should be preceded by careful evaluation of the results from short-term intervention trials.

All of the recommendations involve operational research activities which should also provide insights into the actual causes of malnutrition and anemia among vulnerable groups.

Report of Workshop B. Improvement of Health Delivery System in Relation to Nutrition Services.

General Considerations

Malnutrition is intimately linked to other health problems now receiving priority attention by the Ministry of Health, especially gastroenteritis, respiratory infection and parasitic infestation.

The existing malnutrition-morbidity-mortality dynamic threatens the success of the Ministry of Health's efforts to promote family planning.

Malnutrition is too critical a problem to be ignored and too dispersed in the population to be left to clinical solution. More effective programs with broad coverage are needed within a general strategy of action, the parameters of which need to be tested by experience. But malnutrition ought not be isolated from the broader context of health insults from which it arises and becomes a serious threat to health itself. For the Ministry of Health, malnutrition is best addressed within the framework of the existing health care delivery system.

An indicator of development, malnutrition is also a barrier to development, for it constrains human competence and productivity while inhibiting a society's capacity for change. Malnutrition does much to lock people into the very state of deprivation from which it is derived. Just as malnutrition is a key ingredient of poverty, combatting malnutrition is a necessary, if not sufficient, condition for breaking out of it.

General Recommendation

The Ministry of Health should make nutrition problems a priority in its delivery system, especially protein-energy malnutrition among preschool age children and anemia among pregnant and lactating women.

Specific Recommendations

1. From the vulnerable population of mothers and preschool age children, the target group for priority nutrition programs should be infants and children from six to 35 months of age, and pregnant women, especially young mothers and multiparae who have undergone short pregnancy intervals.

2. Effective screening to identify at-risk children through serial weighing

should be done in the most feasible way for the setting. Weighings, or screening, might be combined with immunization schedules, e.g., which would mean five to six check-ins during the first 12 months. Subsequently, weights could be taken at lengthier intervals in accordance with the second year immunization requirements. Screening should include checking for diarrhea and parasites.

Record-keeping should be simplified and contain all data that will be used, in easily understandable format and coding. Useful information will be growth progress data, immunization and disease histories, and development milestones. The child health records should be the tool for program evaluation, for referral, and for other decisions such as eligibility for supplemental foods.

3. Personnel training in MCH clinics should include all of the staff, and the work of all clinic personnel should be supervised and evaluated. Training would include correct ways of taking anthropometric measurements and using the recording instruments (road-to-health cards) as educational tools with mothers, as the basis for referral, and for program evaluation. Especially with the goal of increasing coverage, the current job descriptions of MCH personnel ought to be reviewed to determine the best way to ensure more home visits either by nurses or by aides.

4. All of the existing, and any new, health programs for the above-defined target group should include an evaluative mechanism which would include indicators of: population coverage; extent of utilization of services, infant mortality rate, and growth progress. Such an evaluation component should be added to programs to enhance their usefulness.

5. The existing pattern of health service delivery in MCH centers at the regional and central levels should be reviewed with the aim of finding out how the system can be made more efficient--i.e., improving the flow of patients to ensure fewer stress points for both personnel and clients.

6. Whatever the supplementary food that might be provided, it ought to be programmed in a manner that is more consistent to nutrition and health care delivery goals, rather than as a supply problem, or logistics nuisance. Innovative use is recommended with field testing of alternative modes of allocation--e.g.

On-site feeding rather than take-home;

Using eligibility criteria (poverty, age, nutritional status, illness, other);

Targeted versus general distribution;

Food regarded as "food" versus food as medicine; and

food used as an incentive for more child weighing, attendance at clinics, etc.

7. Birth registration is essential if screening record-keeping is to be meaningful, especially weight for age. It is recommended that birth attendants register births at the time of delivery rather than wait for parents to register a birth at their convenience at some later date.

8. All of the recommendations call for innovative approaches that need to be tested in the field, carefully and incrementally, to discover the best parts of the existing system and to orient it effectively to meet the nutrition and health needs as they are understood today in Egyptian society.

Report of Workshop C. Improving Environmental Factors to Enhance Nutritional Status: Combatting Nutrition/Health Related Problems, Notably Gastroenteritis and Parasitism.

General Considerations

The interaction of malnutrition and infection is well documented. Each condition predisposes toward the other and, because of poor environmental factors, malnutrition and infection frequently occur together. Measures to combat malnutrition and infection should go hand in hand. The most prominent nutrition problems in preschool age children are protein-energy malnutrition (PEM) and nutritional anemia. The primary causes are inadequate, unsatisfactory and unhygienic feeding practices. Diarrhea and parasitic infestation are the most important precipitating factors.

Recommendations

Preventive action programs are needed for maintaining good nutritional status of the preschool population and for reducing the prevalence, and minimizing the effect, of infectious diseases. To maintain good nutritional status of infants and children, it is recommended that:

Pregnant and lactating mothers be given health care, health education and food supplements in the MCH and health centers;

Premature infants be given special attention as they constitute a highly vulnerable group with regard to infection and malnutrition because of reduced protein reserves and iron stores;

The preschool population be monitored at MCH centers using growth charts; and that primary community leaders or medical social workers be organized to call for children, particularly during the first 12 months of life. A high-risk list could be worked out in each MCH or health center so that these children are given extra care;

Nutrition education for mothers be provided in the MCH, emphasizing the value of breastfeeding and pointing out false advertising regarding baby foods and deleterious effects of contraceptive pills during lactation;

Low-cost weaning foods, whether commercial (Supramine) or home-prepared from locally available foodstuffs, be promoted.

In order to reduce the prevalence, and minimize the effect, of infectious diseases, it is recommended that:

Immunizations for most specific diseases of childhood be compulsory; and

At-risk children be given priority for measles vaccination.

The most formidable prevailing problems are diarrhea and parasitism.

To prevent and control diarrhea, it is recommended that:

1. Mothers, grandmothers, school children, community leaders, etc. be given health education which emphasizes proper sanitary food handling, preparation and storage, personal cleanliness of the child, preference for using spoons and cups in place of bottles; and that the effectiveness of the program be evaluated on a continuing basis.

2. Noting the anti-infective properties of human milk, that breastfeeding be encouraged to the second year without neglecting supplemental foods.

3. Diarrhea be treated early, especially by oral rehydration including electrolytes. All health workers should be told about its importance and made to understand that it can be undertaken in simple health infrastructures or at home. Oral rehydration packets should be readily available to mothers and they should be instructed on how to use them as first aid measures before seeking medical advice. When intravenous rehydration is required, it should be given in centers or hospitals, using proper equipment, and administered by trained health personnel.

4. Medical curricula at the undergraduate level should include training for the proper prevention and control of nutritional and infection problems common to the community and there should be inservice training as well.

5. Environmental hygiene, personal hygiene and food hygiene should be observed in the home and community through the following efforts:

   a. Motivating people to provide sanitary latrines in their houses; (and the feasibility of solar latrines should be studied)
   b. Assuring a safe water supply and proper drainage; (most villages have tap water but to ensure that it is stored properly, supervision and monitoring by health authorities are needed.
   c. Providing adequate waste and refuse disposal systems--e.g. providing boxes, using sanitary dumping, and incentives to persuade the public to use the available facilities and to control flies and mosquitoes.
   d. Accompanying these measures with health education designed to change behavior and motivate people (religious avenues may be practical).

To prevent and control parasitism, it is recommended that:

1. Health education programs be formulated stressing personal hygiene and excreta disposal away from water sources.

2. Periodic stool examinations be made so that cases can be detected and treated early, and that health education accompany such examinations to prevent reinfection.

3. Treatment programs be especially aimed at heavily infected areas and to the specific parasites prevailing.

4. The community be encouraged to participate in all such efforts.

To combat iron deficiency anemia in infants and children, it is recommended that:

1. Mothers be given proper care during pregnancy and nutrition education about the proper foods needed; that their care include iron supplements.

2. Parasitic infections in mothers be detected and treated.

3. Women be encouraged to space pregnancies more wisely to improve maternal health and to prevent depletion of iron stores.

4. Women be more carefully attended at delivery through the education of midwives and health personnel.

5. Wide dissemination be given to correct information about the proper timing and choice of supplemental foods for infants.

Priority Recommendations

The most important interventions, Workshop C members set forth were:

1. Environmental sanitation measures that will ensure a safe water supply, proper refuse and sewage disposal and food hygiene.

2. Education of mothers regarding sanitary feeding practices.

3. Oral rehydration to be available on the widest scale possible.

4. Mobilization of the community to gain their active participation in implementing these measures.

Finally, it was noted that nutrition intervention programs, to be most effective, should be integrated with allied activities in the form of a "package" of health services available to the most vulnerable, at-risk population.

ANALYSIS OF NUTRITION PROBLEMS IN EGYPT:

WHAT	WHO	WHERE	HOW MUCH	WHY
PEM-WASTING	Infants and Children 6 - 23 Months	Rural > Urban Upper Rural > Lower Cairo & Alex. > Other Urban areas	Severe .2 - .8% Moderate 1.3-3.5%	Diarrhea Parasitism Inadequate Food Consumption Timing Quantity Quality
PEM-STUNTING	Infants and Children 12 - 47 Months	Upper > Lower Universe 5 > Other Univs. Rural > Urban Cairo & Alex. > Other Urban	9 - 21%	
PEM	Pregnant & Lactating Women			Low food intake and Infection
ANEMIA	Infants and Children 6-47 Months of age. Women and especially 1)Lactating 2) Pregnant	Upper > Lower Universes 4 and 5 > Other Univs. Rural > Urban Alex. > Cairo	38% (23-45%) 22% (women in sample) 25.3% lactating 22.1% pregnant 17.0% non-pregnant	Varied Causes Inadequate FE Intake Parasitism

AND PATH TOWARD APPROPRIATE INTERVENTIONS

WHAT TO DO	HOW - by whom - & where Selection Criteria: Cost, Feasibility, Effectiveness.
1. Oral rehydration.	1. Distribution/education on use of packaged electrolyte solution and/or homemade.
2. Evaluate and improve hygiene practices & water supply.	2. Based on survey of hygiene practices & water supply, undertake education & water supply improvements.
3. Evaluate and treat parasitic burden.	3. Medications for parasite treatment.
4. Screen infants & children for early risk identification & treatment.	4. Weighing, weight charts--clinics & villages.
5. Earlier introduction of weaning foods & improved feeding after disease.	5. Education to introduce foods sooner in first year of life and after disease.
6. Improve quality of homemade weaning foods.	6. Assess existing home-made weaning foods and practices & determine how to improve through education.
7. Improve commercial weaning food and distribution.	7. Evaluate taste, cost, content, and coverage effectiveness & make necessary improvements.
8. Nutrition rehabilitation.	8. Establish treatment method of acute malnutrition (i.e.improve existing system or establish new centers
9. Evaluate & low birth weight & examine causes.	9. Based on evaluation, provide food supplements and/or medical treatment.
10. Evaluate causes of anemia.	10. Appropriate treatment for other identified major causes.
11. Increase FE intake.	11. Education to increase iron-rich food intake (infants and children). Iron Supplements. Fortification.
12. Evaluate and treat parasitic burden.	12. Medicines for parasite treatment.

CLOSING CEREMONIES

In stating his pleasure to take part again in the Workshop, AID Director Brown expressed his satisfaction that there had been active and thoughtful participation on the part of health representatives from the Governorates as well as the Ministry of Health, academic institutions and other international organizations. He hoped that two of the major objectives--targeting programs to the most vulnerable groups, and training health professionals--could be achieved in the very near future.

Mr. Brown said that throughout his stay and during travels in the country, he has been impressed with how strongly Egyptian leaders at all levels feel about equity and the common welfare--which of course means providing all people with the necessary nutrition to permit them to play the fullest role in national life.

H.E. the Minister of Health Dr. Mamdouh Gabr, in officially closing the Workshop, said that the achievement here was more than the content of recommendations--it was the fine spirit of keen interest and participation that developed in the working groups. The workshop gathered together those most concerned with nutrition and paved the way for the Ministry of Health to effect feasible intervention programs.

The Minister thanked the Scientific and Executive Committee members for their organizing efforts and especially, H.E. Mrs. Jihan El-Sadat who had graciously lent her name in sponsorshop of the Workshop thereby assuring useful publicity about nutrition problems in Egypt.

Dr. Gabr said, "Goodbye, and until we meet again--under better nutritional status."

Egyptian National Nutrition Survey. I. "Growth Status of Preschoolers."

by Dr. Hekmat El-Sayed Aly, Nutrition Institute, Ministry of Health.

The undertaking of a nutrition survey on a nationwide basis has always been needed in Egypt. Ideally such a survey would include all variables that might be connected with nutrition problems. But doing so would have required far more time to collect, process and analyze the data, an additional period of time that could get to be so long that the information would be out of date.

The nutritional status of preschool children is considered a valid indicator of the nutritional status of a community, and preschoolers' physical development is still considered a reliable measure for this status. Accordingly, the Egyptian 1978 national survey was planned and conducted with the objective of getting quickly a picture of the most important nutrition problems among the preschool population.

The Survey was carried out by the staff of the Nutrition Institute, Ministry of Health, with the financial and technical support of UNICEF, the Center for Disease Control(CDC)/USA, and USAID.

Methodology. A population-proportionate representative sample was drawn by the Central Agency for Public Mobilization and Statistics (CAPMAS) covering rural, urban and metropolitan areas. The sample amounted to 11,677 children aged 6 to 71 months, in 19 Governorates.

The Survey was conducted early in 1978 (January to April), then continued in the Cairo area to cover a selected group of children considered to represent a privileged social class. Criteria for this group were based on occupation and education of the father and the nature of the residential area. This activity was performed as a trial to test the potentiality of physical growth of the Egyptian child in optimum circumstances.

Later a representative sample of inhabitants of frontier areas was examined: the Red Sea (July, 1978), Matrouh (August, 1978), and the New Valley (March, 1979).

Among preschoolers, growth studies have shown that the influences of environment, such as nutrition and infectious diseases, are of much greater importance than are those of race and ethnicity. Accordingly, interpretation of the data on body measurements in this survey are presented in correlation with the reference median of the CDC.

It should be mentioned that the Survey was carried out during the winter season in Egypt, a time when the prevalence of infant and childhood diarrhea is at its minimum.

The Egyptian National Nutrition Survey shows the nutritional status of preschool children according to four anthropometric indices: weight for height; height for age; Waterlow classes of wasting, stunting, and wasting/stunting; and weight for age.

Weight for height. Undernutrition is considered to be present when weight for height is found to be below 85% of the median value of the reference population. When below 80%, the condition is considered acute undernutrition. Figure 1 on the next page shows the weight for height distribution curves for Egyptian preschool children in the total representative sample . The curves are very similar to those of the NCHS/CDC reference population; there are few acutely undernourished children in the various governorates and universes. Among the special group only two children showed evidence of wasting. Summary Table #1 shown at the end of this paper presents figures for the total representative sample. 2.3% of Egyptian preschoolers suffered from acute undernutrition while 3.1% were overweight. Table 1 below links prevalence of undernutrition with History of Recent Catabolic Diseases, Table 2.

Table 1. Prevalence of Wasting by Geographic Location (Undernutrition, According to Weight for Height.)

Location	Severe <80	Moderate 80-84.9	Total
Representative Sample	0.6	1.7	2.3
Cairo-Giza	0.8	2.7	3.5
Alexandria	0.2	0.3	0.5
Special Gp	0.1	1.0	1.1
Frontiers	2.0	5.6	7.6

Table 2. History of Recent Catabolic Diseases.

Location	Unspecified Sickness	Diarrhea	Fever
Representative Sample	15.2	9.5	15.7
Cairo-Giza	20.2	14.0	17.3
Alexandria	28.3	20.6	30.6
Special Gp	-	-	-
Frontiers	n.a.	n.a.	n.a.

It can be seen that acute undernutrition is more prevalent in Cairo-Giza than in the Representative sample. Results for the frontier areas indicate much higher prevalence than found in the Nile Valley and Delta. The correlation between infection and nutritional status has been repeatedly stressed. Among the children in this survey, those with a recent history of fever or of diarrhea show more acute undernutrition as, see above, the prevalence of recent catabolic diseases as described by the mother. The situation appears to be worst for underprivileged groups living in the big cities.

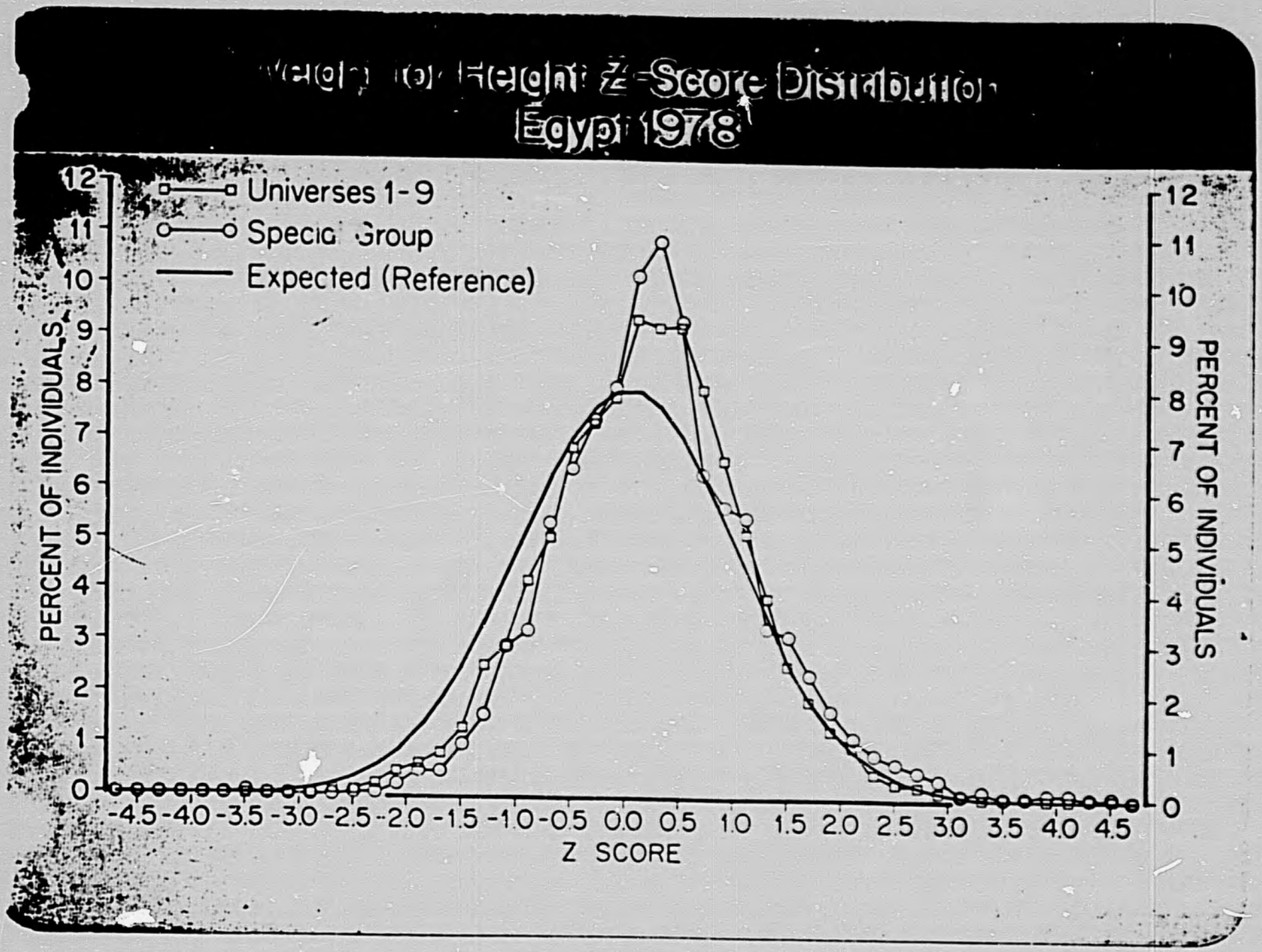

Egypt 1978
Universes 1-9
Special Group
Expected (Reference)
PERCENT OF INDIVIDUALS
PERCENT OF INDIVIDUALS
Z SCORE
-4.5 -4.0 -3.5 -3.0 -2.5 -2.0 -1.5 -1.0 -0.5 0.0 0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5
0 1 2 3 4 5 6 7 8 9 10 11 12

FIGURE 1

Height for Age. A child is considered chronically malnourished, or stunted, when his height for age value is less than 90% of the median of the reference population. When the value is below 85%, the stunting or chronic malnutrition is considered severe. Figure 2 on the next page shows a marked deviation for Egyptian children in the total representative sample while the special privileged group follows rather closely the curve of the NCHS/CDC reference population. Summary Table #1 shows why. 21.2% of the total sample children are chronically malnourished or "nutritionally dwarfed". Table 3 shows stunting by geographic area. It is most prevalent in the frontier areas (24.5%). On the right side of the table, the magnitude of chronic and acute malnutrition is shown as well as the prevalence of obesity.

Table 3. Percentage Distribution of Preschool Children by Height for Age, and by Geographic Area. Magnitude of Chronic and Acute Malnutrition and Prevalence of Obesity.

Location	Severe <85%	Moderate 85-89.9	Total	Acute and Chronic*	Obesity
Representative sample	4.5	16.7	21.2	23.5	3.1
Cairo-Giza	3.5	15.5	19.0	22.5	2.5
Alexandria	2.9	12.8	15.7	16.2	3.5
Special Group	0.1	1.0	1.1	2.2	4.5
Frontiers	4.7	19.8	24.5	32.1	1.5

* We can expect that there will be minor overlapping by combining these two.

Waterlow Classes. Children below 90% height for age are classified as having "stunting" according to Waterlow's categories of nutritional status. Those who are below 80% weight for height are "wasting" and the state of being below 80% weight for height as well as 90% below height for age is "wasting and stunting." Summary Table # 1 shows a prevalence of .6% of wasting and wasting and stunting among preschool Egyptian children and a prevalence of 20.8% of "stunting". Again, relating nutritional status to the presence of disease as described by the mothers, we see the following relationship between Waterlow classes and illness, fever and diarrhea.

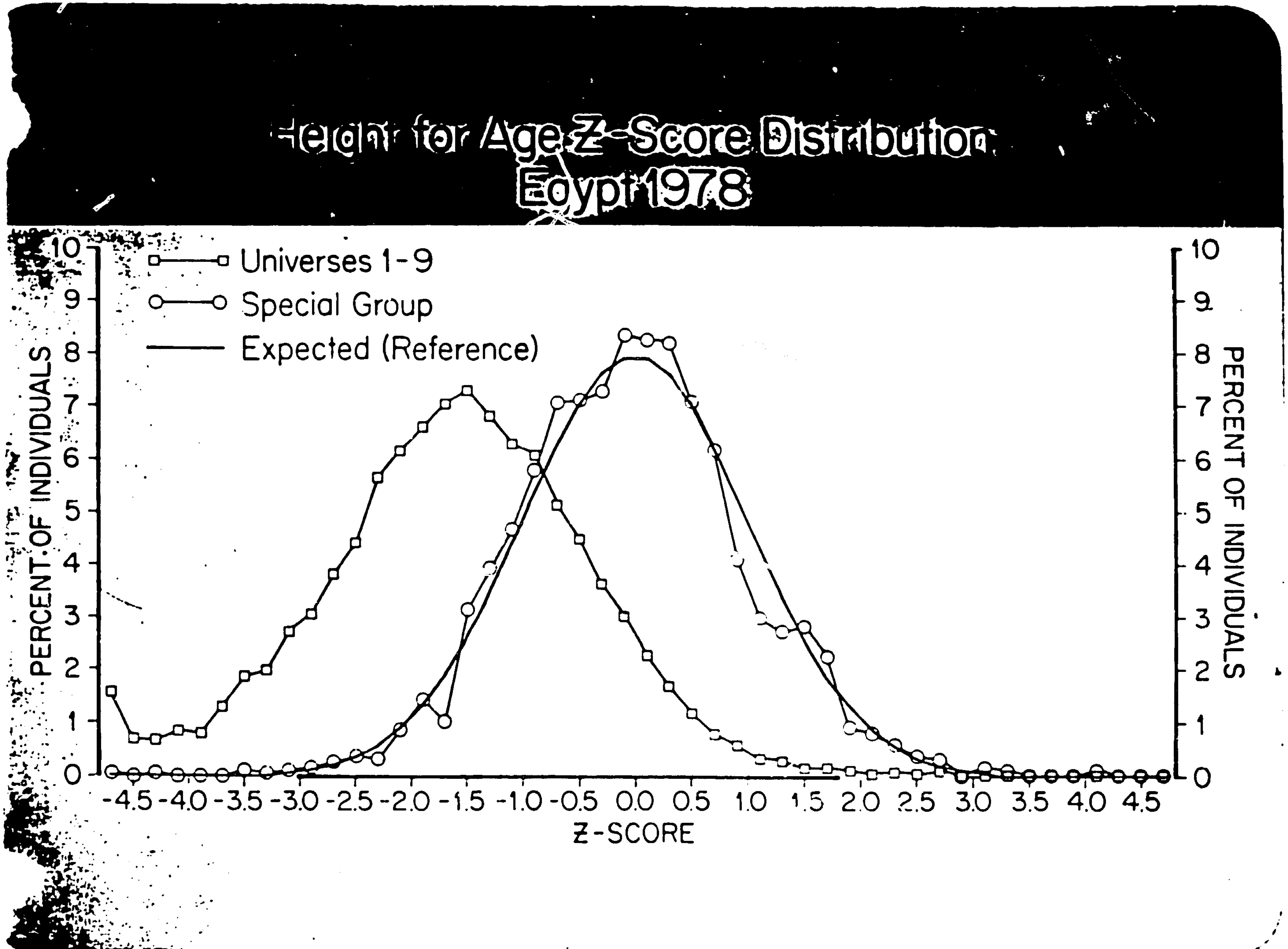

Height for Age Z-Score Distribution
Egypt 1978
Universes 1-9
Special Group
Expected (Reference)
PERCENT OF INDIVIDUALS
0 1 2 3 4 5 6 7 8 9 10
-4.5 -4.0 -3.5 -3.0 -2.5 -2.0 -1.5 -1.0 -0.5 0.0 0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5
Z-SCORE

FIGURE -

Table 4.(a)Illness, Fever and Diarrhea Rates per 100, by Waterlow Classifications (Z-Scores). Egypt 1978.

Waterlow Classification (Z-Scores)	Rates per 100 Illness	Fever	Diarrhea
Normal (N=5095)	14	14	8
Stunting (N=2838)	15	16	10
Wasting (N=38*)	16	11	18
Wasting & Stunting (N=45*)	38	44	24

* N below 50, thus rates are not reliable.

This illustrates the devastating effects of fever and diarrhea on acute malnutrition (with not much effect on chronic, or stunting). However, the number is too small to justify a clearcut conclusion. It is interesting though to look at another correlation made in a survey with which CDC assisted in Haiti where numbers in the two categories of wasting and wasting and stunting were large enough to justify the same conclusion: fever, diarrhea and illness have a very high correlation with wasting and little apparent effect on stunting.

Table 4.(b) Illness, Fever and Diarrhea Rates per 100, by Waterlow Classification (Z-scores). Haiti 1978.

Waterlow Classification (Z-scores)	Rates per 100 Illness	Fever	Diarrhea
Normal (N=2995)	51	41	29
Stunting (N=1871)	54	44	30
Wasting (N=210)	78	60	56
Wasting & Stunting (N=277)	79	64	56

Gomez Classification, Weight for Age. In Summary Table #1, it is apparent that 48% of Egyptian preschoolers suffer from some form of undernutrition; 8.8% are classified as second and third degree or under 75% of body weight for age compared to the median of the reference population.

Prevalence of Undernutrition by Age Group. Summary Table #2, at the end of this paper, shows the prevalence of undernutrition according to the four anthropometric indices, by the different age groups. Infants and children from 6-23 months are most severely affected by acute undernutrition or wasting while the 12-47 month age group show the highest prevalence of chronic undernutrition or stunting.

Prevalence of Undernutrition by Geographic Area. Summary Table #3 shows the prevalence of undernutrition according to the four anthropometric indices, by universe and distinguishes urban from rural population. It is

evident that the prevalence of both wasting and stunting is more pronounced in rural areas than in urban areas, that Cairo and Alexandria are more affected than other urban areas, and that Upper rural Egypt suffers more than Lower rural Egypt. Universe 5, which includes the Governorates of Giza, El Fayoum, Beni Suief and El Menia, had the greatest prevalence of chronic undernutrition or stunting than the other universes in the survey. (Universe 5 along with Universe 4, it should be noted, were also the most adversely affected by anemia.)

Finally, attention is drawn to the last two Figures which compare the development of the Egyptian child with that of pre-schoolers of several other countries which have been surveyed recently with the assistance of CDC. It is apparent that 6-23 months of age is the most critical period in the road to health of the Egyptian child. This is the period in which proper child feeding and weaning practices are most important for growth, development and disease resistance. Delayed introduction of supplemntal feeds threatens the lives of children in this age group. After this critical period (and in the case of linear growth retardation, after 36 months of age) the Egyptian child's chances of improving are greater than those of the children in all of the countries with which comparison is made. We cannot fail to mention, however, that the high rates of first and second year infant mortality, affect this picture as well.

The last two tables summarize the dietary survey data. Table 5 shows the Mean, Standard Deviation and Coefficient of Variation of Food Units Consumed; this is based on the mothers' recall of their children's recent dietary intake. Table 6 indicates a "variety score" (or mean number of food categories consumed) according to universe and by nutrition status category. A modest correlation between amount and variety of foods consumed and nutrition status is evident. However, the coefficient of variation is too high (400% in the case of one food group) to be reliable.

[1]Nutrition Institute, Center for Disease Control (CDC). (1978). Egyptian National Nutrition Survey.

[2]Aly, H.E., A. Dakroury, and M.H. Morsey 1978, in press). Nutritional Status of preschool children in the Red Sea area.

[3]Aly, H.E., M.A. Hussein and F. Ghoneim (1978, in press). Nutritional Status of preschool children in Mersa Matrouh.

[4]Aly, H.E., A.K. Said, and F. Ghoneim (1979, in press). Nutritional Status of preschool children in the New Valley.

Table 5.
MEAN, STANDARD DEVIATION, AND COEFFICIENT OF VARIATION OF FOOD UNITS CONSUMED, FOR NINE FOOD GROUPS: EGYPT 1978

Food Groups	Mean	S.D.	C.V.
Milk Group	3.35	4.48	133%
Weaning Food Group	0.18	0.72	400%
Grain Group	6.41	4.02	63%
Legume Group	0.91	1.64	180%
Tuber Group	0.80	1.51	189%
Egg/Meat Group	1.25	1.45	116%
Vegetable Group	2.26	2.52	112%
Oil/Fat Group	0.91	1.23	135%
Sugar/Beverage Group	3.14	2.74	87%

Table 6.

"VARIETY SCORE" (MEAN NUMBER OF FOOD CATEGORIES CONSUMED) BY GEOGRAPHIC AREA AND BY NUTRITION STATUS CATEGORY: EGYPT 1978

	Height for Age % of Median		
Geographic Area	<90%	90%+	Total
Total Rural(01-06)	4.28	4.40	4.36
Large Villages & Small Towns(07-08)	3.85	4.40	4.30
Small Cities(09)	4.40	4.74	4.69
Total Representative Sample(01-09)	4.23	4.44	4.38

	Weight for Height % of Median		
Geographic Area	<85%	85%+	Total
Total Rural(01-06)	2.83	4.39	4.36
Large Villages & Small Towns(07-08)	1.75	4.34	4.30
Small Cities(09)	2.00	4.69	4.69
Total Representative Sample(01-09)	2.62	4.41	4.38

	Hemoglobin (gms/100ml)		
Geographic Area	<11g	11g+	Total
Total Rural(01-06)	4.13	4.51	4.37
Large Villages & Small Towns(07-08)	3.56	4.55	4.30
Small Cities(09)	4.50	4.70	4.67
Total Representative Sample(01-09)	4.04	4.55	4.38

SUMMARY TABLE # 1

SUMMARY PERCENT DISTRIBUTION OF PRESCHOOL CHILDREN BELOW CUT-OFF LEVELS FOR VARIOUS ANTHROPOMETRIC INDICES, TOTAL REPRESENTATIVE SAMPLE: EGYPT 1978

Weight for Height Percent of Median:

Acute Undernutrition

Severe	Moderate	Normal	Overweight	Total
< 80.0	80.0-84.9	85.0-119.9	120.0+	
0.6	1.7	94.7	3.1	100.0

Height for Age Percent of Median:

Chronic Undernutrition

Severe	Moderate	Normal		
< 85.0	85.0-89.9	90.0-94.9	95.0+	
4.5	16.7	40.4	38.5	100.0

Weight for Age Percent of Median:

Degree of Undernutrition

Third	Second	First	Normal	
< 60.0	60.0-74.9	75.0-89.9	90.0+	
0.8	8.0	38.5	52.0	100.0

Waterlow Classifications:

Wasting & Stunting	Wasting	Stunting	Normal	
< 80.0 Wt/Ht & < 90.0 Ht/Age	< 80.0 Wt/Ht	< 90.0 Ht/Age	> 80.0 Wt/Ht & > 90.0 Ht/Age	
0.3	0.3	20.8	78.6	100.0

SUMMARY TABLE # 2

SUMMARY PERCENT DISTRIBUTION OF PRESCHOOL CHILDREN BELOW CUT-OFF LEVELS FOR VARIOUS ANTHROPOMETRIC INDICES, BY AGE: EGYPT 1978

AGE IN MONTHS	Weight for Height Percent of Median		Height for Age Percent of Median		Waterlow Classification			Weight for Age Percent of Median		
	Severe < 80	Moderate 80-84.9	Severe < 85	Moderate 85-89.9	Wstg & Stg < 80 Wt/Ht < 90 Ht/Age	Wasting < 80 Wt/Ht 90+Ht/Age	Stunting < 90 Ht/Age 80+Wt/Ht	3rd Deg. < 60	2nd Deg. 60-74.9	1st Deg. 75-89.9
6 - 11	1.5	3.8	2.2	8.0	.9	.6	9.3	2.5	8.4	38.6
12 - 23	1.2	3.8	5.7	20.5	.7	.5	25.5	1.8	16.7	46.0
24 - 35	.3	1.2	6.1	20.4	.2	.1	26.3	.5	7.9	35.8
36 - 47	.2	.4	5.6	17.0	-	.2	22.6	-	4.5	34.1
48 - 59	.2	.2	3.5	12.8	-	.2	16.3	-	3.5	35.5
60 - 71	.2	.4	1.0	15.0	-	.2	16.0	-	3.5	39.1
TOTAL	.6	1.7	4.5	16.7	.3	.3	10.6	.8	8.0	38.5

SUMMARY TABLE # 3

SUMMARY PERCENT DISTRIBUTION OF
PRESCHOOL CHILDREN BELOW CUT-OFF LEVELS
FOR VARIOUS ANTHROPOMETRIC INDICES, BY GEOGRAPHIC AREA:
EGYPT 1978

GEOGRAPHIC AREA	Weight for Height Percent of Median		Height for Age Percent of Median		Waterlow Classification			Weight for Age Percent of Median		
	Severe	Moderate	Severe	Moderate	Wstg & Stg	Wasting	Stunting	3rd Deg	2nd Deg	1st Deg
	< 80.0	80.0-84.9	< 85.0	85.0-89.9	< 80 Wt/Ht < 90 Ht/Age	< 80 Wt/Ht 90+Ht/Age	< 90 Ht/Age 80+Wt/Ht	< 60	60-74.9	75-89.9
Lower Rural (01-04)	.7	1.7	4.6	17.2				.6	7.8	37.4
Universe 01 - Kafr El Sheikh Damietta	.3	.5	2.4	13.8	-	.3	16.1	.2	5.1	36.0
Universe 02 - El Ismalia El Sharkieh	.4	2.5	5.4	17.5	.1	.3	22.7	.3	9.0	37.8
Universe 03 - El Dakahlia El Gharbia El Menoufieh El Qalyoubieh	1.0	1.7	4.7	17.9	.4	.6	22.1	.7	7.7	37.5
Universe 04 - El Beheira	.5	1.5	4.9	17.1	.1	.3	21.8	.8	8.5	37.4
Upper Rural (05-06)	.8	2.1	6.7	20.8				1.0	11.9	41.9
Universe 05 - El Giza El Fayoum Beni Suief El Menia	.8	2.0	8.7	24.0	.8	-	32.0	1.2	13.0	41.9
Universe 06 - Asyout Souhag Quena Aswan	.8	2.1	4.7	17.6	.3	.4	22.0	.8	10.8	41.9
Large Villages (07)	.3	1.6	4.6	19.7	.3	-	24.0	1.2	8.5	42.4
Small Towns (08)	.6	1.9	2.9	11.8	.2	.3	14.5	.7	6.0	35.5
Small Cities (09)	.3	1.0	1.7	8.9	-	.3	10.6	.2	3.6	32.6
TOTAL REPRESENTATIVE SAMPLE (01-09)	.6	1.7	4.5	16.7	.3	.3	20.8	.8	8.0	38.5

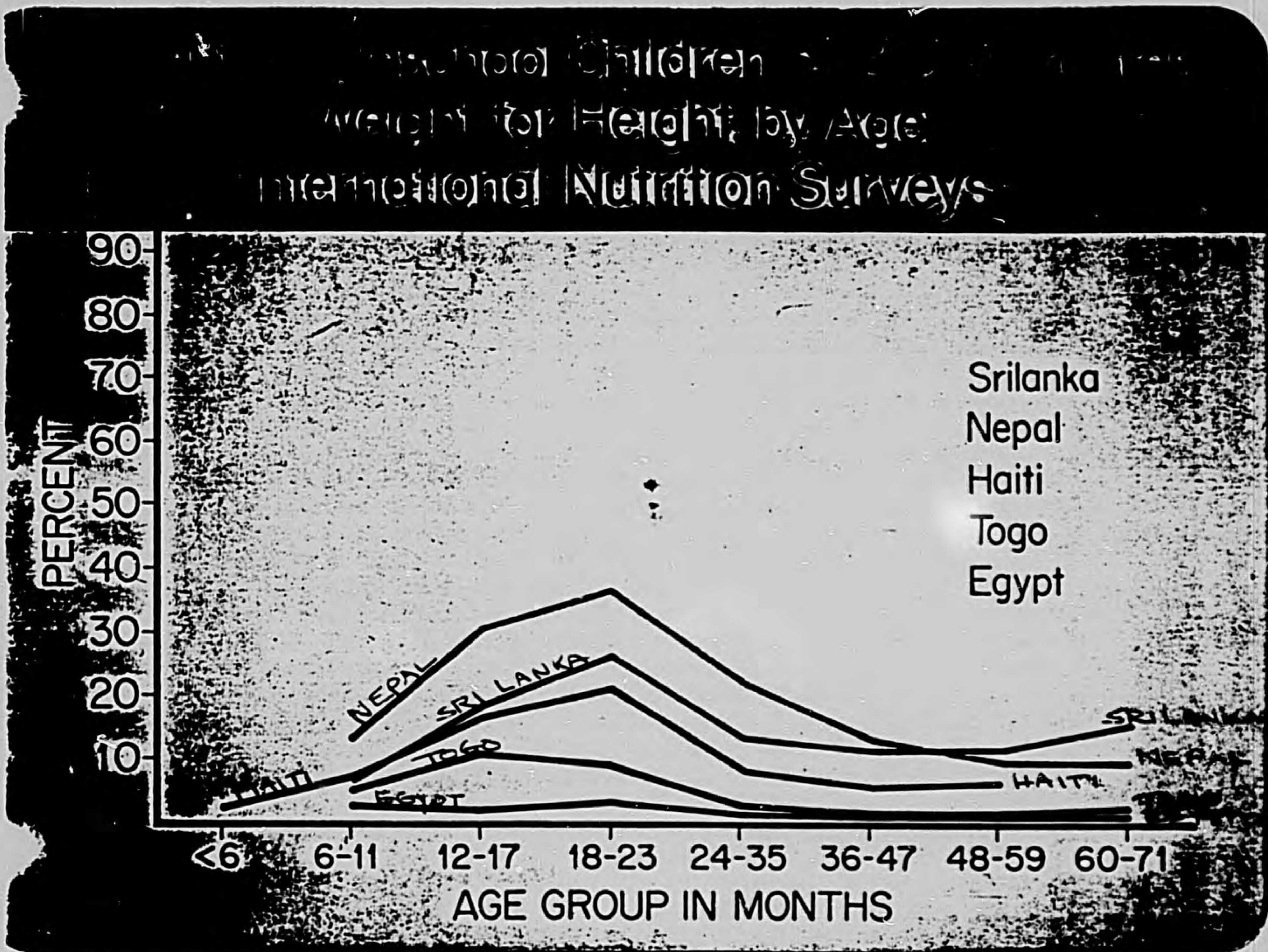

Children
Weight for Height, by Age
Nutrition Surveys
PERCENT
90
80
70
60
50
40
30
20
10
<6
6-11
12-17
18-23
24-35
36-47
48-59
60-71
AGE GROUP IN MONTHS
Srilanka
Nepal
Haiti
Togo
Egypt
NEPAL
SRI LANKA
TOGO
EGYPT
HAITI

FIGURE 3

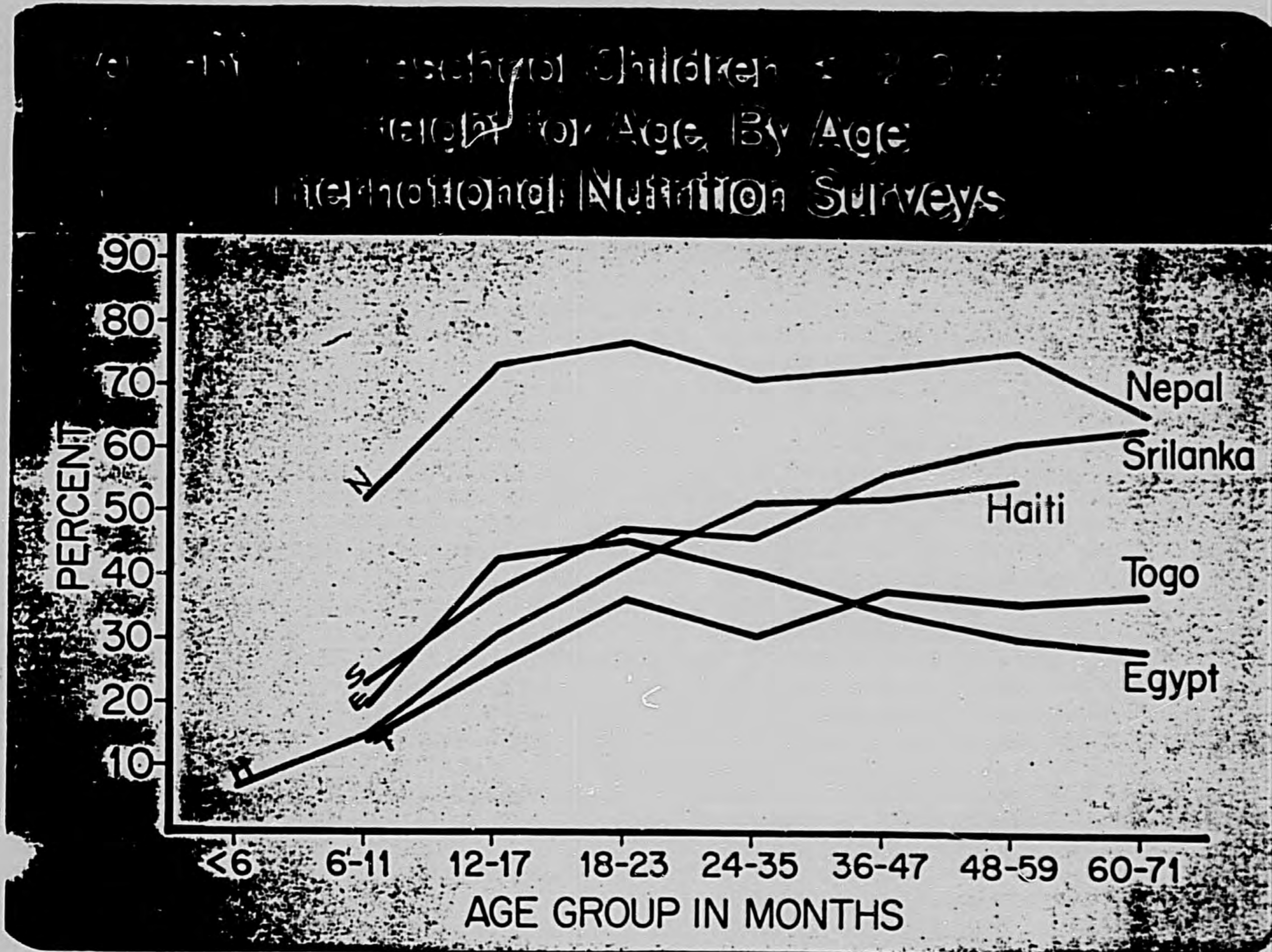


FIGURE 4

Egyptian National Nutrition Survey. II. "Socio-Economic Characteristics Affecting Growth in Pre-School Children; Infant Feeding Practices; and Certain Nutrition Signs."

by Dr. Amin Kamel Said, Nutrition Institute, Ministry of Health.

A. Socio-Economic Characteristics.

Some characteristics have an indirect impact on the growth and health of survey children though they do not in themselves indicate a causal relation. These characteristics were determined by interviews with one or both parents and can be used as indicators of the socio-economic status of the household members. They are summarized below:

1. The live birth order of sample children. A child who cries at birth was considered a live birth for survey purposes. Our sample revealed the following percentages for each birth order.

Table 1. Percentage of Each Live Birth Order of Sample Children* for Mothers.

Live Birth Order	% of Sample Children
First	18.7
Second	16.7
Third or Fourth	27.0
Fifth or More	37.6
Total	100.0

*Urban sample children showed a lower live birth order than rural children; children of semi-educated areas of Cairo-Giza and Alexandria were more comparable to rural children.

Over 60% of the sample children are of the third birth order or more. It is also apparent that urban sample children showed a lower live birth order than rural ones indicating that: a) urban mothers have fewer pregnancies than rural mothers; and b) the tendency for urban children to survive in smaller households which suggests that physical and economic differences of urban living promote changes in the traditional concepts of ideal family size. It is also noteworthy that children of the semi-educated areas of Cairo-Giza and Alexandria were more similar to rural children.

2. The household size. A household was defined as one in which all individuals eat their major meal together from one kitchen. It can be seen from Table 2 below that the average household size in rural areas, small towns and among the less privileged populations of big cities is 6 to 7 persons per household.

Table 2. Household Size in Various Areas Surveyed.

Area	Household Size (Persons)
Rural	7.2
Small Towns	6.4
Cities, 50,000+	6.2

3. The father's literacy and the father's education. The father's literacy was defined as his ability to read and write. Among more than 6,000 fathers, the literacy rate was about 43%. More illiterates live in rural areas, and literacy rates increase with greater urbanization. Of some 2,700 literate fathers: 61% received no educational certificate; 13% received a primary certificate of education; 20% received a preparatory certificate; and only 5% had a college degree. The data on fathers' literacy and education reflect the lesser educational opportunities in rural areas compared with urban areas.

4. The father's occupation. The data analyzed indicate that the selected categories for the fathers' occupation were inadequate. However, farm cultivators, landowners, agricultural laborers and sharecroppers are characteristic of rural areas. On the other hand, professional, technical, managerial, clerical personnel and skilled laborers are characteristic, as can be expected, or urban and metropolitan areas.

5. Water source availability, electricity and the primary cooking source. All of these characteristics reflect differences between rural and urban areas and indicate the socio-economic status of the community. Safe water in the house from pipes or a well and electricity were not frequent in rural areas. Rural people used water in the neighborhood of the house in about 80% of the cases. [illegible] more than 25% of the rural houses surveyed had electricity. Safe water and electricity in the house were more frequently observed with increased urbanization. In the less educated areas of Cairo-Giza and Alexandria, the percent of houses with safe water supply or electricity were limited probably by actual community availability and economic constraints. The primary source of cooking was open fire in about 60% of the rural houses visited. The use of kerosene and bottled gas as a primary source of cooking was almost the rule in urban areas.

Summarizing these different characteristics, Table 3 below presents the relationships between some of the socio-economic factors surveyed and the

nutritional status of the pre-school children according to the Waterlow classifications.

Table 3. Socio-Economic Factors by Waterlow Classes for Pre-School Children.

	Normal	Stunted	Wasted	Wasted & Stunted
Mean Birth Order	4.0	4.2	4.1	4.9
Mean Household Size	7.7	7.7	8.1	7.5
Percent of Literate Fathers	49.8	41.0	52.4	31.5
Percent of Educated Fathers	29.6	15.3	15.0	14.7
Mean Occupation of Fathers	8.3	9.2	8.5	9.7

There is a gradual but small increase in the prevalence of wasting and stunting as the live birth order increases. However, no effect is apparent according to household size. On the other hand, normal children had higher percentages of literate and educated fathers as compared with wasted and stunted children. Similarly, malnourished children had fathers with lower occupational ratings.

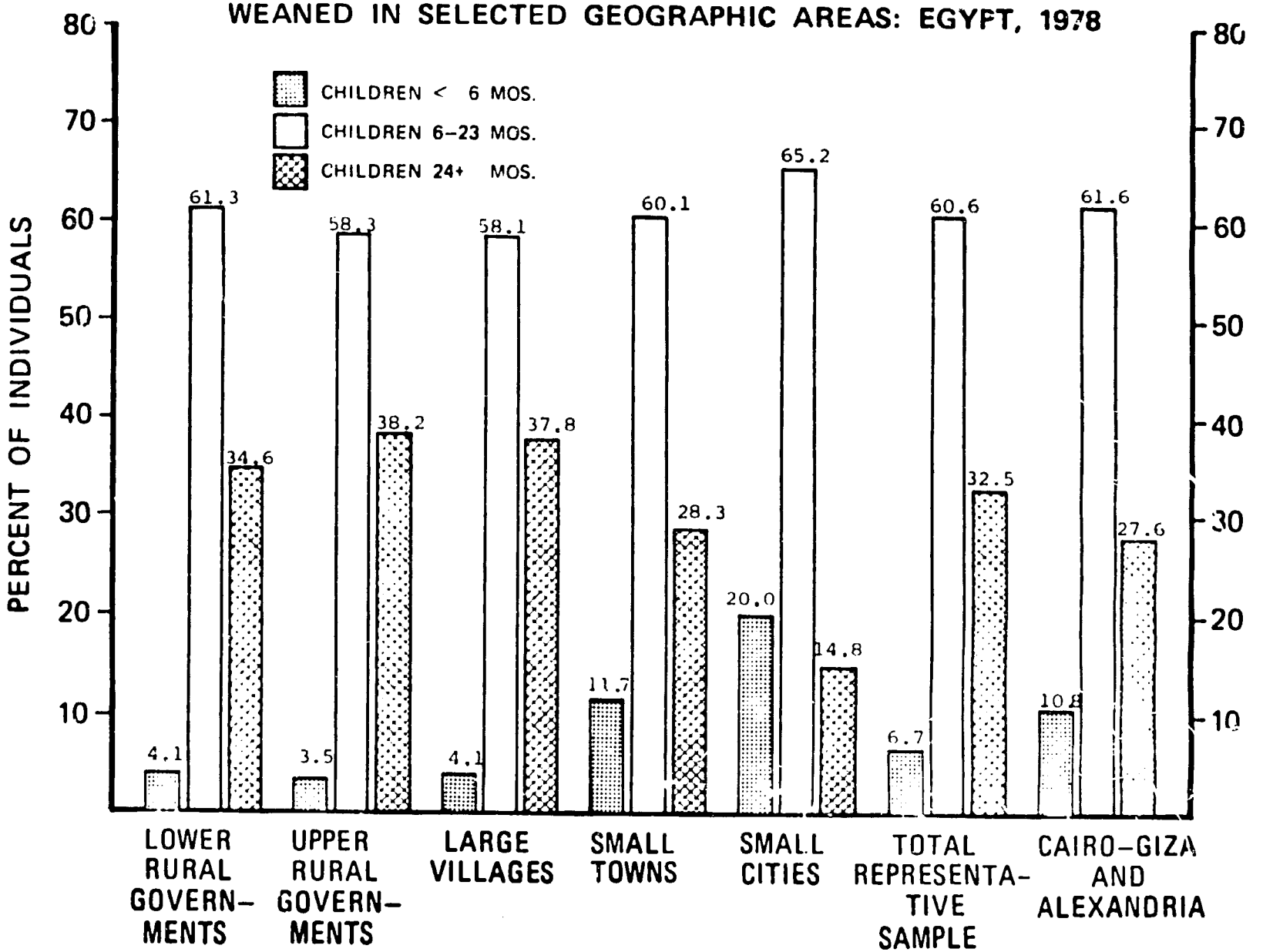
Interviews about Family Planning practices revealed that about one in five mothers surveyed used contraceptives. There was a wide variation in contraceptive use depending on the area of residence and socio-economic status. A positive association was found between contraceptive use and measurements of child health when other variables were controlled statistically.

B. Infant Feeding Practices.

Breastfeeding, Weaning Practices. There are important differences in the feeding practices of children under two years of age in rural and urban populations as well as among those less privileged populations of Cairo-Giza and Alexandria.

Children in rural and less privileged urban areas are breastfed for a longer period of time and completely weaned at a later age than practiced in urban areas. Figure No. 1 on the following page shows that the percent of weaned children below six months of age is low in rural areas and increases with the degree of urbanization. However, about 60% of the children were weaned in the 6 to 23 month age period in all of the areas surveyed.

FIGURE 1. PERCENT OF CHILDREN IN SPECIFIC AGE GROUPS COMPLETELY WEANED IN SELECTED GEOGRAPHIC AREAS: EGYPT, 1978



Infants that are breastfeeding only in the 6-11 month age group showed the lowest prevalence of wasting and the highest prevalence of overweight. By contrast, the 12-23 month old children showed prevalences of wasting and stunting to be highest among the children who were breastfeeding only. Children over 12 months of age who were completely weaned had the highest prevalence of overweight. Complete weaning between three and six months of age is generally associated with a lower prevalence of short stature, which increases with later age of complete weaning.

Age of Supplementation. 80 to 90% of the children, depending on the time of recall by their mothers, first received semi-solid supplements after the age of six months. Wasting and stunting is much more common in children over one year of age receiving breast milk plus a food supplement than in those who are completely weaned.

These findings suggest that the traditional patterns prevail among rural women and among less privileged urban mothers or that the availability of weaning foods is less either in actual availability or in terms of cost.

C. Certain Nutrition Signs.

The nutrition signs looked for were limited as it was recognized that it is difficult to evaluate a specific sign or signs as an indicator of a specific nutrient deficiency in an individual or population. The constraints are: 1) the non-specificity of a sign for a single deficiency; 2) the frequent occurrence of a deficiency state in the absence of signs; and 3) the difficulty in standardizing the diagnoses by examiners. Therefore, only certain nutrition-related clinical signs were looked for in each child. These were: pedal edema, three signs of Vitamin A deficiency; six signs for rickets; and angular stomatitis. Table 4 shows that these signs were infrequently observed in the survey children. Only 17 cases of pedal edema were encountered, suggesting a possible protein-energy malnutrition syndrome. Only four cases of Bitot spots and 0.4% prevalence of nightblindness, possibly due to Vitamin A deficiency, were found. Some of the 16 cases of corneal scarring may be due to Vitamin A deficiency.

Also the prevalence of signs suggestive of rickets was low. No craniotabes were diagnosed. Not more than 3% prevalence was noted for frontal bossing and as can be seen in the same Table on the following page, only about 3% of the children had angular stomatitis.

Table 4. Prevalence of Nutrition Signs in Egyptian Pre-School Age Children

Signs	No.	%	Remarks
A. Bilateral Pedal Edema	17	0.2*	*Of total number examined, 9794 children aged 6-71 months.
B. Vitamin A Deficiency			
1. Bitot spots	4	0.0*	**Of 6575 children over 24 months of age.
2. Corneal scars	16	0.2*	
3. Night blindness	27	0.4	
C. Vitamin D Deficiency			
1. Craniotabes	-	-*	
2. Frontal bossing	-	3.0*	More than 2/3 were 6-35 months old.
3. Rachitic rosary	-	1.0*	3/4 were 6-35 months old.
4. Abnormally enlarged wrist epiphysis	45	0.5*	80% were 6-35 months old.
5. Bilateral bowing of legs	189	*	Among children over 12 months, 2.3% in 12-23 months, 1.9% in 60-71 months.
6. Open anterior fontanelle	114	1.7**	93% in 24-35 months old.
D. Angular Stomatitis	286	2.9*	Ranged from 0.8-4.7% in geographic areas, increasing with age to 5% over four years.

Only 1.4% of the total children sampled were observed to have more than one sign of Vitamin D deficiency as shown below:

Table 5. Occurrence in Egyptian Pre-School Children of Vitamin D Deficiency Associated Signs by Number of Signs and Age.

Age in Months	Vitamin D Deficiency Signs Observed				
	None	Any One	Any Two	Any Three or More	Total Number
6-11	96.1%	3.1%	0.5%	0.2%	809
12-23	91.6%	6.5%	1.5%	0.4%	1816
24-35	88.8%	8.4%	2.6%	0.2%	1657
36-47	95.3%	4.3%	0.1%	0.3%	1422
48-59	96.7%	2.6%	0.6%	-	1267
60-71	96.8%	2.3%	0.9%	-	1045
Total Sample	93.5%	5.0%	1.2%	0.2%	8016
Cairo-Giza Total	94.7%	4.7%	0.4%	0.1%	890
Alexandria Total	93.6%	5.6%	0.6%	0.2%	888

The relative increase in prevalence of rachitic signs after the first year of life is probably due to increased prevalence of chronic rachitic signs such as frontal bossing and bowing of legs. The firm diagnosis of rickets requires radiological and biochemical procedures.

To summarize, the prevalence of nutritional signs was low among the sample children surveyed perhaps because of seasonal variations; the survey was conducted during the winter months.

However, important foci of specific nutrient deficiencies exist in other age groups which are not included in this survey design and sampling, particularly among vulnerable groups such as school children, pregnant and lactating women, industrial workers, etc.[1, 2, 3, 4].

[1] Said, A.K., A.H. Ayoub, A.G.E. Bahei Eldine, and H.E. Aly (in press). "Health status of primary school children. II. Some clinical findings at the start of a school lunch program in rural areas." Bull. Nutr. Inst. Egypt.

[2] Said, A.K., A.H. Ayoub, A.G.E. Bahei Eldine, and H.E. Aly (in press). "Health status ofprimary school children. IV, Some basic clinical findings during the first year of implementing the school lunch program in rural areas." Bull. Nutr. Inst. Egypt.

[3] Aly, H.E., A.K. Said, F.M. Shaheen, W.A. Hussein, and I.E. Dongol (1976). "Evaluation of school lunch program at technical secondary schools of the A.R.E. I. Effect on height, weight and clinical picture." Bull. Nutr. Inst. Egypt. 6:1.

[4] Aly, H.E., W.A. Moussa, H.G. Demian, N.M. Aref, and A.K. Said (in press). "Followup study of nutritional deficiencies among Cairo school children." Bull. Nutr. Inst. Egypt.

APPENDIX 3

Egyptian National Nutrition Survey. III. "Prevalence of Anemia Among Pre-School Children and Their Mothers; Relationship to Child Growth."

by Dr. Ahmed M. Dakroury, Nutrition Institute, Ministry of Health.

Hemoglobin concentration was determined for 20% (1609) of the National Nutrition Survey children and their mothers (1478) by the Cyanmethemoglobin method. The definition of anemia used in the survey generally follows that proposed by WHO: children 6-71 months of age and pregnant women with a hemoglobin value of less than 11 g/100 ml. are considered anemic; and for non-pregnant women, a value of less than 12 g/100 ml. is considered to indicate anemia. This is an arbitrary definition which is used in the absence of satisfactory physiological criteria for defining anemia. Hemoglobin concentration was determined also on a sub-sample of socio-economically advantaged children 6-71 months old in Cairo.

A. Hemoglobin Status of Children.

The percent distribution of preschool children among different hemoglobin concentrations by geographic area is presented in Table 1.

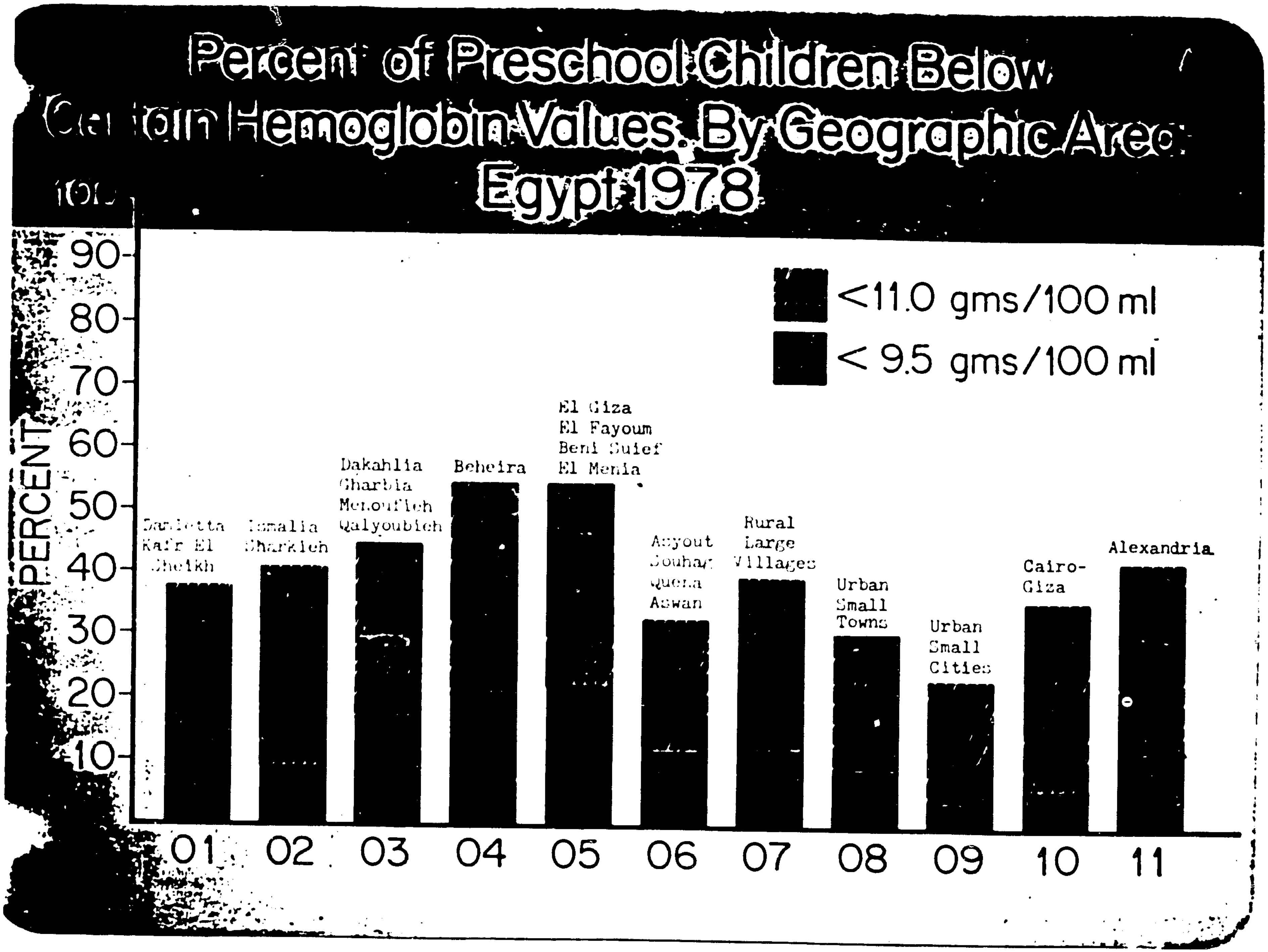
Table 1. Percentage Distribution of Preschool Children by Hemoglobin Values and Geographic Areas.

	Hemoglobin Value (gm/100 ml)[a]			
Geographic Area	≤ 9.5	≤ 11.0	11.0+	Total[b]
Lower Egypt Rural	14.9	44.6	55.4	100.0 (715)
Upper Egypt Rural	16.5	43.4	56.6	100.0 (358)
Large Villages	11.9	39.2	60.8	100.0 (176)
Small Towns	8.3	30.5	69.4	100.0 (180)
Small Cities	3.3	23.3	76.7	100.0 (180)
Total representative sample	12.2	38.4	61.6	100.0 (1609)
Cairo-Giza	5.6	35.5	64.4	100.0 (177)
Alexandria	11.8	42.1	57.9	100.0 (178)
Advantaged Group	1.9	16.9	83.0	100.0 (359)

[a] Hemoglobin value less than 9.5 gm/100 ml is indicative of severe anemia; hemoglobin value less than 11 gm/100 ml is defined by WHO as indicative of anemia.

[b] All percentages are weighted by universe population proportions; the actual number of persons surveyed is given in parentheses.

The Figure on the next page depicts graphically anemia and severe anemia (≤11 gm/100 ml and ≤9.5 gm/100 ml respectively) according to each geographic area--i.e. a more detailed geographic breakout than that shown above among the Survey children sampled.



Percent of Preschool Children Below
Hemoglobin Values, By Geographic Area:
Egypt 1978
PERCENT
100
90
80
70
60
50
40
30
20
10
<11.0 gms/100 ml
< 9.5 gms/100 ml
Damietta Kafr El Sheikh
Ismalia Sharkieh
Dakahlia Gharbia Menoufieh Qalyoubieh
Beheira
El Giza El Fayoum Beni Suief El Menia
Assyout Souhag Quena Aswan
Rural Large Villages
Urban Small Towns
Urban Small Cities
Cairo-Giza
Alexandria
01
02
03
04
05
06
07
08
09
10
11

FIGURE NO. 1

Table 1 shows that the prevalence of anemia is highest in rural populations and that it increases with increasing urbanization and population size. The prevalence of anemia (Hb value less than 11 g/100 ml) in the total sample is about 38% while the prevalence of severe anemia (Hb value less than 9.5 g/100 ml) is about 12%. In the lower socioeconomic sub-sample of Cairo-Giza and Alexandria, anemia is more prevalent than in other urban areas. However, as can be seen in Figure No. 1, anemia is most prevalent in the rural areas of Universes 4 and 5, or in the Governorates of Beheira, Giza, Fayoum, Beni Suief and El Menia. These areas have the highest prevalences of both anemia and severe anemia. Urban small cities are least affected, except of course for the special group of children of socio-economically advantaged families where prevalence is less than 17%.

The following table shows the mean hemoglobin values and prevalence of anemia among preschool children by age groups. It is evident that the highest prevalence of anemia is in the age group 12-23 months; prevalence then decreases with increasing age. It should be noted that Table 2 uses the single cutoff level of 11 gm/100 ml rather than the more appropriate 10 g/100 ml for the 6-23 month age group. This makes a difference in prevalence as follows: rather than 57.3% for the 6-11 month group, the prevalence is 22.5% using the under 10 gm/100 ml cutoff; and rather than 59.4% for the 12-23 month group, the prevalence is 30.0 using the less demanding cutoff level. Table 3 shows these differences and the variation according to geographic area.

Table 2. Mean Hemoglobin Values and Prevalence of Anemia Among Preschool Children by Age.

Age in Months	Mean[a] Hemoglobin (±SD) gms/100 ml	Percent Anemic Hb < 11 gm/100 ml	Total Number[b] Examined
6 - 11	10.7 (1.4)	57.3%	169
12 - 23	10.4 (1.4)	59.4%	383
24 - 35	11.1 (1.5)	41.1%	338
36 - 47	11.5 (1.4)	31.9%	270
48 - 59	12.1 (1.4)	16.6%	234
60 - 71	12.2 (1.2)	12.8%	215
Total	11.2 (1.6)	38.4%	1609

[a] Mean hemoglobin gms/100 ml blood; ±SD = plus or minus standard deviation from the mean.

[b] Total number of children from whom hemoglobin values were available; all percentages are weighted by universe population proportions.

Table 3. Prevalence of Anemia among Preschool Children by Age and Geographic area (percent)[a].

Age in Months	Lower Rural	Upper Rural	Large Villages	Small Towns	Small Cities	Total Representative Sample[b]
6 - 11	23.9	26.6	26.3	21.1	10.3	22.5
12 - 23	25.2	37.1	23.4	30.0	12.9	30.0
24 - 35	50.4	45.2	46.2	32.5	21.4	41.1
36 - 47	45.9	33.0	29.2	14.8	16.7	31.9
48 - 59	13.6	28.1	15.0	8.3	13.8	16.6
60 - 71	21.9	14.5	11.1	3.3	6.9	12.8
Total	33.5	33.0	26.7	20.0	14.4	27.6

[a]Anemia defined as hemoglobin value less than 10 gm/100 ml for ages 6-23 months; and less than 11 gm/100 ml for ages 24-71 months.

[b]All percentages are weighted by universe population proportions.

The next three tables show the relationship between anemia and growth progress of preschoolers according to different anthropometric indicators.

Table 4. Prevalence of Chronic Undernutrition in Preschool Children by Hemoglobin Value. (Percentage distribution)

	Chronic Undernutrition[b]	Normal	Total
Anemic[a]	31.4%	68.6%	100%
Non-anemic	17.4%	82.6%	100%
Total	22.8%	77.2%	100%

1609 children.

[a]Hemoglobin value less than 11 gm/100 ml.

[b]Height for age less than 90% of the reference median.

Table 5. Prevalence of Anemia in Preschool age Children By Height for Age Category. (Percentage distribution)

	≤ 11 g/100 ml	11 g/100 ml+	Total
Stunted[a]	52.9%	47.1%	100%
Normal	34.1%	65.9%	100%
Total	38.4%	61.6%	100%

1609 children.

[a]Height for age less than 90% of the reference median.

Table 6. Anemia Rates per 100 in Preschool Children by Waterlow Classifications: Egypt 1978.

Waterlow Classification (Z-scores)	Rate of Anemia per 100
Normal (N = 1002)	20
Stunting (N=591)	39
Wasting (N=7)*	35
Wasting and Stunting (N=9)*	65

* Note: N<50 thus rates are not reliable.

Parasitic infection, especially schistosomiasis, is considered a major health problem in rural areas of Egypt, but is not considered a major cause of

anemia in preschool children in the general sense. In this age group, anemia is probably the result of iron and possibly folate deficiency in addition to other factors such as chronic parasitic and microbial infections. On the other hand, while iron deficiency anemia is basically an iron-deficient dietary problem, there are many factors which interfere with absorption of dietary iron, e.g., phytate and lack of Vitamin C. The utilization of iron depends upon the availability of adequate protein, in addition to copper. Although definition of the individual contributions of different factors underlying the prevalence of anemia has not been attempted, it is generally thought that a relative deficiency of absorbable dietary iron is a primary cause of anemia. The highest prevalence of severe anemia and the lowest mean hemoglobin levels occur in the 12-23 month age group. This would suggest that the availability of iron to the child during weaning and during the period of transition to the household diet is particularly inadequate. The results of the dietary study point to lower intake of important food iron sources during this period (legumes, meat and eggs, and vegetables

B. Hemoglobin Status of Women.

Women with at least one child 6-71 months of age were included in the Survey. Table 7 below shows the distribution of hemoglobin values among the mothers of survey children in each geographic area. The prevalence of anemia is high in rural populations, being highest in large villages (Universe 7) followed by Upper Egypt rural and Lower Egypt rural. The prevalence is generally lowest in urban populations. The highest prevalence of anemia is seen in women from the lower socioeconomic population of Alexandria.

Table 7. Percentage Distribution of Hemoglobin Values Among Mothers of Preschool Children by Geographic Area.

Geographic Area	Hemoglobin Value (gms/100 ml)				
	< 9.5	9.5-10.9	11.0-11.9	12.0+	Total[a]
Lower Egypt Rural	5.2%	7.6%	17.0%	70.2%	100% (642)
Upper Egypt Rural	2.4%	10.8%	11.1%	75.7%	100% (334)
Large Villages	8.6%	9.2%	17.2%	65.0%	100% (163)
Small Towns	4.2%	6.0%	15.5%	74.4%	100% (168)
Small Cities	0.6%	4.1%	15.8%	79.5%	100% (171)
Total Representative Sample	4.3%	7.9%	15.3%	72.5%	100% (1478)
Giza-Cairo	1.8%	8.5%	18.3%	71.3%	100% (164)
Alexandria	6.1%	10.9%	18.2%	64.8%	100% (165)

Hemoglobin cutoff levels vary according to the physiological status of women. Anemia is defined as a hemoglobin value of less than 12 gm/100 ml in non-pregnant and/or lactating women and of less than 11.0 gm/100 ml in pregnant

women. Table 8 shows the prevalence of anemia by physiological status.

Table 8. Mean Hemoglobin Values and Prevalence of Anemia Among Survey Mothers of Differing Physiological Status.

Physiological Status	Mean Hemoglobin (±SD) gm/100 ml	Percent Anemic	Total Number Examined
Non-pregnant	13.1 (1.6)	17.0%	402
Lactating	12.8 (1.6)	25.3%	823
Pregnant	11.8 (1.5)	22.1%	253
Total	12.7 (1.7)	22.4%	1478

Non-pregnant women show the highest hemoglobin level (13.1 gm/100 ml) and the lowest prevalence of anemia compared with pregnant and lactating women. In these physiological states, prevalence is 22.1% and 25.3% respectively. This reflects the stress of breastfeeding and pregnancy on the mothers' iron stores and the concomitant increased requirements of iron. Prolonged breastfeeding without adequate dietary iron replacement leads to severe maternal anemia. Such an association appears to be more highly present among rural lactating mothers, who tend to breastfeed a longer period of time than urban mothers. One should also not forget the existence of dietary differences between urban and rural mothers.

Other studies made prior to the Egyptian National Nutrition Survey which is the focal point of this analysis show higher prevalences of anemia in infants, preschool children, pregnant and lactating mothers.[1-4] Abdou observed a higher prevalence of anemia among the chronically undernourished.[3] Data obtained during a study of the nutritional status of infant and preschool children in Beheira Governorate of Lower Egypt during 1965-66 point to a much higher incidence of anemia among the age group 0-2 years.[5] The prevalence in the urban areas was found to be higher (84%) than in rural areas (75%). The lowest prevalence was seen among those schildren attending MCH centers (70%). In a study of hemoglobin levels of children 3-6 years of age in day care centers in Alexandria it was observed that anemia (Hb<11g/100 ml) is prevalent among more than one-third of the children.[6]

The prevalence of anemia among pregnant and lactating mothers is much lower in the Survey than the prevalence reported in previous studies.[2,3] This may be explained by the fact that the present results represent a national average, while the previous studies represent only the groups of mothers seeking medical services at MCH centers.

The seasons in which the different studies were made must also be taken into consideration. And it should be mentioned that the previous studies were carried out a relatively long time ago.

In summary, the Survey results point to a high prevalence of anemia among preschool children in Egypt. Prevalence is greater in rural than in urban areas. The highest prevalence of severe anemia occurs in the 12-23 month age group suggesting that the availability of iron to the child during weaning is inadequate. It is thought that most of the anemia in this age group is the result of iron deficiency. The possible interaction of other environmental factors and other dietary deficiencies remains to be determined. Anemia was found to be of greater presence among lactating and pregnant women than among other women. Universes 4 and 5, the rural areas of the Governorates of Beheira, Giza, Fayou, Beni Suief and El Menia were found to be the most severely afflicted insofar as preschoolers are concerned.

[1]Abdou, I.A. (1960). J. Egypt. Publ. Health Assn. 35:137.

[2]Abdou, I.A., H.E. Aly, and A.K. Lebshtein (1965). Bull. Nutr. Inst. I:9.

[3]Abdou, I.A., A.M. Dakroury, and N.N. Tadros (1966). Bull Nutr. Inst. II:153.

[4]Abdou I.A., F.M. Farrag, and A.F. Guindi (1968). Bull Nutr. Inst. IV:107.

[5]Abdou, I.A., M.S. Shaker, F.F. Bishara, and M.K. El-Megharbel (1967). Bull. Nutr. Inst. III:5.

[6]Fahmy S., N.Kamel, E. Eid, and O. Darwish (1977). Bull. H.I.P.H. (Alexandria).

APPENDIX 4.

"The MIT-Cairo University Health Care Delivery System Project."

by Dr. Ibrahim Fouad Khalil, Professor and Chairman of the Public Health Department, Kasr-El-Aini Faculty of Medicine, Cairo University.

The 1977-79 Health Care Delivery System Project is a cooperative effort shared by the following institutions and persons:

Cairo University

Salah Shahtender
Ahmed Safwat Shukry
Ibrahim Fouad Khalil
Shafika Nasser
Mervat El Hafie
Ibrahim Farag

National Research Centre

Osman Galal

Ministry of Health

Motaz Mobarak
Mostafa Hammami
Abd El Monein Fouad
Mohammed El Molla
Nabil Nassar

MIT

D. Ekaus
John O. Field
J. Ropes

Of the 38 million Egyptian population censused in 1976, 55% lived in rural areas in some 4100 villages. The other 16.9 million lived in urban areas comprising 138 cities and towns. Rural areas have higher birth and death rates than urban areas and all health problems are aggravated by poor environmental conditions. Thus rural vulnerable groups including infants and pre-schoolers are particularly exposed to the hazards of infectious disease and malnutrition.

Primary health care is provided to the rural areas through a network of "centers" and "units". "Units" are in the smaller communities and do not have beds. By mid 1978, there were 2303 primary health centers in the rural areas; 595 of them had a total of 9077 beds. Each entity has a physician and health team, and increasingly, two physicians serve a center. The centers offer preventive and curative services including: registration of births, deaths and illnesses; maternal, child and school health care; environmental control; health education; immunization and communicable dieasease control; family planning; diagnosis and treatment of disease through an outpatient clinic; referral; simple laboratory capability; first aid; and inpatient treatment in the centers with beds available.

Background of the Project. Planned in 1977, the present project has as primary objectives those of identifying rural health problems, understanding the role of the existing health care delivery in their management, and delineating the gaps or shortcomings. Nutritional status of infants and pre-schoolers was

selected as an indicator of community health. Preliminary steps included gathering information on food production, food consumption and direct indices of nutritional status including clinical, biochemical and anthropometric data as well as indirect indices such as birth and mortality rates. The researchers met with the Directors General of the 17 Governorates covered in the study to introduce the aims of the project and explain how it should be carried out including how the questionnaires should be completed. The Directors General subsequently held meetings with the physicians in their Governorates. A two-day training course for physicians and nurses of the 17 centers selected for the weighing exercise was given at Cairo University. Measuring tapes and scales were provided, and a demonstration was given on how to take height and weight, on common errors to be avoided and practice exercises were staged.

Out of 26 Governorates (Sinai by then had been made into two Governorates), 17 were included. The omitted governorates had no rural communities; four were urban; four frontier. The 17 governorates included 132 administrative districts. A rural health center or unit was chosen at random from each district. Two of the centers had to be dropped during the study due to problems with the data from questionnaires.

The questionnaire is in three parts. Part I is a study of the knowledge, attitudes and practices of the physician with regard to the health and nutrition problems of the area served by his unit; it includes information on the ecological characteristics of the area and attitudes towards family planning and food supplementation; and it has information about the physicians' education and training. Part II consists of data on birth and death rates and causes of deaths for the last few years; it also indicates utilization and coverage of health services by noting attendance at MCH clinics and at vaccination times. Part III is the collection itself of anthropometric data from 17 centers, which as mentioned above, were randomly chosen from the 132 rural centers.

Infant and Child Malnutrition. Although the Project is not primarily concerned with malnutrition, Parts I and III of the exercise offer valuable data on nutritional status and other aspects of child health.

A. Health Problems of Children.

Some questions of Part I deal with the health problems of children under five years of age. Physicians were asked what they considered the principal health problems of these children to be and to what extent the needs are served. Special attention was given to nutritional deficiency diseases.

The physicians were asked whether malnutrition in preschoolers is a health problem in their areas. 93.8% answered yes with only eight centers replying no to the question. The negative replies might stem from the true lack of malnutrition or from other more prominent problems that overshadow malnutrition.

The physicians were asked their judgment on how important malnutrition is, compared with other health problems affecting preschoolers. 93% answered that malnutrition is either among the most important (75%)or the most important (18%).

The next question concerned the most common deficiencies observed among under-five-year-olds. The Table below shows the different diseases in the order of importance indicated by the physicians.

Table 1. The Most Common Nutritional Deficiencies Among Children Below Five Years of Age (129 Centers out of 130).

Deficiency	Percent Who Listed the Deficiency	Percent of all Responses
Stunted Growth	82.2	21.8
Iron Deficiency Anemia	70.5	18.8
Marasmus	46.5	12.4
Low Birth Weight	39.5	10.5
Rickets	35.7	9.5
Pellagra	30.2	8.0
Kwashiorkor	24.8	6.6
Vitamin A	23.3	6.2
Riboflavin	20.2	5.4
Goitre	1.6	.4
Other(s)	1.6	.4
None	-	-
Don't Know	-	-

The great majority agreed upon stunted growth, 82.2%,and iron deficiency anemia, 70.5%, as the most important, followed by a variety of other deficiencies.

In Table 2 below, the problems are listed according to frequency of occurrence.

Table 2. The Principal Health Problems Affecting Children Below Five Years of Age, According to the Physician in the area. (97% or 126 Centers)

Problems (in order given)	Percent who Listed The Problems	Percent of all Responses
PCM/Marasmus/Kwashiorkor	77.8	23.9
Gastroenteritis/dehydration/ Diarrheal Diseases	59.5	18.3
Respiratory Infections	38.1	11.7
Fevers/General Infections	33.3	10.2
Parasitic Infestations	30.2	9.3
Growth Failure/Stunting/Debility	14.3	4.4
Vitamin/Mineral Deficiencies	3.2	1.0
Accidents	1.6	0.5
Mortality	-	-
Other Health Problems	67.5	20.7

78% listed the problems of protein-calorie malnutrition/Marasmus/Kwashiorkor and this category constituted 24% of all the responses. Other nutritional deficiencies included growth failure/stunting/debility and vitamin and mineral deficiencies. Other problems high on the list have an impact on nutritional status, notably the four problems that followed PCM on the list: diarrheal diseases, respiratory infections, fevers and parasitic infestations. Constituting 21% of all responses was the category of other health/background factors which include poverty, ignorance, poor living conditions etc which collectively have their repercussions on the health and nutritional status of the vulnerable preschool age group.

Table 3 below shows the geographic distribution according to Lower or Upper Egypt of the major nutritional problems.

Table 3. Distribution of Principal Health Problems by Region.

Health Problem	Lower Egypt Number	Lower Egypt Percent	Upper Egypt Number	Upper Egypt Percent	Total Number	Total Percent
PCM	51	80%	47	76%	98	78%
Gastroenteritis	35	55%	40	65%	75	60%
Parasitic Infestation	25	38%	13	21%	38	30%
Growth Failure	7	11%	11	18%	18	14%

It is evident that there is little difference in geographic distribution except for parasitism which is more of a problem in Lower Egypt.

The physicians were asked to estimate the magnitude of stunted growth in children below five years of age. Table 4 below shows the responses by geographic region. Variations are due to different socio-economic conditions, to community development and the utilization of the health centers.

Table 4. Estimate of the Physician for Stunted Growth in Children Below Five Years of Age in the Areas Served. 129 Centers Responded.

Estimate	Lower Egypt Number	Lower Egypt Percent	Upper Egypt Number	Upper Egypt Percent	Total Number	Total Percent
Majority	17	25%	20	32%	37	29%
Significant Minority	21	31%	24	39%	25	35%
Small Minority	21	31%	12	19%	33	26%
Almost None	7	10%	5	8%	12	9%
Others	1	3%	1	2%	2	1%

It is obvious that stunted growth of young children is an appreciable problem given by a relatively high proportion of physician, and is somewhat more pronounced in Upper Egypt than in Lower Egypt.

The physicians were then asked about the principal causes of stunted growth in children. A number of variable non-homogeneous causes are shown in the next

Table. The responses reflect the awareness on the part of the physicians that growth is influenced not only by the direct factor of nourishment but also by a group of underlying factors which work together to produce malnutrition and stunted growth.

Table 5. The Principal Causes of Stunted Growth in Children Below Five Years of Age in the Judgment of the Physicians. All, 130, Centers responded.

Causes	% Centers Listing Cause	% of All Responses
Malnutrition	95.4	23.7
Lack of Hygiene	65.4	16.2
Ignorance	63.8	15.8
Repeated Infections	59.2	14.7
Poverty	59.2	14.7
Parasites	57.5	14.3
Others	2.3	.6
Don't Know		

On the same basis of the knowledge that stunted growth is a multifaceted problem, the physicians gave their opinion of the etiological role of malnutrition, whether important (i.e. of prime importance) or just acknowledged along with other factors. Strangely six centers did not see the importance of malnutrition to stunted growth, or 5% while 62% considered it of prime importance.

Table 6. The Importance of Malnutrition to Stunted Growth, as Perceived by the Physicians in their Areas. 129 Centers responded.

Relationship of Malnutrition to Stunted Growth	Lower Egypt		Upper Egypt		Total	
	Number	Percent	Number	Percent	Number	Percent
Important	37	56%	43	68%	80	62%
Acknowledged	24	36%	19	30%	43	33%
Not Acknowledged	5	8%	1	2%	6	5%

The 5% who did not see the importance may be explained by the fact that the physicians observe that some rural children show stunted growth while all of the children live under the same socio-economic conditions.

Physicians also understood the importance of malnutrition with regard to infant mortality. More than 20% cited malnutrition as a principal cause of infant mortality (in addition to morbidity as shown in the preceding tables).

The next table shows the responses given to the question of how common protein calorie malnutrition is ranging from "very common" to "not present". Variations are due to ecological conditions and use of health services, but it can be seen that the problem is more pronounced in Upper Egypt than Lower Egypt.

Table 7. How Common, According to the Physician, is PCM Among Children Below Five Years of Age. 129 Centers Responded.

Answer	Lower Egypt Number	Lower Egypt Percent	Upper Egypt Number	Upper Egypt Percent	Total Number	Total Percent
Very Common	2	3%	6	10%	8	6%
A Majority	22	33%	25	40%	47	36%
A Significant Majority	19	29%	28	44%	47	36%
A Small Minority	19	29%	4	6%	23	18%
Not Present	3	5%	-	-	3	2%

In evaluating the severity of PCM, 63% considered most cases to be moderate and equivalent levels of mild and severe cases (14 and 13% respectively). A greater number of severe cases is seen in Upper Egypt .

Table 8. Severity of PCM the Physician and His Staff Have Observed. 128 of 130 Centers responded.

Severity	Lower Egypt Number	Lower Egypt Percent	Upper Egypt Number	Upper Egypt Percent	Total Number	Total Percent
Mild	10	15%	8	13%	18	14%
Moderate	41	61%	40	66%	81	63%
Severe	5	8%	11	18%	16	13%
Too Few Cases	10	15%	1	2%	11	9%
Other	1	1%	1	1%	2	1%

Marasmus was recognized to be an important deficiency problem though most widely recognized to occur "occasionally". It was seen "quite commonly" or "rarely" in 12% of responses for each. Kwashiorkor too was observed by the physicians, as see in the Table below, though not as commonly as Marasmus. Two centers only mentioned that it is quite common, otherwise occasional, rare, or even never seen.

Table 9. Frequency of Marasmus and Kwashiorkor Among Under Five Year Olds According to the Physicians in the Centers Covered.

	N = 129 clinics Marasmus						N = 128 clinics Kwashiorkor					
	Lower E.		Upper E.		Total		Lower E.		Upper E.		Total	
Frequency	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Quite Common	7	10%	8	13%	15	12%	-	-	-	-	-	-
Occasionally	39	58%	43	69%	82	64%	22	33%	22	33%	44	34%
Rarely	10	17%	6	8%	16	12%	20	30%	19	31%	39	31%
Never Seen	0	-	0	-	0	-	10	15%	10	16%	20	16%
Others	11	17%	5	8%	16	12%	14	22%	11	18%	25	19%

B. The Weighing Exercise.

Part III is the "weighing exercise" which was conducted in April 1978 with the following objectives: 1) to test the feasibility of this kind of examination and determine whether it can reasonably be included in routine rural health services; 2) to give rural health personnel responsible for child care the opportunity to learn how to monitor child growth which might otherwise be a causal activity; and 3) to define the problem of growth failure among children attending rural health centers and to measure its magnitude. The weighing exercise was conducted in 17 centers or units, one in each Governorate, over a period of two weeks. Clients were infants and under six year old preschoolers. Infants were self-selected in that those who were brought to the center/unit for one reason or another were those included in the study. Preschoolers came on call, having been identified from birth registers. The sample included at least 30 children in each annual age cohort, with a total of 4327. The calling system was verified in two centers through field visits. The weights and heights were taken by personnel who had received a two-day training course at Cairo University. UNICEF scales were used for infants while older children were weighed on adult scales. Table 10 is a summary sheet of all of the anthropometric results classified according to the different indicators: weight for height; height for age; Waterlow classes; and weight for age. The data are broken out by Upper and Lower Egypt, and it will be seen readily that malnutrition is more a problem in Lower Egypt and is more severe there than in Upper Egypt. Other principal findings can be summarized as follows:

Growth failure is a prominent feature of the children examined. Only 40% are normal on a weight for age basis, using the Gomez classification, while 5.4% show third degree malnutrition.

Chronic undernutrition (characterized by height for age below 90% of the standard) was noted in 40% of the children over two years of age, 17.1% of whom showed severe stunting - or below 85% of the standard.

Acute undernutrition, or a weight for height measurement below 80% of the standard, was evident in 6.2% of the children while 13.8% were overweight.

Stunting and wasting, according to Waterlow's classification, showed up in a high proportion of children over two years of age. 38.6% showed stunting while 4% showed wasting and 1.4% both stunting and wasting. For the whole group, 60% were normal and 40% had impaired growth and development.

Table 10. EGYPTIAN PRE-SCHOOL CHILDREN

SUMMARY TABLE OF ANTHROPOMETRIC INDICATORS

130 CLINICS IN LOWER AND UPPER EGYPT - MIT/CU WEIGHING EXERCISE, APRIL 1978

(percentage distribution in the different classifications)

ANTHROPOMETRIC INDICATOR - Number	Acute Malnutrition	Normal		Overweight
WEIGHT FOR HEIGHT	<80	80.0 -99.9	100 - 119.9	120+
Lower Egypt (1062)	5.9	38.7	38.7	16.7
Upper Egypt (1216)	6.3	44.1	39.0	10.4
Total (2278)	6.2	41.3	38.8	13.8

HEIGHT FOR AGE	Severe	Moderate	Normal	
	<85	85 - 89.9	90.0 - 94.9	95+
Lower Egypt (1061)	19.8	24.4	31.9	23.9
Upper Egypt (1199)	13.9	21.0	31.3	33.8
Total (2260)	17.1	22.9	31.6	28.3

WATERLOW*	Wasting & Stunting	Wasting	Stunting	Normal
Lower Egypt (1061)	1.5	4.3	42.7	51.4
Upper Egypt (1199)	1.4	3.7	33.6	61.4
Total (2260)	1.4	4.0	38.6	55.9

WEIGHT FOR AGE	Third Degree Severe	Second Degree Serious	First Degree Moderate	Normal
	<60	60 - 74.9	75 - 89.9	90+
Lower Egypt (1938)	7.0	21.0	34.8	37.0
Upper Egypt (2146)	3.?	14.8	38.2	43.7
Total (4084)	5.4	18.2	36.3	40.0

* Over age two.

Malnutrition by Age Groups. Birthweights appear to be within the normal range. Normal growth, as indicated by weight for age, is maintained through the first six months of life (while nutritional requirements are satisfied by keeping the infant on breast milk). Thereafter, the mother may give liquids or starchy foods. Or no supplementation is given. Growth begins to decline and becomes quite apparent after the first year. The Tables below show different degrees of underweight which, on the average, is in the middle to high first degree until the fourth year of life. Then weight improves and approaches the normal growth curve at age four. Children aged 12-23 months show the highest rates of malnutrition with only 30% normal and third degree attaining some 8.4%.

Table 11. Weight-for-Age Percentage Distribution (Gomez Classification) of Egyptian preschool Children by Age Group.

Percent of NCHS/CDC Reference Median.

Age group (months)	Normal 90.+	First Degree 75.0-89.9	Second Degree 60.0 - 74.9	Third Degree <60.0	Number
0 - 5	55.3	21.4	20.2	3.1	334
6 -11	45.3	33.2	15.2	6.3	473
12 -23	29.6	43.0	19.0	8.4	912
24 -35	36.8	41.1	17.2	4.9	805
36 -47	42.9	29.7	23.8	3.6	804
48 -59	42.6	38.7	13.9	4.7	703
60	59.6	26.1	11.9	2.4	53

Table 12. Height-for-Age Percentage Distribution and Prevalence of Chronic Undernutrition for Egyptian Preschool Children by Age Group.

Percent of NCHS/CDC Reference Median.

Age group (Months)	Chronic Undernutrition <85.0	85.0 - 89.9	Normal 90.0-94.9	95.0+	Number
24-35	13.0	24.0	34.9	28.0	706
36-47	18.3	25.5	31.3	24.9	800
48-59	19.5	19.4	29.0	32.1	701
60	19.3	18.7	30.3	31.6	53

By sex, boys and girls were more or less similar in their overall profiles, with some tendency of girls to demonstrate better growth.

The Cairo University/MIT Weighing Exercise is compared with the Nutrition Institute's National Nutritional Status Survey as follows:

	Nutrition Institute National Survey	CU/MIT Weighing Exercise
	8016	4327
Sample Site	All Areas	Rural Areas
Basis	Population	Attendees of Rural Health Services
Malnutrition Weight-for-Age	48%	60%
Incidence of 2nd and 3rd Degree Malnutrition	<10%	24%
Incidence of 3rd Degree Malnutrition	0.7%	5%

Children of the CU/MIT weighing exercise showed far more marked malnutrition than did those in the Nutrition Institute Survey. The two samples, however, are not comparable. The CU/MIT group was drawn from rural areas only, among particular children attending the rural health centers or units (for preventive and curative services), while the national survey group was taken from all areas, of children from the general population.

APPENDIX 5.

"Malnutrition in Preschool Children."

by Dr. Laila M. Kamel, Assistant Professor of Preventive Medicine, Cairo University.

This work was carried out at the Department of Public Health and the Department of Pediatrics, Faculty of Medicine, Cairo University, and the National Research Center, Cairo, during the years 1966 to 1975, in collaboration with:

Prof. Dr. M.R. Barakat
Prof. Dr. A. S. Shukry
Prof. Dr. F.M. Labib
Dr. R. El Gammal
Dr. Mervat El Rafie
Dr. O. Galal
Dr. S. Wahba.

Methodology. Cross sectional surveys were carried out in two villages in Giza Governorate. In Manshaat El Bakary all preschool children were examined. In Saft El Laban a properly selected sample comprising 50 percent of the preschool children were examined.[1,2] Two high density areas of Cairo were also surveyed. In El Assal, a systematic sample of every fifth family was included in the survey,[3] while in Ein El Sira, all children in the residential blocks were examined.[4]

A longitudinal study was carried out on a sample of 81 children visiting two MCH centers in Giza and Ein El Sira.[5] The total number of visits was 264, with a range of two to five visits by each child. Another longitudinal study was done in Kerdasa village in Giza Governorate to assess the effect of person-to-person nutrition education through home visits on the nutritional status of infants and young children.[6]

Results. The data presented here summarize the above-mentioned surveys. Details may be found in the referenced papers and in two theses.[7,8]

A. Prevalence.

Protein-energy Malnutrition. Assessment by weight/age is the classical means of estimating protein-energy malnutrition. Table 1 shows the results of the cross-sectional surveys in the two urban and two rural areas.

Table 1. Prevalence of PEM Syndromes in the Four Areas Examined.

Areas	Number Examined	Year	Protein-Energy Malnutrition Syndrome: Mild-Moderate	Maras-mus	Kwashior-kor	Total Malnourished
Menshaat El Bakary	1494	65/66	57.4%	3.8%	2.9%	64.1%
Saft El Laban	747	67/68	55.5%	1.9%	13.5%	70.9%
El Assal	555	69	55.2%	5.9%	0.0%*	61.1%
Ein El Sira	306	69	60.5%	1.3%	0.0%	61.8%

*Two cases of edema were demonstrated in the second year of life.

Table 2 shows results of the longitudinal study of an urban population; Table 6 on the next page shows the results of the longitudinal study of intervention through nutrition education activities in the rural area.

Table 2. Longitudinal Study of Urban MCH Centers showing Percentage Prevalence of Different Levels of PEM According to Weight/Age. 1974-75.

Age Period (Months)	No.	% Normal > Stand.	% Normal Stand.	Percentage Protein-energy Malnutrition > 90	80	70	60 & less	Total
0 - 3	36	27.8	5.6	25.0	13.9	19.4	8.3	66.6
4 - 6	40	25.0	27.5	27.5	10.0	7.5	2.5	47.5
7 - 11	51	11.8	13.7	29.4	31.4	11.8	1.9	74.5
12+	36	2.8	13.9	39.9	25.0	16.6	2.8	83.3

Rickets. Rickets, as diagnosed by the association of three or more clinical signs, was highly prevalent in the first three years of life, as see below:

Table 3. Percentage Prevalence of Clinically Diagnosed Active Rickets. (Three Signs)

Age (Yrs.)	Number Examined Menshaat	Saft	Assal	Sira	Percentage Rickets Prevalence Menshaat	Saft	Assal	Sira
0 +	232	118	146	31	4.3	11.7	4.1	3.2
1 +	343	158	114	48	17.8	29.4	28.1	25.0
2 +	303	137	98	48	5.6	15.1	16.3	2.1
0 - 3	878	413	358	127	10.0	19.7	15.1	11.0

Anemia. Hemoglobin levels measured by Sahli hemoglobinometer were low enough to be of great concern. While this method may not be the most accurate for hemoglobin estimation, the results indicate a high prevalence of anemia among preschool children. Tables 4 and 5 below show hemoglobin estimations in the two Cairo urban areas and a Giza village, and in Kerdasa village in Giza, respectively.

Table 4. Hemoglobin Concentration at Different Ages in Cairo Urban Areas and a Rural Area. (Hemoglobin, in Grams)

Age (Years)	Ein El Sira	El Assal	Saft El Laban
0 +	9.2	10.8	9.5
1 +	8.6	10.0	9.1
2 +	8.8	10.3	9.2
3 +	9.2	10.6	9.8
4 +	9.7	10.5	10.0
5 +	9.7	10.8	10.9

Table 5. Percent Distribution of Examined Groups According to Hemoglobin Levels in Kerdasa Village.

	Percentage of Infants, Each Level Deficient	Low	Acceptable	High
Hemoglobin level (gm/%)	< 10	10-10.9	11-12.4	12.5
Village	50.8%	28.3%	17.9%	3.0%

Table 6. Mean Weights of Children Expressed as Percent of Expected at Different Ages During Follow-up Study of Rural Area

Age Months	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
No.																			
6	98.1	95.2	94.0	93.0															
7		99.2	94.0	93.4	93.3														
5				91.9	89.7	88.0	88.6												
6					85.4	81.6	80.9	78.4											
6						78.2	75.8	75.1	77.5										
3							89.5	87.2	86.7	87.8									
4								73.2	74.2	75.2	77.5								
1									61.8	61.4	62.7	65.0							
3										73.3	72.9	73.6	74.8						
2												71.4	72.5	74.1	76.0				
6																73.6	75.5	76.8	78.4

B. Ecological Factors.

Feeding. Details of feeding habits were obtained in the two Giza villages and are presented in Table 7 below. Breast feeding generally is begun on the first day of life and continues through the first year. After the age of two years, the percentage of children receiving the breast dropped rapidly. A new pregnancy was the most important cause of weaning, representing 67.1% of the cases of weaning, while 22.9% of the children were weaned at a later age, around two years. With regard to PEM and breastfeeding, it was found that infants receiving the breast during the first year were better off than non-breastfed infants, while during the second year of life, the weaned children had better chances of being better nourished.

Table 7. Percentage of Children Receiving Different Types of Feeding at Different Ages in Two Giza Villages.

Age (months)	Number	Breast	Only Breast	No Breast	Milk	Solids	Fluids
MANSHAAT EL BAKARY							
0- 5	116	100.0	93.1	0.0	2.6	0.0	3.4
6-11	116	98.3	66.4	1.7	6.0	23.3	7.8
12-17	171	95.9	9.9	4.1	8.8	91.2	2.9
18-23	172	69.8	3.5	30.2	11.0	92.4	2.3
24-29	173	41.6	0.6	58.4	5.8	99.4	0.0
30-35	130	16.2	0.0	83.8	3.8	100.0	0.0
36-41	159	4.4	0.0	95.6	3.8	100.0	0.0
42-47	85	0.0	0.0	100.0	2.4	100.0	0.0
SAFT EL LABAN							
0- 5	45	97.8	88.9	2.2	2.2	0.0	8.9
6-11	73	100.0	72.6	0.0	2.7	9.6	9.5
12-17	66	92.4	13.6	7.6	18.2	66.7	11.6
18-23	92	76.1	7.6	23.9	19.6	66.3	5.4
24-29	73	21.9	0.0	64.4	17.8	100.0	0.0
30-35	64	4.7	0.0	95.3	1.6	100.0	0.0
36-41	65	4.6	0.0	95.4	1.5	100.0	0.0
42-47	72	0.0	0.0	100.0	0.0	100.0	0.0

Diarrhea. Current, recent and recurrent diarrhea was highly prevalent in all four areas of the cross-sectional study as see in Table 8 below.

Table 8. Percentage Prevalence of Diarrhea in the Four Areas Examined.

Area	Number Examined	Current Diarrhea	Recent Diarrhea	Recurrent Diarrhea
Menshaat	1494	20.7%	8.7%	-
Saft	747	13.1%	10.0%	16.7%
Assal	673	10.6%	5.3%	6.8%
Ein El Sira	301	6.0%	2.7%	10.0%

The relationship between diarrhea and protein-energy malnutrition was investigated in Saft El Laban and was found to be highly correlated with nutritional status, as follows:

Table 9. Prevalence of Diarrhea at Different Levels of PEM in the Age Group 0-3 Years in Saft El Laban .

	Number Examined	Current Diarrhea	Recent Diarrhea	Recurrent Diarrhea
Acceptable Wt/Age	100	17.0	5.0	13.0
1st Level Underweight	96	14.6	8.3	20.8
2nd Level Underweight	71	14.1	13.7	23.9
3rd Level Underweight	37	13.5	24.3	35.1
4th Level Underweight	13	22.1	15.4	38.5
Edema	91	36.3	37.4	53.8
Total	408	20.1	16.1	27.5
Correlation Coefficient		0.72	0.83	0.98

Parasitic Infection. Intestinal parasites were highly prevalent in the rural areas, the most common parasite being Ascaris. In the urban areas examined, the overall prevalence of intestinal parasites was much lower, the most common being Entamoeba. Table 10 shows the overall prevalence of parasitic infections in the areas examined.

Table 10. Percentage Total Prevalence of Parasitic Infection in Rural and Urban Areas.

Area	Number Examined	Total Infected (%)
Saft El Laban (rural)	147	51.0
Assal (urban)	247	10.5
Ein El Sira (urban)	181	12.8

C. Intervention. An intervention activity was carried out with nutrition education by means of home visits to advise on infant feeding and testing of home-prepared foods. The intervention did not halt the downward trend of weight/age noted in the survey, but it did result in considerable improvement (shown in Table 6 earlier and in Figure 1 on the following page).

[1]Shukry, A.S., M.R. Barakat, R. El Gammal, L.M. Kamel (1972). "An epidemiological study of protein-energy malnutrition among rural populations in Egypt." Gaz. Egypt. Paed. Assn. 20:2:1511

[2]Kamel, L.M., A.S. Shukry, R. El Gammal (1975). "Some epidemiological aspects of rickets." Gaz. Egypt. Paed. Assn. 23:1:51

[3]Shukry, A.S., F.M. Labib, L.M. Kamel (1973). "Assessment of the health and nutritional standards of infants and preschool children in a high density Cairo community." Gaz. Egypt. Paed. Assn. 21:3:47.

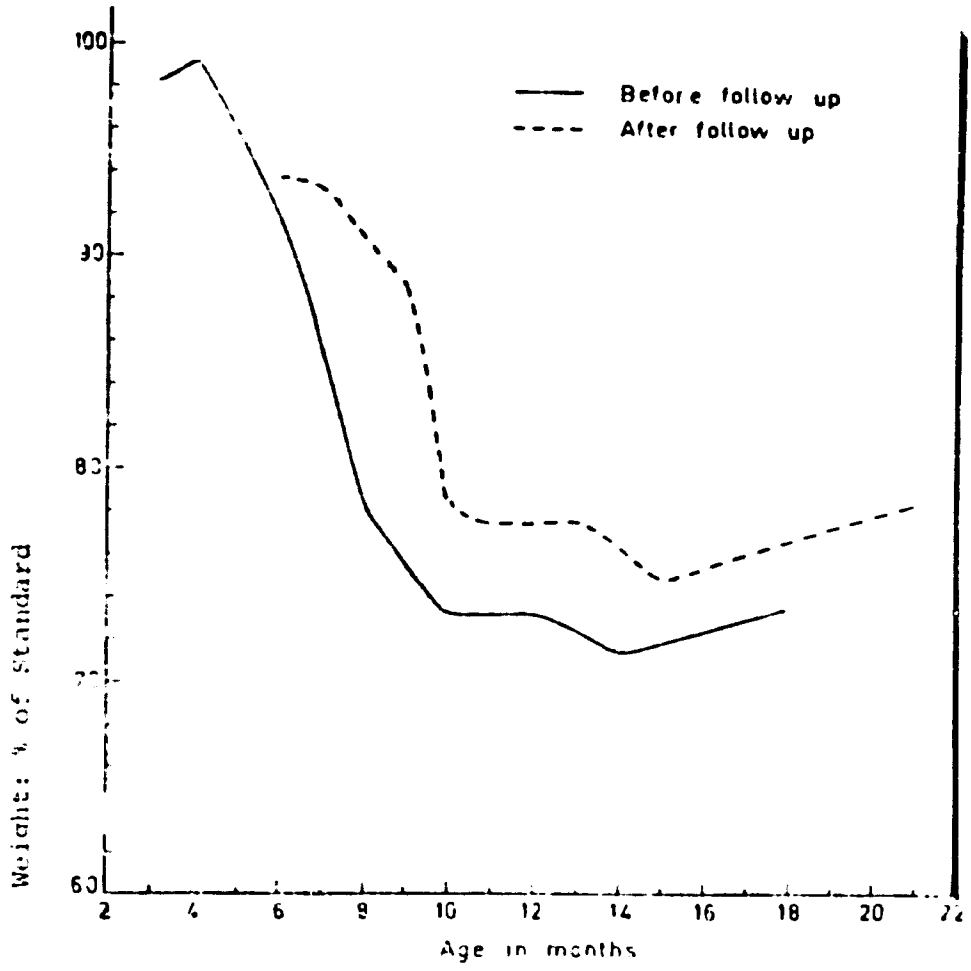


FIG. 1. EFFECT OF NUTRITION EDUCATION (RECOMMENDED DIET) ON THE WEIGHT OF INFANTS EXPRESSED IN PERCENTAGE OF NORMALS.

[4] Labib, F.M., R. El Gammal, L.M. Kamel (1970). "An investigation of the health and nutritional status of preschool children in a homogeneous urban area." Report, Assessment of Health Needs of Children in Egypt. UNICEF.

[5] Kamel, L.M., M. El Rafie (1975). "Maternal and child health status in a slum area." Paper presented to the First Medical Research Conference, Alexandria, August, 1975.

[6] Wahba, S., O. Galal, L.M. Kamel, K.S. Morsi, F.A. El Wakil (1975). "Improved feeding patterns in the prevention of childhood malnutrition." Jan. Egypt Paed. Assn. 23:2:97.

[7] Kamel, L.M. (1969). "Protein malnutrition of early childhood among rural population." unpublished M.A. (Public Health) Thesis, Faculty of Medicine, Cairo University.

[8] Wahba, S. (1974). "Nutritional status of infancy in Egypt and possible means for its improvement." unpublished M.S. (Food Science), Thesis, Faculty of Agriculture, Cairo University.

"Malnutrition Among School Children in Egypt."

by Dr. Sawsan Fahmi, Department of Family Health, High Institute of Public Health, Alexandria.

This work was done by Dr. A.F. El Sherbini and Dr. Sawsan Fahmi in the Department of Public Health, High Institute of Public Health.

The 6-18 year age group in Egypt has recently reached a figure of approximately eleven and a half million. Of this group, about seven million are in schools and form 17.5% of the total population of the country. The majority are in primary schools (about four million) and the rest are in preparatory and secondary schools.

What is the nutritional status of this large sector of our population? In an effort to answer this question, there have been several sample studies covering some urban and rural areas giving a picture that can be considered true for the whole of Egypt.

From the ecological point of view, malnutrition states in Egypt are found to result from multiple overlapping and interacting factors in the community--i.e., the physical and biological environment together with the cultural aspects. The resulting picture is thus usually not a sharply defined one, but rather a combination or a syndrome produced by decrease or increase of one nutritional element or another.

Retarded Growth. Protein energy deficiency in the diets of children is a common clinical picture: children look stunted for their age. In a recent study in Alexandria which included a representative sample of primary school students (3810), percentiles of heights and weights were calculated.[1] These percentiles were found to be at a constantly lower rate than the standards in developed countries. Table 1 below and Figures 1-4 show the differences between the calculated 50th percentiles of weights and heights and those of Harvard standards.[2]

Table 1. The 50th Percentiles of Weights and Heights for Egyptian and American Children 6-11 Years.

Weight (kgs.)	6 yrs.	7 yrs.	8 yrs.	9 yrs.	10 yrs.	11 yrs.
Boys - Egyptian	20.9	24.1	24.4	28.4	29.9	31.7
- American	21.9	24.5	27.3	29.5	32.6	35.2
Girls- Egyptian	19.9	22.7	23.5	27.3	29.6	33.5
- American	21.1	23.7	26.3	28.9	31.9	35.7
Height (cms.)						
Boys - Egyptian	115.2	121.3	126.4	132.9	135.5	141.2
- American	117.5	124.1	130.0	135.5	140.3	144.2
Girls- Egyptian	113.1	119.3	126.3	130.8	136.5	142.6
- American	115.9	122.3	128.0	132.9	138.6	144.7

Fig. 1. 50th Percentiles of Weights of Egyptian and American Boys (6-11 years).

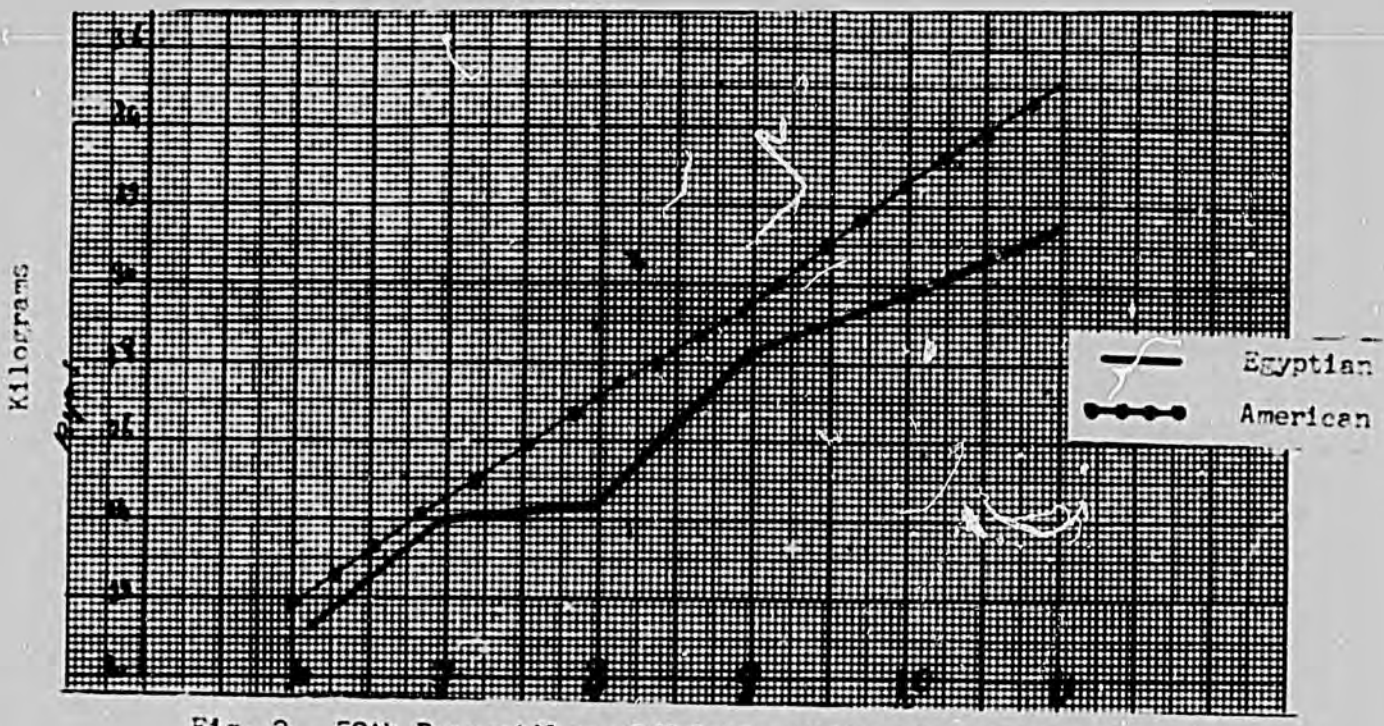


Fig. 2. 50th Percentiles of Weights of Egyptian and American Girls (6-11 years).

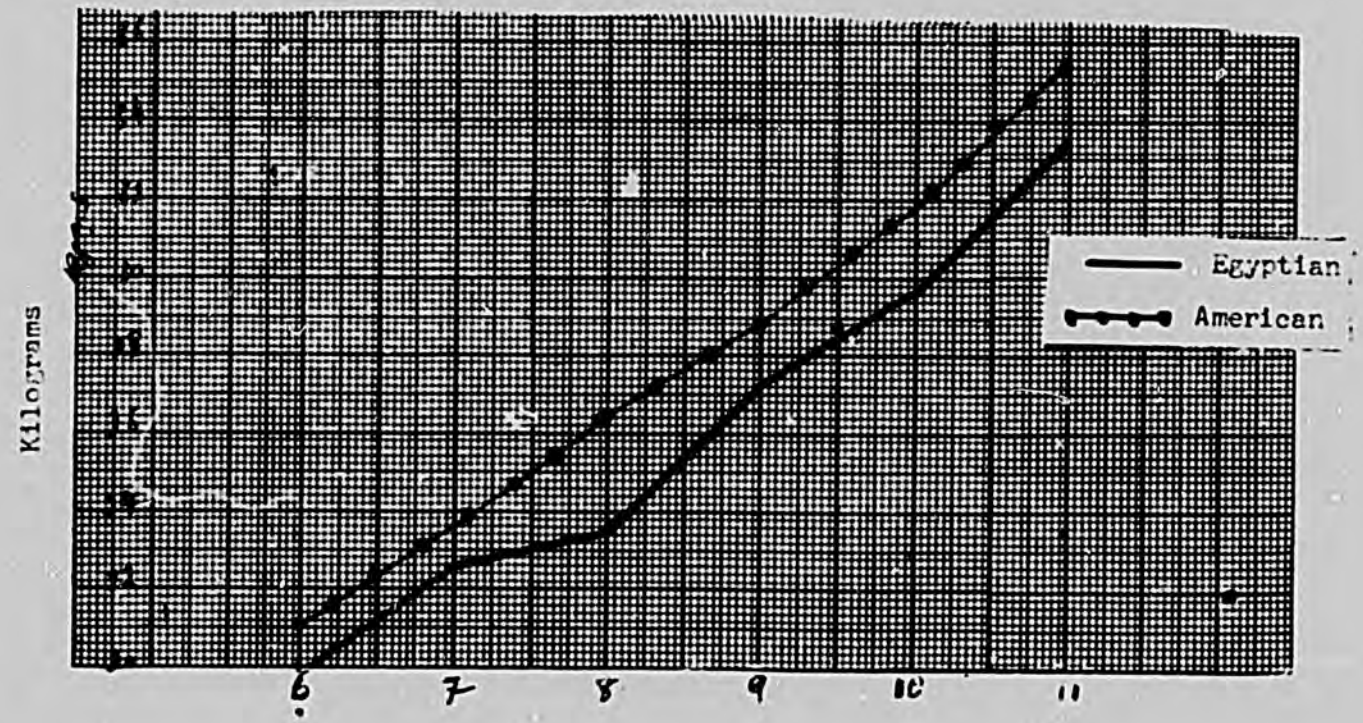


Fig. 3. 50th Percentiles of Heights of Egyptian and American Boys (6-11 years).

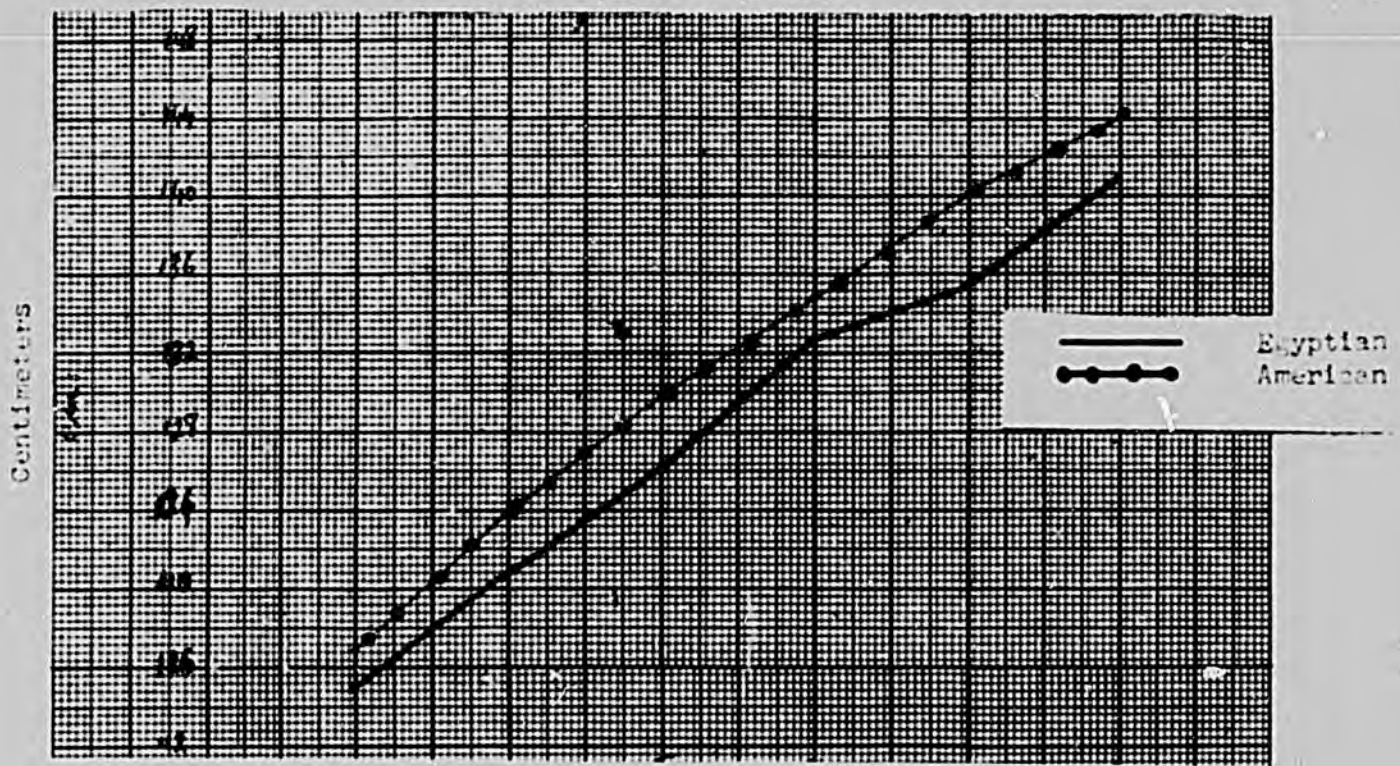
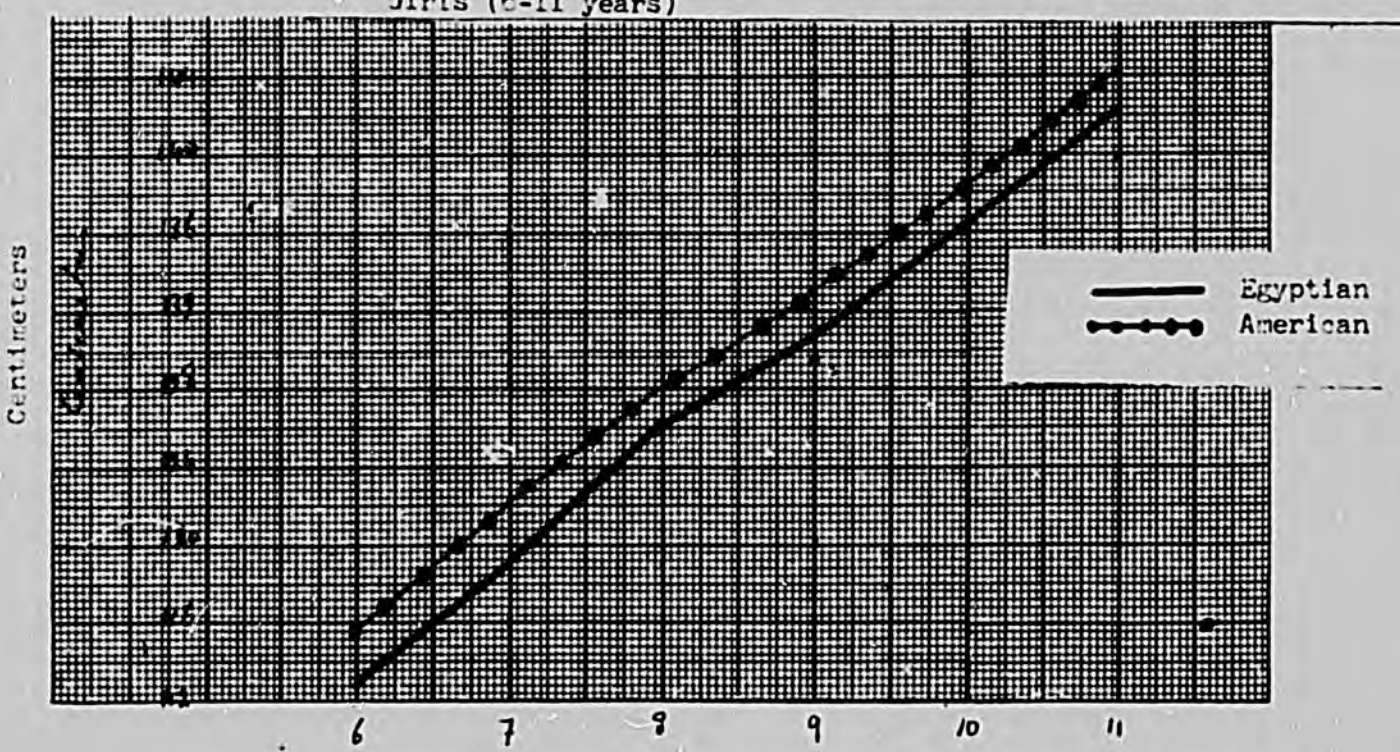


Fig. 4. 50th Percentiles of Heights of Egyptian and American Girls (6-11 years)



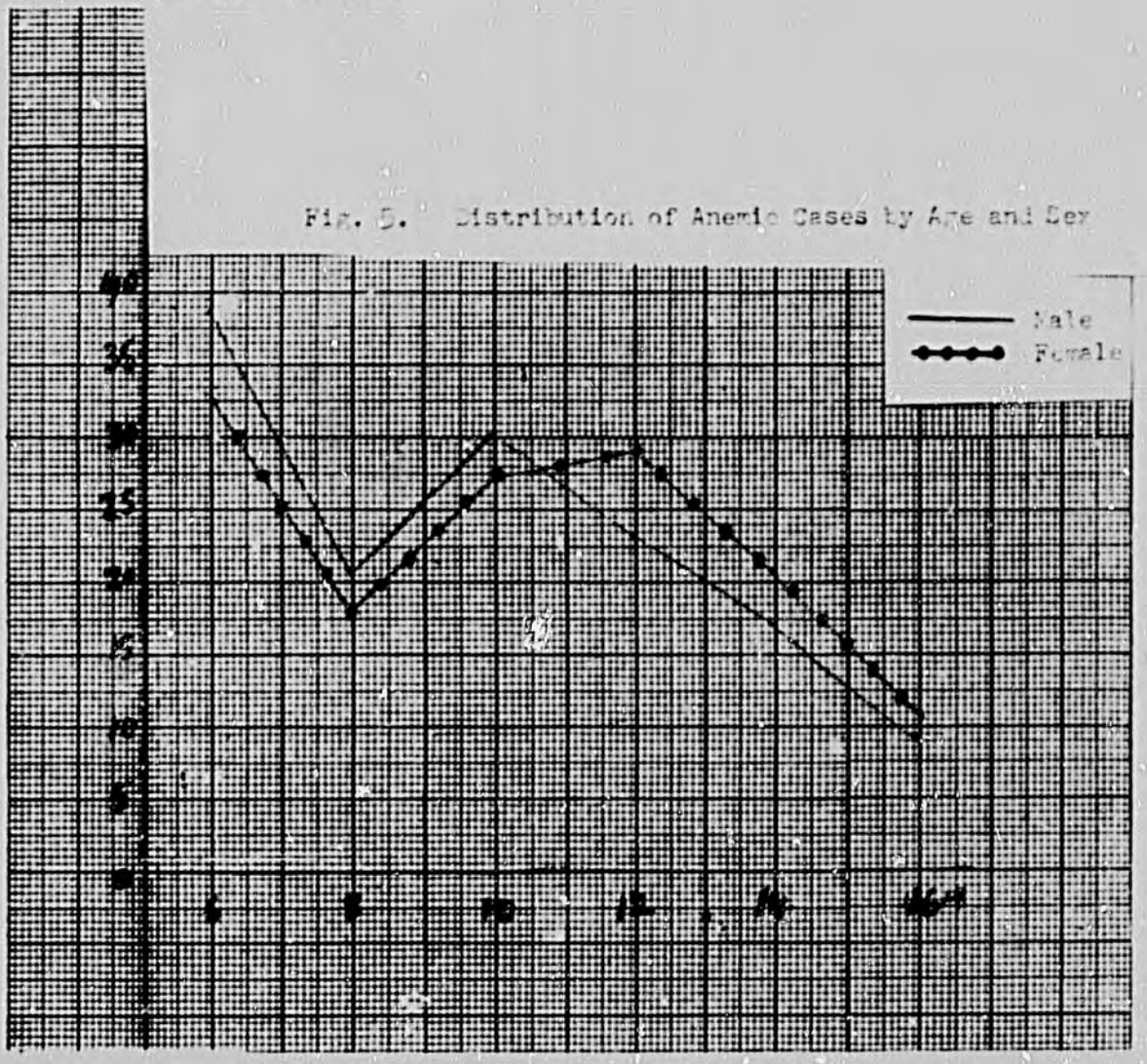
Anemia. Another highly prevalent malnutrition problem among our school children in anemia. A study of 2685 students representing urban and rural Alexandria schools at all three educational levels revealed a prevalence of anemia among these children of 22%. In other words, about one-fifth of the children had hemoglobin levels of less than 12 gms/100 ml (1972 definition of anemia by WHO).[3] The highest prevalency rates were among primary school children. Table 2 illustrates the distribution of anemia by age.

Table 2. Distribution of Detected Anemia Cases by Age.

Years of Age	Number in Sample	No. Cases of Anemia	Percent
6+	330	120	36.4
8+	420	84	20.0
10+	448	129	28.8
12+	415	107	22.7
14+	470	89	16.6
16-18	602	62	10.3
Total	2685	591	22.01

For both sexes there was a sharp drop in anemia prevalence from 6-8 years of age, followed by a gradual rise up to 10 years and a drop again up to 18 years. See Figure 5 below.

Fig. 5. Distribution of Anemic Cases by Age and Sex



However, the total prevalence among primary school children (6-12 years) was 27.7%, and for the rural sector was 69.7%. Among preparatory students, 12-15 years, prevalence dropped to 18.7% and among secondary students, 15-18, it again dropped to 13.8%.

When the anemic children were further investigated for parasitic infection, it was found that such infections were significantly higher in prevalence among the anemic than among the non-anemic group.

The effect of anemia on physical growth was also clearly demonstrated in their heights and weights. Among primary school children alone, it was found that 70.3% of anemic boys were below the 50th percentile of Egyptian standards, compared to 24.5% of their non-anemic cohorts. In height, 74.7% of the anemic boys were below the 50th percentile of Egyptian standards compared to 19.8% of the non-anemic group. The effect of anemia dropped in subsequent age groups. Among preparatory school children, 58.1% of anemic boys were below the 50th percentile Egyptian standard weight compared to 16.5% of non-anemics, while 62.9% were below the 50th percentile of heights compared to 19.6% of non-anemics. At the secondary school level, the effect of anemia on weight and height was still lower, 37.1% of anemics being below the 50th percentile compared to 15.6% for non-anemics, and in height 48.6% for anemics compared to 31.2% for non-anemics.

The same trend, but at even higher rates, was found among anemic school girls, all through the three educational levels.

Which preceded the other, anemia or parasitic infection, or whether the two proceed together, is a difficult question to answer. What was definite about these children was that their school achievement was affected by their nutritional state, the better achievement being made by children not afflicted by anemia and/or parasitic infection.

Specific Deficiency States. In a study performed in the city of Tanta in 1975, nutritional data were taken on 3812 primary school children randomly selected from different schools representing three socioeconomic strata of the community.[4] Table 3 shows the rates of deficiencies as determined by clinical signs.

Table 3. Percent of Primary School Children in Tanta Affected by Specific Nutritional Deficiencies.

Item Deficiency	High Socioeconomic Urban Schools		Middle Socioeconomic Urban Schools		Low Socioeconomic Urban Schools		Rural Schools	
	M	F	M	F	M	F	M	F
Vitamin A	4.5	4.2	17.3	14.1	31.8	31.1	68.8	36.8
Riboflavin	-	-	2.2	1.5	19.9	-	34.6	26.2
Niacin	-	-	-	-	0.97	-	4.6	-
Old Rachitic Changes	-	0.5	0.7	0.7	2.8	0.9	2.3	0.9

Vitamin A deficiency as manifested by follicular hyperkeratosis and/or xerosis of conjunctiva and Bitot spots was found to affect all social classes but at a lower rate among the higher socioeconomic classes. Children in the rural sector of the sample were affected at a significantly higher rate, especially among males. Riboflavin deficiency as manifested by angular stomatitis and/or cheilosis was also more prevalent among rural male students but was also detected among urban students of the lower socioeconomic strata. Niacin deficiency as manifested by pellagrous dermatosis was nearly restricted to rural boys, and at a very low rate, among boys of low social strata.

[1] El-Kossaiy, A. (1979), "Study of some elements of physical fitness among primary school children in Alexandria." Unpublished D.Sc. Thesis, Physical Education, Faculty of Physical Education, Helwan University.

[2] Stuart, H.C., and S.S. Stevenson (1959), "Growth and development of children," in Nelson, W.E., Textbook of Pediatrics, W.B. Saunders Co., Philadelphia.

[3] W.H.O. (1972). "Nutritional anemias." Technical Report Series 503.

[4] El-Bandarawy, M.S. (1975). "Epidemiology of malnutrition among primary school children in Tanta city." Unpublished Thesis M.D. Public Health, Faculty of Medicine, Middle Delta University.

"Community Development Project of Baragil Village."

by Dr. Mervat El Rafie, Faculty of Medicine, Cairo University.

This work was done at the Department of Public Health and the Department of Pediatrics, Faculty of Medicine, Cairo University, in collaboration with:

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Methodology. A systematic random sample representing one fifth of an Egyptian village population was chosen. A survey sheet covering social and economic aspects of the sampled group was drawn up and data were collected by staff members of the Faculty of Arts and Faculty of Agriculture of Cairo University. Two medical survey sheets, one for infants and preschool children, and the other for the age group above six years, were prepared. Information gathered on these sheets included medical histories, obstetric data for females, full clinical examinations and simple laboratory tests.

The study foresaw a total of 2,000 persons, but in fact 1,115 were examined. This reduction in the sampling was due to the fact that Baragil village is near Cairo and many of the men work in Cairo.

Cairo University's computer center helped with the tabulation of data and the statistical analysis of results.

Because data on parasitic infestation were not adequate in the first part of this work, a sample of 100 families was chosen by systematic random sampling from the 1500 families in the village. All children under six years of age were included in the study. Total number examined was 350.

Growth and development in the preschool age group were determined by anthropometric measurements including weight, height and arm circumference. McLaren's classification was used.[1]

Complete urine and stool examinations were done by a trained technician and hemoglobin concentrations were determined among the children. The results were analyzed to determine the effect of parasitic infection upon growth and development. The infestation rate was compared to rates previously determined in the adult sample.

Results. The age and distribution of the sample infants were as shown in Table 1.

Table 1. Distribution of Infants Examined by Age and Sex.

	≤3 months	3-6 months	6 months +	Total
Number	7	17	26	50
Males (percent)	57%	47%	50%	50%
Females (percent)	43%	53%	50%	50%

Mothers were asked about complaints in their infants. Nearly all of the children were said to have some sort of complaint. Some may have been fallacious as mothers like to receive some medication for their children. It will be noted in the Table below that in the group of infants under six months of age, the principal complaint was respiratory infection (47%) while in the group above six months of age, the main complaint (52%) was gastro-intestinal disturbance.

Table 2. Distribution of Infants by Complaints Present.

Number(Total: 47)	≤3 months 5	3-6 months 17	6 months + 25
Complaint (%)			
None	40	0	0
Fever	20	18	8
GI Disturbance	20	18	52
Respiratory	20	47	40
Inability to walk	0	6	0
Others	0	12	0
Unknown	2	0	1

N.B. Percentages may add up to over 100 because of rounding figures.

The next point to be examined was feeding patterns of infants under one year of age. In asking mothers the causes of weaning in infants below one year, we received the following replies:

Table 3. Causes of Weaning Under One Year Olds.

Number (Total: 50)	≤3 months 7	3-6 months 17	6 months + 26
Cause of Weaning (%)			
Not done	86	88	92
Lactation failure	0	0	4
Old enough	0	0	4
Pregnancy	14	12	0
Unknown	0	0	0

Breastfeeding was the rule for the infants under one year old: more than 85% in each age group was on mothers' milk. The main reason for stopping breast-feeding was pregnancy, followed by lactation failure and mothers belief that the infant was old enough to be weaned from the breast.

Anthropometric data on the under six year olds are shown below, according to weight for age criteria with a separate notation for edematous children.

Table 4. Level of Nutritional Status as Measured by Weight/Age and Presence of Edema: Distribution among preschoolers.

	<3 m	3 m +	6 m +	1 yr +	2 yr +	3 Yr +	4 yr +	5 yr +
Number (Total:250)	7	17	26	41	34	37	32	54
% Standard+	71.4	41.1	38.5	12.2	8.8	40.5	20.5	18.5
% St - 91%	-	44.1	11.5	12.2	11.7	8.1	35.2	24.0
81-90%	14.3	5.9	34.6	24.4	17.6	21.6	20.6	35.4
71-80%	-	-	7.7	26.8	26.6	18.9	8.8	12.9
61-70%	-	11.8	7.7	17.0	14.7	5.4	11.9	3.7
60% or less	-	-	-	7.9	11.7	-	-	-
Edema	14.3	-	3.8	-	8.8	5.4	11.8	5.5

Among infants under one year old, nearly 67% were 91% or above standard[2] while during the second year of life only 24% were in these categories. Normal weight was more in evidence below six months of age, during breastfeeding, than above six months when breastfeeding may have stopped or diminished. The highest prevalence of underweight for age was in the second and third years; and edema was present in 8.8% of the + 2 year olds, 5.4% of the + 3 year olds and 11.8% in the + 4 year olds, indicating that PEM is an important health problem at those ages.

Table 5. Level of Nutrition Status as Measured by Height/Age. Percent Distribution among preschoolers.

	<3 m	3 m +	6 m +	1 yr +	2 yr +	3 yr +	4 yr +	5 yr +
Number (Total: 237)	7	17	25	39	33	35	32	49
Standard +	42.9	70.6	36.0	25.6	6.0	17.1	18.2	30.6
95% -	42.9	5.9	32.0	20.5	12.1	20.0	22.4	12.2
87.5% -	14.2	17.6	24.0	35.8	45.5	40.0	48.8	42.8
80% & less	-	5.9	8.0	17.9	33.4	22.9	10.6	14.4
Unknown	-	-	1.0	2.0	1.0	2.0	2.0	5.0

This Table indicates that 50% of the under one year olds were above standard in height,[3] 26% were above standard in the second year, and there was a marked decrease in overall height during the third year.

Table 6. Level of Nutritional Status as Measured by Weight/Age/Height Percent Distribution among preschoolers.

	<3 m	3 m +	6 m +	1 yr +	2 yr +	3 yr +	4 yr +	5 yr +
Number (Total: 230)	6	17	24	39	32	33	30	49
Standard +	33.3	5.9	8.3	2.6	3.1	11.5	16.7	14.3
Standard	50.0	76.5	54.1	25.6	21.9	57.1	63.3	55.1
1st grade	16.7	-	12.6	12.8	18.8	11.5	6.7	12.2
2nd grade	-	-	20.8	35.9	40.5	17.8	3.3	8.1
3rd grade	-	17.6	4.2	23.1	15.6	17.2	10.0	1.3
Unknown	1.0	-	2.0	2.0	2.0	2.0	4.0	5.0

In the first year of life, 61% of the infants were above standard or first grade malnutrition according to weight/age/height. The corresponding percentages in the second and third years are 28% and 25% respectively. Of the severely

malnourished, 19% were under one year old while 59% and 56% were in this category in the second and third years respectively. Normal growth was more prevalent among infants below six months of age than in those above. This better growth during the first year indicates the important role of breastfeeding and also indicates the vicious circle of malnutrition and infection in the artificially fed. The effect of lactation on growth is tabulated below.

Table 7. Distribution of the Group by Weight/Age/Height According to Infant Feeding.

Number (Total: 47)	No breast 7	Breast only 31	+Fresh Milk 4	+ Fluids 4	+ Solids 3
Standard +	28.6	9.7	-	-	-
Standard	28.6	67.7	50.0	75.0	66.7
1st grade	14.2	6.5	-	-	33.3
2nd grade	-	12.9	50.0	-	-
3rd grade	28.6	3.2	-	25.0	-
Unknown	-	1.0	-	1.0	1.0

66% of the children nursed depended on breastfeeding only, while the rest received supplements. Among the breastfed, 77.4% were above standard or slightly undernourished, and 16.1% were severely malnourished. These percentages were comparable to the rest of the group, but the percentages were not calculated due to the small numbers in the rest of the group.

Motor development was evaluated as follows:

Table 8. Motor Development Achievement at Different Ages.

	≤1 yr	1 yr+	2 yr+	3 yr+	4 Yr+	5 Yr+
Number (Total: 230)	48	38	30	34	32	48
Motor Development (%)						
None	16.4	7.9	-	-	-	-
Hold head	52.1	5.1	-	-	-	-
Sit	24.9	7.9	-	-	-	-
Crawl	2.1	15.8	-	-	-	-
Stand	4.2	21.1	23.3	-	-	-
Walk supported	2.1	15.2	6.6	-	-	-
Walk unsupported	-	10.6	6.6	-	-	-
Crawl up stairs	-	7.9	6.6	-	-	-
Run	-	10.6	56.6	100.0	100.0	100.0
Unknown						

Thus in the second year of life, nearly 37% of the group showed delayed motor development and in the third year, 36.5% showed a similar delay.

Description of the Global Sample including Infants. The dependent age group in Egypt, below 15 years of age, comprises 42.7% of the population (1971).[4] Our sample, shown below, is therefore a representative one.

Table 9. Distribution of the Group Examined by Age.

Age in Years	Number	Percent	
less than 1	50	4.74	
1 - 6 years	198	18.78	
6 -10 years	64	6.07	
10-15 years	238	13.09	= 42.7%
15-20 years	82	7.77	
20-30 years	161	15.57	
30-40 years	132	12.52	
40-50 years	63	5.97	
50-60 years	73	6.95	
60-70 years	52	4.93	
70 years +	41	3.89	
Total	1054	100.0	
Unknown	61		

Population over six years of age. The male to female ratio of this group, 1:1.74 contrasts with the 1.03:1 male to female ratio given for Egypt in 1974.[5] It can be explained by the fact that survey dropouts were primarily men who worked outside of the village. Table 10 below shows that pregnant and lactating females made up 15.7% of the female population, (75/476).

Table 10. Distribution of the Group Examined by Sex and Physiological Status.

Sex/Physiol. Status	Number	Percent
Male	316	36.45
Female	476	54.9
Pregnant	29	3.34
Lactating	46	5.31
Total	867	100.0

The tables below show the presence of gastrointestinal and respiratory complaint. Only 13% complained of gastrointestinal problems which was lower than urinary complaint. 65% complained of respiratory difficulties; these were more common in the winter season.

Table 11. Distribution of the Group According to Presence of Gastrointestinal Complaint.

Symptom	Number	Percent
No complaint	743	86.9
Constipation	64	7.48
Diarrhea	29	3.39
Dysentery	19	2.23
Total	855	100.0
Unknown	12	

Table 12. Distribution of the Group According to Presence of Respiratory Complaint.

Symptom	Number	Percent
No complaint	302	34.67
Cough	450	51.66
Asthma	4	0.46
Repeated cough	111	13.21
Total	867	100.0

26% of the group knew that they had parasitic infection, but this cannot

be taken as the actual rate of infection as, for example, bilharziasis was mentioned by only 4.26%. The main parasitic infestations mentioned were oxyuriasis (12.22%), ascaris (5.99%) and malaria (2.57%). Dysentery was not common, being mentioned by only 1.15%, perhaps due to the unspecific manifestation of the disease.

Table 13. Distribution of the Group by History of Parasitic Infection.

Complaint	Number	Percent
No complaint	640	73.81
Bilharziasis recently	7	0.80
Bilharziasis more than 1 year	30	3.46
Dysentery	10	1.15
Ascaris more than 1 year	14	1.61
Ascaris, treated	38	4.38
Oxyuris	106	12.22
Malaria	22	2.57
Total	867	100.00

Complete examinations, including taking anthropometric measurements, examinations of different systems, and simple laboratory tests were carried out on the group studied.

Anthropometry. Weight, height, arm circumference and triceps skin fold measurements were taken and weight for height was calculated from standard tables. Those found to be within normal weight for height range, i.e. with an index of 0.90 to 1.10, constituted 67% of the sample, while 31% were considered overweight and 2% underweight. Obesity is thus a more common nutritional problem in urban populations than in rural.[6] The weight/height distribution is shown below.

Table 14. Distribution of the Group According to Weight for Height.

Percentage Weight/Height	No.	Percent
+1.4	48	6.5
1.4 -	37	5.01
1.3 -	44	5.96
1.2 -	100	13.55
1.1 -	93	12.60
1.0 -	159	21.54
0.9 -	131	17.75
0.8 -	10	1.35
0.7 or less	6	0.81
Total	738	100.00
Unknown	129	

Laboratory investigations included blood, urine and stool samples to determine hemoglobin concentration, sugar, albumin and parasitic presence. The following table shows that those considered to be anemic (with Hb concentrations of less than 10 g/100 cc) comprised 86.45% of the sample, reflecting the well known high prevalence of anemia in the rural population.

Table 15. Distribution of the Group by Hemoglobin Concentration.

Hb Concentration, gm/100 cc	Number	Percent
6	15	2.99
6 -	5	0.99
7 -	56	11.17
8 -	203	40.51
9 -	164	32.73
10 -	51	10.17
11 -	10	1.99
12 -	7	1.39
13 +	0	0
Total	501	100.00
Unknown	366	

Results of the urinalyses revealed only 41% of the survey group to be normal. Bilharziasis, which is known to be highly prevalent in rural areas, was present in 37% of the sample. And as seen in Table 16, the percentage of diabetics was quite above the expected rate, at 1.7%. An error in technique may be responsible for this and it should be corrected with a survey using more sophisticated tests.

Table 16. Distribution of the Group by Urine Analysis.

Analysis	Number	Percent
Normal	224	40.95
Sugar	110	20.10
Bilharziasis	196	35.83
Albumin + sugar	9	1.64
Sugar and bilharziasis	8	1.48
Total	547	100.00
Unknown	320	

The rate of parasitic infection was 34% and mixed infections were common. Amoeba was expected to be higher than 0.55% and errors in detection may be responsible. The stool findings are shown in Table 17.

Table 17. Distribution of the Group by Positive Findings in the Stool.

Findings	Number	Percent
Normal	356	66.05
Ascaris	164	30.45
Ankylostoma	8	1.48
Ascaris and ankylostoma	3	0.55
Oxyuris	121	22.45
Amoeba	3	0.55
H. nana	16	2.96
Giardis and H. nana	3	0.55
Total	539	100.00

Preschool Health and Growth Progress. Anthropometry.

The percentage of children showing various grades of malnutrition was 43.1%. 11.6% showed severe malnutrition. These figures coincide with earlier figures from the same village. Using McLaren's classification, results are:

Table 18. Growth and Development of PreSchool Children (McLaren).

Grade of Nutritional Status	Rank	Number	Percent
Above normal	1	38	10.9
Normal	2	161	48.0
Mild PEM	3	65	18.6
Moderate PEM	4	45	12.9
Severe PEM	5	41	11.6
Total		350	100.0

Table 19. Relation Between Age and Growth and Development.

Nutritional Status	∑3 years	3 years +	Total
Normal & Mild PEM	N = 49	N = 215	N = 364
in percentage	49.5%	85.7%	
Severely Malnourished	N = 50	N = 36	N = 86
in percentage	51.5%	14.3%	

Severe malnutrition was highly prevalent among children under three years of age, exposing this vulnerable and high risk group to infectious disease. After this age, parasitism begins to appear. Synergism between infection and growth is manifested during this period.

Laboratory Investigations.

Table 20. Urine Examination in Children.

Results of Examination	Number	Percent
Positive Bilharziasis	24	9.6
Negative Bilharziasis	226	90.4
Total	250	100.0
Unknown	100	

Of the children examined for bilharziasis, the 10% positive is a high percentage for an age group whose growth would be severely affected by this infestation. Parasitism is an important problem in this group, with infestation occurring in 25.7% of the cases, ranging from 9.3% ascaris to 2.6% H. nana. Oxyuris was expected in a higher percentage and the discrepancy may be due to the fact that solophon tape was not used in the analysis.

Table 21 gives the hemoglobin concentration in the group of children examined. Hemoglobin concentration in vulnerable groups such as pregnant mothers and children is very low.

Table 21. Hemoglobin Concentration in Children Examined.

Hemoglobin Concentration	Number	Percent
< 50	16	7.1
50 -	90	41.1
60 -	102	46.1
70 -	12	5.7
80 +	0	0
Total	220	100.0

Table 22. Parasitic Infestation and Growth and Development

Nutr. St. Growth	Positive Bilharzia	Negative Bilharzia	+ve Intest. Parasites	-ve Intest. Parasites
Grade 1, 2, 3 + St. St. Mild.	8 (33.3%)	200 (88.5%)	30 (41.7%)	180 (86.5%)
Grade 4, 5 Moderate, Severe.	16 (66.7%)	26 (11.5%)	42 (58.3%)	28 (13.5%)

Nutritional status is clearly affected by parasitic infestation (both bilharziasis and intestinal infestation). Moderate and severe malnutrition were highly prevalent where positive cases of bilharziasis and intestinal parasites existed.

The last table shows how hemoglobin concentration is adversely affected by blood loss associated with bilharziasis and some intestinal parasites. In positive bilharzia cases, 14.2% had Hb concentrations below 55%, compared with 7.9% in negative bilharziasis. The corresponding percentages in cases of intestinal parasites were 40.0% and 19.6% respectively. These differences were not statistically significant.

Table 23. Hemoglobin Concentration and Parasitic Infection.

Parasite		-55% Hb Concen	55%+ Hb Concen	Total
Bilharziasis	+ve	15 (14.2%)	9 (7.9%)	24
	-ve	91 (85.8%)	105 (92.1%)	196
		106	114	220
Intestinal Parasites	+ve	40 (40.0%)	20 (16.6%)	60
	-ve	60 (60.0%)	100 (83.4%)	160
		100	120	220

[1]McLaren, D.S., P.L. Pellet, et.al. (1972), Lancet 2:146.

[2]Jelliffe, D.B.. (1966). WHO Monograph Series No. 53.

[3]Wallace, H.M. (1962). "Health Services for mothers and children." W.B. Saunders Co.

[4]Khalil, I.F. (1970). Public Health. Scientific Book Center.

[5]Khalil, I.F. (1975). "A Guide to Public Health."

[6]Labib, F.M., et al. (1974). "Assessment of health and standards of school children in Egypt." UNICEF Report, Cairo.

[7]Kamel, H., and A. Abdel Aal (1970). J. Egypt. Med. Assn. 53:5:368.

"The Nutritional Status of the Egyptian Child During a Quarter of a Century (1952-1977)."

by Dr. Farouk Shaheen, Nutrition Institute, Ministry of Health.

Several studies and surveys have been carried out during the period 1952-1977 which attempt to assess the nutritional status of the Egyptian child. These studies showed variations in results depending on the geographical location, socioeconomic status, season of the study, etc. None had been carried out on a national scale. Only in 1977-78 was a comprehensive national nutrition survey carried out by the Nutrition Institute to assess the nutritional status of the preschool Egyptian child and to investigate some of the ecological factors.

Physical Growth and Development. In Egypt, as in many developing countries, most nutritional problems are accentuated in the preschool age group and are manifested in poorer physical growth and development.

The results obtained from a survey carried out in 1953-54 on attendees of the Well Baby Clinic of the Cairo Pediatrics Hospital,[1] together with the results obtained by Abdou et al. (1965)[2] on the attendees of Cairo MCH centers in 1956-57, showed that body measurements (height and weight) begin to deviate from the reference standard levels as early as the third month of life. By the end of the first two years of life, the Cairo clinic child weighs about seven pounds less and measures about 12 cm. less than the Iowa (U.S. standard) child, meaning a growth retardation of about half a year by the end of the second year of life.

In 1965, urban and rural preschool children were studied in Beheira Governorate.[3] Protein-energy malnutrition (PEM) was least prevalent in the 0-6 months age group. Thereafter PEM increased gradually to reach its peak (70%) by the end of the second year in both the rural sector and the less-privileged urban sector. The study showed that rates of severe PEM were higher in rural than in urban areas (9% and 5% respectively). Overall prevalence of mild or moderate PEM was 40% in urban areas compared with 48% in rural preschool children while the prevalence of severe cases of PEM was 1% and 3% in urban and rural areas respectively. Most cases of PEM in Egypt appeared to be of the mild or moderate type, meaning: underweight/short stature, belonging to what has been called the "nutritional dwarfing" category. Girls always showed more growth retardation than boys, apparently confirming the "cultural" observation that boys are given better nutritional care.

A 1965-66 comprehensive survey made in Beheira revealed a prevalence rate of anemia of 84% among rural 0-2 year olds and of 75% among urban 0-2 year olds. In the same study, 2-6 year olds had milder and less frequent anemia--68% in urban children and 65% in rural children. In 1975, the prevalence among Edfou preschool children was 62%, 70% in the 0-6 year old group and 55% in the 2-6 year old group.

Prevalence of anemia among 6-18 year old children differs according to sex, locality (urban or rural, governorate), whether the child was attending school or not, and to the year of study. In general, girls, school children and rural children are less frequently affected than boys, non-educated and less privileged urban children as is illustrated below:

Table 2. Prevalence of Nutritional Anemia Among Children 6 - 18 Years Old, by Sex and Locality.

		Percent of Anemic Cases			
		6 - 12 years		12 - 18 years	
Governorate	Locality	Male	Female	Male	Female
Cairo	Urban	19	20	6	10
Kaliubieh	Rural			49	44
Beheira	Urban	48*	46*	33*	39*
"	Urban			19	20
"	Rural	56*	50*	48*	51*
Asyut	Urban	33	39	20	39
"	Rural	69	73		
Aswan	Urban	62	68	24	43
"	Rural	73	58		

*Not attending school.

It can be seen in Table 3 below that the rate decreases steadily with age.

Table 3. Prevalence of Nutritional Anemia Among Different Age Groups.

		Percent of Anemic Cases	
Age Group	Sex	Rural	Urban
0 - 2		75	84
2 - 6		65	68
6 - 12	M	56	48
6 - 12	F	50	46
12 - 18	M	48	33
12 - 18	F	51	39

Rickets. In 1956-57, a survey of the nutritional status of preschool children revealed a 13% prevalence of rickets from birth to the end of the second year.[2] In 1965-66, the rate of prevalence in this age group was 11-14%.[3]

Two years later in Beheira Governorate, a study of preschool children was carried out in two villages. A slight decrease in the prevalence of all forms of PEM was reported: 43% as mild-moderate (M-M) and 1% as severe. Maximum growth retardation occurred during the 6-24 months of age period, supporting the findings of the earlier study in Beheira.

Aly et al.[5] in 1975, in metabolic investigations of bladder stone disease in Edfou preschool age children, found that the prevalence of M-M PEM was 69% and that of severe PEM, 2% in preschool children from families free from urolethiasis, while the rate was higher (95% M-M PEM) in preschool children from families with a past history of vesicular calculi.

Growth in School Age Children. A comparison of mean weights and heights of school children, based on the Iowa standard, in 1965 (Beheira) and in 1975 (Kafr El Sheik) is presented in Table 1. Differences in the 1965 data[6] and the 1975 data[7,8] are as follows: a) Improvement in weight is readily evident among both sexes during the period between six and 12 years of age. In 1965 the mean values fall around the 50th percentile of standards with slightly higher values for children between 15 and 16 years old. In 1975 the mean values fall above the 75th percentile; b) heights of the two sexes increase less perceptibly and less consistently over the same ten-year period.

Table 1. Heights and Weights of School Children 7-12 Years (Primary School)

Age Yrs.	Beheira, 1965 Height, cm. Boys	Girls	Weight, kg Boys	Girls	Kafr El Sheik, 1975 Height, cm. Boys	Girls	Weight, Kg. Boys	Girls	Differences + or - Height, Cm. Boys	Girls	Weight, Kg. Boys	Girls
7	116.9	120.5	22.4	22.8	120.8	122.3	26.4	25.6	+3.9	+1.8	+4.0	+2.8
8	122.5	125.9	24.3	25.5	124.3	126.3	29.4	28.0	+1.8	+0.4	+5.1	+2.5
9	125.3	130.1	26.5	28.9	129.3	129.8	34.4	33.9	+4.0	-0.3	+7.9	+5.0
10	132.3	134.8	23.9	31.4	130.9	136.0	36.0	38.6	-1.4	+1.2	+12.1	+7.2
11	136.1	138.9	32.2	35.2	137.4	134.8	38.4	40.5	+1.3	-4.1	+6.2	+5.3

The reason for improved weight gains of pupils in the primary school age group may be that more care was given by mothers during this period; the mother's influence seems to decline once the child reaches puberty.

Anemia. Anemia is still a major health problem in Egypt. Hemoglobin concentratrations below 11 gm/dl blood were found in a considerable number both sexes at various ages. In 1956-57, the prevalence rate of anemia among urban preschool children 0-2 years old attending Cairo MCH Centers was 80%.[2]

Goitre. Grade I goitres are fairly common in some parts of Egypt. Results of surveys conducted in the 1960s show that goitre is endemic in the New Valley[10] where the overall prevalence rate among school children 6-18 years old in Kharga and Dakhla Oases was 52%. Fewer goitres were reported among school children in Asyut and Aswan--24% among girls,[11] and even less frequently prevalent among school age boys and girls in Cairo,[12] 1.7% and 17.8% respectively. The prevalence rate in both urban and rural sectors of Beheira is very low among preschool children, 1% in the rural 0-2 age group, and from 1.4% to 2.8% in the 2-6 year old group in rural and urban sectors.[3]

Avitaminosis A. Signs suggestive of Vitamin A deficiency such as follicular keratosis and Bitot's spots are not common preschool children--not exceeding 0.5%--and occur mostly in rural areas.[3] Signs suggestive of Vitamin A deficiency in the form of follicular hyperkeratosis was reported to range between 27% and 41% among rural school children in Asyut, and 37-48% in Aswan Governorate, while the percentages were about half these in the urban areas of both Governorates.[11] In Cairo school children the percentage falls to 3-7%.

Ariboflavinosis. Riboflavin deficiency, indicated by cheilosis and angular stomatitis, is common among children of both sexes in most parts of Upper Egypt. Signs of riboflavin deficiency were detected in roughly 2% and 4% in the urban and rural 2-6 year olds in Beheira Governorate.[3] The deficiency affected about 23% of Cairo school children,[9] 52% in Asyut, and 38% in Aswan.[11] Studies carried out in Cairo in 1974 among 12-18 year olds showed signs of this deficiency in only 1% of the group.[13]

[1] Egyptian National FAO Committee. "Report of the State of Food and Agriculture, 1953-54." University Press. (1955).

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[3] Abdou, A.I., E.M. Shaker, F.F. Bishara, and M.K. El-Megharbel (1967), "A comparative study of nutritional status of infants and preschool children in different types of villages, urban sector, and MCH centres of Beheira Governorate." Bull. Nutr. Inst. III.

[4] Abdou, A.I., F.F. Bishara, and A. Riad (1968). "The use of western anthropometric standards for the assessment of the nutritional status of preschool children in rural communities." Bull. Nutr. Inst. IV.

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[7]Aly, H.E. (unpublished). "Report on evaluation of the school lunch programme in primary school children."

[8]Aly, H.E. (unpublished). "Report on evaluation of the school lunch programme in technical secondary schools."

[9]Abdou, I.A., F.M. Farrag, and A.F. Guindi (1968). "Prevalence of nutritional anemia in the age group 6-18 years of rural, urban and industrial communities in Beheira Governorate." Bull. Nutr. Inst. IV.

[10]Abdou, I.A., and M.A. Youssef (1966). "The problem of goitre and its control in Kharga and Dakhla Oases." Bull. Nutr. Inst. II.

[11]Abdou, I.A., H.E. Aly, A. B. Basiouni, A.M. Nafie, A.E. El-Shazli, and M.S. Abdel-Kader (1967). "Nutritional deficiencies, goitre, dental caries, and parasitic infestation among school children in rural and urban areas of Asyut and Aswan Governorates." Bull. Nutr. Inst. III.

[12]Abdou, I.A., H.E. Aly, A.K. Said, W. A. Moussa, H.G. Demian, A.M. Soliman, and L. H. El-Hawary (1968). "Incidence of nutritional deficiencies, goitre, and dental caries among school children in Cairo." Bull. Nutr. Inst. IV.

[13]Unpublished data from a survey assessing school lunch programme, (Personal communication from Dr. H.E. Aly, Director, Nutrition Institute).

APPENDIX 9.

"Feasible Interventions."

by Dr. Joe Wray, School of Public Health, Harvard University

and

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The available studies and surveys that have been reviewed point to similar reasons behind the malnutrition problem in Egypt despite some differences in the degree or severity of the problem. It is these similar causes and feasible ways of preventing them which we will be discussing in the workshop sessions.

It is appropriate that nutrition is being addressed at thie workshop sponsored by the Ministry of Health of Egypt. His Excellency the Minister of Health Dr. Mamdouh Gabr, has written, "Gastroenteritis and measles are the two commonest precipitating factors of malnutrition in Egyptian children." He has further pointed out that the occurrence of this secondary malnutrition due to disease and infection is also accompanied by inadequate weaning foods frequently introduced too late. Thus, programs to improve nutritional status must address disease and infection as well as appropriate infant and young child feeding.

Government programs in other sectors such as those which aim at increasing agricultural production and incomes will clearly benefit child nutrition and health status over the longer run. In the shorter run, it can be shown that direct interventions in health and nutrition can impact on health and nutritional status. While this workshop is not addressing other development sectors, their importance to long term health improvements is recognized. A more appropriate role for health and nutrition workers may well be to assess the impact of other government programs on nutrition and health of vulnerable groups. Dr. Wray will now discuss some key nutrition interventions which if used in combination, can maximize the likelihood of impacting on infant child mortality. He will also discuss the importance of screening and continual evaluation of these efforts, and finally, he will describe an intervention program in Candelaria, Colombia.

While there are no precisely similar program successes which can be passed from country to country, there are some <u>key</u> nutrition components which hold great promise for impacting on mortality and which may be feasible in Egypt.

<u>Key Program Components</u>. The key components discussed here are drawn from 10 projects which were analyzed in a report, "Can Interventions Make a Difference?

The Policy Implications of Field Experiment Experience," by Gwatkin, Wilcox and Wray (March 1979). The 10 projects selected were ones that tried to reduce infant and child mortality in poor rural areas and also kept records that were adequate to permit conclusions about their accomplishments. Six were concerned with children's physical growth and four sought to promote family planning acceptance and fertility reduction. The limits of this presentation precludes a detailed description of these projects (these can be obtained in the report), but it should be useful to mention the specific program components which stand out as particularly effective.

1. Maternal Nutrition. The value of nutrition programs for expectant mothers was explored most extensively in the Rural Guatemala II project, where the impact of maternal food supplements on the birth weights and death rates was impressively documented. Heavier birth weights are strongly associated with lower death rates. The findings at Narangwal were similar where iron, folic acid, and food supplements for expectant mothers seem to have been associated with the significant decline in mortality at very young ages. Indeed, although efforts to improve maternal nutrition through services providing iron, folic acid, food, and nutrition education were a relatively small part of the Narangwal project, this component seems to have been a particularly effective means of averting early infant deaths. Increased maternal food intake, with its possible influence on both birth weight and maternal lactation capacity, has been suggested as an explanation for the otherwise puzzling finding in the Northern Peru project that food given to entire families helped to reduce infant mortality without contributing to more rapid physical growth at later ages.

The fact that maternal nutrition was given explicit attention in only a few of the projects is a reflection of the relatively recent appreciation of its importance. In fact, much of our understanding of the importance of maternal nutrition was initiated by the Rural Guatemala II project findings, available only after the most recent of the projects reviewed were already in the field. Similarly, few attempts were made in the projects covered to alter breast feeding practices either by maternal nutrition supplementation or by maternal education.

2. Maternal Immunization Against Tetanus. Concerted tetanus immunization efforts for pregnant women were included as components of the Narangwal and Rural Guatemala II studies because of the effective protection afforded against tetanus in the new-born through placentally transmitted immunity. In Narangwal, an early survey showed that neonatal tetanus was responsible for almost 20 percent of the neonatal deaths. Project personnel were able to immunize 87 percent of the mothers and have estimated that at least 80 percent of the deaths from neonatal

tetanus were averted. Tetanus immunizations for prospective mothers also appear to have made a significant contribution to mortality declines in the Rural Guatemala II project. Such experiences commend immunization of mothers as a particularly promising component in communities where neonatal tetanus remains a problem.

3. Nutrition Monitoring. Nutrition monitoring was pioneered with considerably good success at Imesi and later refined with equally encouraging results in the Narangwal and Hanover projects. In these situations, growth monitoring based on regular anthropometric measurements of children in the project area facilitated the early identification of infants and young children with retarded growth and consequent increased mortality risk. Nutrition supplementation, medical treatment, and nutrition education efforts could then be focussed on these children and their families.

The use of anthropometric measurement also served importantly in these child health programs as a tool for alerting mothers to the retarded growth of their children, thereby encouraging improved feeding practices. In some practices, as in the Hanover project, such a demonstration effect was felt to be even more important than the nutrition supplementation and education provided in reducing young child mortality and the prevalence of protein-calorie malnutrition. Thus, in communities where social or cultural factors play a greater role than absolute resource inadequacy in the etiology of malnutrition, nutrition monitoring appears to have a significant impact on mortality even in the absence of more expensive and more difficult-to-implement components such as nutrition supplementation or education.

4. Widespread Population Coverage. In contrast to the 15-20 percent of the population in need reached by health services in most developing countries, the coverage of the projects reviewed was remarkably complete. In many cases, almost all the target population was surveyed at the project's outset and then served regularly thereafter. At Imesi, for example, over 95% of the village children were enrolled in the project, and they were seen once every two weeks on the average; in Northern Peru, more than 95 percent of the families consumed the full food ration provided over the project's life; the Hanover project screened over 90 percent of children in the project area; those projects offering immunizations report having reached 80 percent or more of the eligible children.

As such figures indicate, the projects got to the children at need and provided them with ongoing care. Given potentially effective measures, program

strategies that take them to the largest possible number of people in need are clearly important for success.

The vigorous outreach efforts that made this possible also appear in many of the projects to have reduced the class disparities in access to services that can typify more passive activities. The Jamkhed Project, for example, sent its health teams to the villages in the early mornings in order that they might be easily available to serve poor families before they had to leave for the fields.

5. Greater Reliance on Paramedical Personnel. Several of the projects experimented with ways of giving more responsibility to paramedical personnel for the provision of simple curative services in order to facilitate the broader population coverage just described. Narangwal reported considerable reduction in deaths from diarrheal and respiratory diseases by relying on family health workers to diagnose these problems, administer penicillin as necessary, and institute oral rehydration procedures handled principally by the mothers themselves. Similarly, the Kavar, Jamkhed, Hanover and Rural Guatemala II projects also relied heavily on paramedical personnel to deliver the services provided, all with considerable apparent impact on infant and child mortality.

6. Effective Training Programs. Several of the projects emphasized the importance of training. Although important differences existed and details are not always available, the most successful training programs, as in the Hanover, Narangwal and Rural Guatemala II projects, shared several common features: they were developed by health professionals thoroughly familiar with local problems, having themselves dealt with such problems under field conditions; active, on-the-job training was carried out under the guidance of experienced workers who could do the tasks required within the constraints of local conditions; continuing education based on frequent and regular meetings of field workers and supervisors was included; formal training was usually brief and carried out close to home. The value of field-oriented training was illustrated particularly by the Kavar experience, where the project investigators found that an initial overemphasis on formal education led to a village health worker preference for the provision of curative medical services to the detriment of preventive and public health activities.

The effective training programs were usually integrated with overall personnel systems which supported effective utilization of the training received by fostering the sense of satisfaction and motivation required for field personnel

effectiveness. Among other things, such systems featured the careful development and application of workable job descriptions, the provision of continuing, supportive supervision, and the delegation of an adequate degree of responsibility.

7. Other Nutrition and Health Measures. Not surprisingly, the experience of the 10 projects effectively confirmed the importance of nutrition for infant and child mortality reduction. The Narangwal data, for example, showed that each 10 percent decrease in weight-for-age brought an exponential increase in the probability of death. A child under three years of age weighing between 60 percent and 70 percent of the Harvard weight-for-age standard was 10 times more likely to die than was a child weighing over 80 percent of that standard. Nutrition considerations were incorporated in all but one of the seven more successful projects, compared with one of three earlier, less obviously successful ones.

Also, several specific nutrition program components appear to have made notable contributions. A pair of particularly promising nutrition approaches--nutrition supplements for expectant and nursing mothers and nutrition monitoring--have already been identified. Nutrition supplements for infants and children seem to have been effective in reducing mortality in the Northern Peru project, and to have had an important impact in the Narangwal and Rural Guatemala I and II projects.

To state that nutrition interventions as a class are inherently superior to health interventions as a class, though, would require much more solid evidence than these studies provide. As noted, a number of health measures--maternal immunization against tetanus, increased reliance on paramedical personnel--were also very promising. Child immunization programs were widely used, with apparent effect. All but one of the seven more obviously successful projects included some kind of health component as well as a nutrition element. And under some circumstances, the health interventions employed appear to have been more effective than theparticular nutrition components that were used. At Narangwal, for example, the cost of preventing an infant or child death was lower in the medical care area than in the nutrition care area for all but the very youngest age groups; the Rural Guatemala II investigators attributed 70 percent of the observed mortality decline to their health interventions, 30 percent to their nutrition intervention efforts. In neither case, apparently, was it possible to reach the individual children in greatest need at the right time and with enough additional food to realize fully the inherent potential of a nutrition supplement program.

All this argues for pragmatism and flexibility. The projects point to a

number of nutrition and health components that seem to work well, but they do not support a dogmatic statement that any given component or family of components works best under all circumstances. It seems fairly clear, in fact, that no overall judgment concerning the inherent desirability of nutrition relative to health interventions is possible on the basis of the projects reviewed. The most effective projects seem to have featured a judicious mix of both nutrition and health components, a mix that has differed from place to place in response to the dramatically different epidemiological, social, economic, and political conditions that exist in the heterogenous Third World. The projects' experience also suggests that the mix will need to vary according to the relative importance attached to different aspects of program performance. Take, for example, the hints from Narangwal that nutrition interventions may be more effective in stimulating physical growth and reducing mortality at very early ages (particularly through maternal nutrition programs) while medical interventions may in general be more effective in reducing mortality among older children. Under such circumstances, the relative importance accorded each component would depend on the priority attached to saving new-born babies relative to, say, toddlers 2-3 years of age. The Narangwal data suggest that more neonatal deaths can be averted than deaths at later ages for any given amount of money; and averting deaths at younger ages could have the further effect of promoting the kind of climate necessary for full parental commitment to the child, which would in turn improve the child's physical and mental well-being throughout the critical early years and beyond. On the other hand, toddlers might well be considered more "valuable" by both parents and economists in light of the considerable psychological and economic resources already invested in them.

Or, perhaps it might be argued, emphasis should not be on mortality reduction efforts but rather on program components that promote physical growth, in line with an overall policy emphasizing the capacities and qualities rather than the quantities of people who constitute society.

To the degree that the Narangwal findings are more widely relevant, any policy decision of this nature would raise the importance of nutrition relative to health inputs.

These are difficult questions to which there are no easy answers. The absence of easy answers, coupled with the situational differences noted earlier,

argues against unduly strenuous efforts to "fine tune" intervention programs by identifying certain components as undeniably most effective. Better to go toward the community with an open mind, and to be guided by what is found upon arrival.

General Considerations.

Beyond the effectiveness of the individual project components and of different component mixes are other more general considerations influencing the projects' overall impact on infant and child mortality.

Two themes emerge from a consideration of the 10 projects together.

The first concerns the degree to which the individual projects departed from the mold of Western physician and institution-based medicine; the second has to do with the unusual effectiveness with which the projects' service programs were organized, administered, and directed.

AVAILABLE DATA ON INFANT MORTALITY RATE, EGYPT

I. INFANT MORTALITY RATE BY GOVERNORATE

Governorate	Number of Infant Deaths per 1,000 Liye Eirths	
	Ministry of Health 1973	El Rafie. 1976
Ismailia	74	-
Damietta	85	67
Dakhalia	79	66
Sharkieh	89	-
Qalyoubieh	118	95
Kafr El-Sheikh	55	-
Gharbia	99	87
Menoufia	115	110
Beheira	71	-
Guiza	109	86
Beni Suef	106	48
Fayoum	97	93
Menia	103	105
Asyout	98	81
Souhag	88	67
Quena	75	53
Aswan	132	106
Port Said	48	-
Suez	60	-
Alexandria	103	-
Cairo	128	-

II. INFANT MORTALITY DUE TO DIARRHEA IN EGYPT*

	1965	1970	1972
Total deaths during the first year of life	138,120	135,067	137,688
Deaths from diarrhea during first year of life	73,167	66,066	63,090
Infant Mortality Rate	113	116	116
Infant Mortality rate due to diarrhea	59.9	56.9	53.1

*K.A.H. Murad et al. Gaz. of Egyp. Ped. Ass. 26: 83-94,1977.