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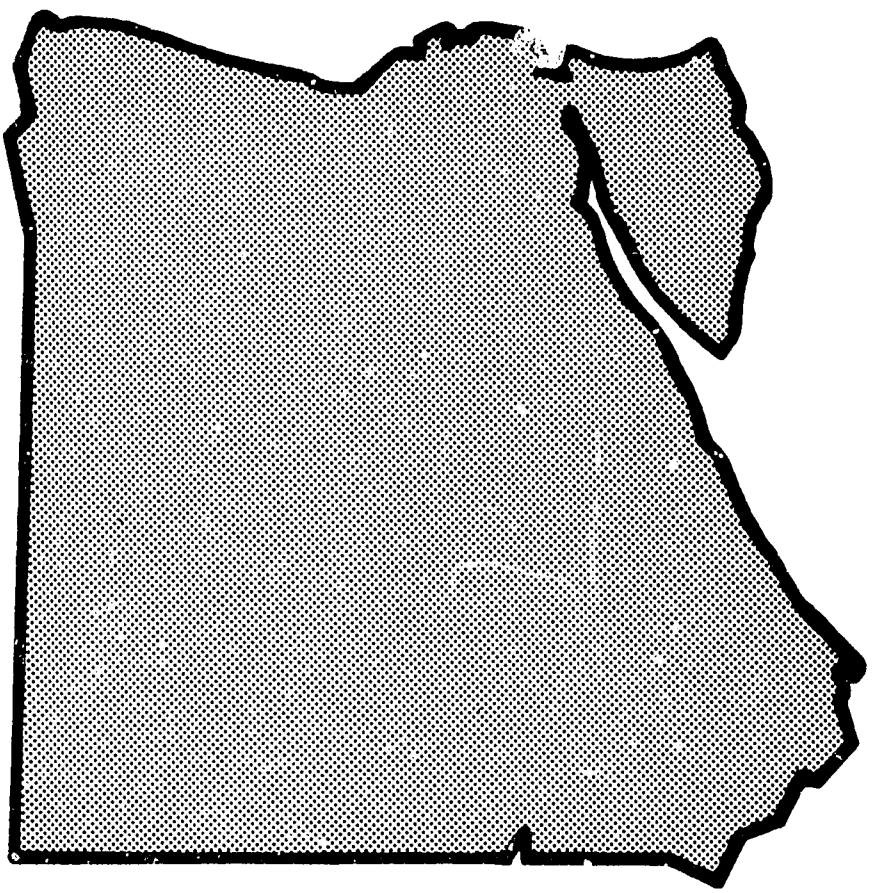
ARAB REPUBLIC OF EGYPT
Nutrition Status Survey II



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U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
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ARAB REPUBLIC OF EGYPT

NUTRITION STATUS SURVEY II, 1980

conducted by

The Nutrition Institute
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PREFACE

In October 1979 the Egyptian National Nutrition Institute in collaboration with the U.S. Agency for International Development (USAID)/Cairo convened a workshop to review the results of the 1978 Arab Republic of Egypt (ARE) National Nutrition Status Survey, as well as the results of other surveys carried out in Egypt to that point in time. In contrast to the results from many of the earlier surveys, a low prevalence of acute undernutrition was found in the 1978 ARE National Nutrition Status Survey. The participants suggested that one reason for this low prevalence was that the 1978 survey was carried out during a season when there is little diarrheal illness. The workshop participants recommended that a repeat survey be carried out during a season of expected higher diarrhea prevalence. In April 1980 the USAID mission in Cairo received a request from the Egyptian National Nutrition Institute for financial and technical support in carrying out a repeat survey.

The Nutrition Institute and USAID/Cairo agreed to perform a follow-up survey in August and September 1980 in two of the six rural areas surveyed in the 1978 ARE National Nutrition Status Survey. The Nutrition Division, Center for Health Promotion and Education, Centers for Disease Control (CDC), Atlanta, provided technical consultation and analyzed the survey data.

INTRODUCTION

A follow-up nutritional status survey was performed in 1980 in two (one in upper and one in lower Egypt) of the six rural universes originally surveyed in the 1978 ARE National Nutrition Status Survey.[1] This follow-up survey was carried out during a period of suspected high incidence of diarrheal illness, August and September, immediately following Ramadan, a month of fasting with special dietetic characteristics.

Between January and April 1978, the Nutrition Institute of the Egyptian Ministry of Health completed a national nutritional status survey of preschool children. A total of 9,794 children, aged 6 months through 71 months inclusive, were included in the survey. Among 5,336 rural children, 2.4 percent had acute undernutrition (i.e. "wasting"), defined as a weight-for-height less than 85 percent of the National Center for Health Statistics/Centers for Disease Control[2] (NCHS/CDC) reference median while only 0.7 percent were less than 80.0 percent of the reference median weight-for-height. Twenty-three percent had evidence of chronic undernutrition (i.e. "stunting"), defined as a height-for-age less than 90.0 percent of the NCHS/CDC reference median. While chronic undernutrition was significantly more common among rural children in Upper Egypt than in Lower Egypt ($p<.01$), there were no significant differences in the prevalence of acute undernutrition between villages of Upper and Lower Egypt.

The weight-for-height index, which relates body mass to length or stature, is used as the primary index for assessing the prevalence of wasting. Inadequate

food intake of a few weeks duration, diarrheal illness, and other catabolic illnesses may rapidly lead to this condition. In Egypt, January through April is considered a period of low incidence for diarrheal illness and July through September is considered a period of high incidence for acute diarrheal illness. Consequently a survey carried out in late summer, a season of known high prevalence of diarrhea, might be expected to show a higher prevalence of acute undernutrition than one carried out in a nondiarrheal season of the year. Seasonal differences in prevalences would be useful in documenting the significance of undernutrition as a public health problem in Egypt.

This follow-up survey also provided an opportunity to search for temporal changes in anemia prevalence among both children and mothers and in breast-feeding and weaning practices. Information was also collected to evaluate countrywide efforts to improve the mother's awareness of oral rehydration methods as a treatment of acute diarrheal diseases and to determine the availability and utilization of oral rehydration salts. Limitations of the survey methodology preclude the identification of specific etiologies for any temporal or seasonal changes in nutrition, physiology, or behavior that may have taken place.

OBJECTIVES AND GOALS

The objective of the 1980 ARE Nutrition Status Survey was to obtain nutritional status information on preschool-age children in well-defined rural regions (universes) for comparison with the results from these same two regions which were surveyed during the 1978 ARE National Nutrition Status Survey.

Toward this objective, this report presents information from and makes comparisons between the 1978 and 1980 surveys regarding:

(a) Prevalence and distribution of acute and chronic undernutrition in children aged 6 months through 71 months during two periods 18 months apart;

(b) Prevalence and distribution of diarrheal disease in preschool children in two different seasons;

(c) Prevalence and distribution of acute undernutrition (wasting) among children with and without recent acute diarrheal disease;

(d) Prevalence and distribution of anemia and clinical signs of selected micronutrient deficiencies;

(e) Duration of breast-feeding and patterns of weaning;

(f) Associations between nutritional status and age; and

(g) Associations of nutritional status with season and diarrheal illness.

The overall survey goal was to determine whether or not there were seasonal or temporal differences in nutritional status and to identify at-risk groups and risk factors for undernutrition. This information will permit administrators to better interpret the results of the 1978 Survey in order to more effectively establish priorities and to design, initiate, and evaluate intervention programs.

SURVEY METHODOLOGY

The 1980 Survey adopted, wherever possible, the content and methods used in the 1978 Survey.

For the 1978 Survey the rural populations of 17 governorates were grouped into six rural universes (four in Lower Egypt and two in Upper Egypt) for sampling, data collection, and data comparison. A rural universe included all villages with populations less than 10,000 people within defined geographical boundaries. For the 1980 Survey two of the rural universes with widely differing prevalences of acute undernutrition as determined by the 1978 Survey were selected; one of these was from Lower Egypt (universe 1) and one from Upper Egypt (universe 5). Universe 1 has a rural population of 970,000 and consists of Damietta and Kafr El Sheik governorates. Universe 5 has a rural population of 3,243,000 people and consists of El Giza, El Fayoum, Beni Suief, and El Minia governorates. The two universes chosen for the 1980 survey were selected primarily for logistical ease - not because they were especially characteristic of the rural universes.

A two-stage population proportionate sampling method was used to identify both the sample sites (villages) in each universe as well as the starting households within each sample village which were to be visited. For the 1978 Survey the Central Agency for Public Mobilization and Statistics (CAPMAS) selected 30 sample villages in each universe from the 1976 census figures using a systematic sampling technique. The 1980 Survey utilized the same villages in both universe 1 and universe 5. In both surveys the second stage of sampling identified the starting household in each sample site by random selection from a complete household list of the village.

The survey team collected data on 30 consecutive children aged 6 months through 71 months beginning with the starting household and proceeding clockwise to the next closest household. Therefore, the households included in 1980 were different from those in 1978.

This sampling methodology permits prevalence estimates of approximately the same precision in each universe. The methodology also permits the use of standard testing to determine significant differences between the two surveys for each universe and between universes for each survey.

The three teams for the collection of data were each composed of a physician, nutritionist and a social worker, all members of the 1978 Survey staff. Team members received a 1 week refresher course which emphasized techniques for interviewing and data recording, measuring children, and drawing of blood specimens. Following review and practice in performing weight and height measurements, each teams' performance was tested and standardized for anthropometric accuracy and precision using a procedure adapted from Habicht.[3]

Data collection took place during August and September 1980. The three teams worked concurrently in each universe. They recorded sample site, household and survey child identification, age, birth order, data on breast-feeding and weaning, measurements of weight and height, illness history including history

of recent acute diarrhea, socioeconomic data, and knowledge of oral rehydration concepts*. Staff from the Nutrition Institute and CDC provided field supervision.

Hemoglobin values were determined on capillary blood from every fifth child and his or her mother. The same biochemist was responsible for performing all hemoglobin determinations at central field points within 36 hours of blood collection. Results were recorded on the questionnaires.

The completed forms were processed at CDC. Computer analysis included editing of data for consistency, computation of anthropometric indices, tabulation of data according to predefined specifications, and computation of statistical precision.

DATA PRESENTATION

Three indices of physical growth are commonly used to describe the nature and extent of malnutrition in children: weight-for-height, height-for-age, and weight-for-age. Weight-for-height (body mass in relation to body length) provides an estimate of current nutritional status, either undernutrition or over nutrition. Height-for-age is an index of linear growth and reflects past nutritional status. The weight-for-age index (Gomez Classification[4]), although commonly used, is a composite index and does not distinguish between

*The form used in the 1980 Survey is presented in the appendix. It is identical to the 1978 survey form except that questions regarding household water supplies, cooking fuel and electricity were omitted in 1980 and questions about use of oral rehydration salts were added.

a child who is underweight because of thinness and one who is underweight because of shortness. Data for all anthropometric indices are presented as percentages of the NCHS/CDC reference median values.[5]

In the report of findings of the 1978 Survey, wasting (severe acute undernutrition) was defined as less than 80.0 percent of the reference median weight-for-height. Children whose weight-for-height was 80.0-84.9 percent of the reference median were classified as having moderate acute undernutrition.

Because of the very low prevalence of severe acute undernutrition (less than 80.0 percent of reference median weight-for-height) in 1978 and the necessity of having sufficient numbers to make valid comparisons, the entire category of acute undernutrition (less than 85.0 percent of reference median weight-for-height) is used in the present analysis. Children whose weight-for-height was 120.0 percent of the reference median or greater were considered overweight.

Children whose height-for-age was less than 90.0 percent of the reference median were considered stunted. Children whose weight-for-age was less than 75.0 percent of the reference median were equivalent to the Gomez classifications of second and third degree malnutrition combined.[4]

Waterlow and others[6] have suggested a two-way classification method using height-for-age and weight-for-height which permits the categorization of children as normal in both indices; stunted alone; wasted alone; or concurrently wasted and stunted, a category with measurably greater morbidity and mortality risk. In this report the term wasting refers to children whose weight-for-height values were less than 85.0 percent of the reference median.

All P-values presented are based on t- test distribution of sample site means. All significance testing was done at the 95% level ($P<.05$). In the text, P-Values are indicated whenever the P is less than or equal to (.05).

RESULTS

Questionnaires were completed on 900 preschool children in each of the two universes. Data analysis in 1980 is based on 895 children in universe 1 (in lower rural Egypt) and 888 children in universe 5 (in upper rural Egypt) for whom complete, reliable data are available. The 1978 Survey data for both universes were used for comparisons. In 1978 reliable data were available for 880 children in universe 1 and 892 children in universe 5.

(1) Age Distribution

The age distribution of survey children in the 1978 and 1980 Surveys is presented in Table 1 . The age distribution in universe 1 in 1980 differs from that in 1978. The mean age in this universe is significantly lower in 1980 ($p<.02$) and is due to the fact that 14.2 percent of universe 1 survey children in 1980 were in the group aged 6-11 months compared with 8.3 percent aged 6-11 months in 1978. The percentage of children in other age groups in this universe was similar in 1978 and 1980. The age distributions and the mean age in universe 5 in the 1978 and 1980 surveys were not significantly different.

(2) Weight-for-Height

The mean weight-for-height percent of reference median values for each age group is shown in Table 2. Preschool children were thinner in the 1980 survey than in the 1978 survey in both universes. Significance values for the comparison of the 1978 and 1980 surveys are also shown in Table 2.

The prevalences of acute undernutrition are presented in Table 3. In both surveys, the prevalence of acute undernutrition was greater in universe 5 than in universe 1 (1978: $p=.003$; 1980: $p<.001$). In 1980 more preschool children had acute undernutrition than in 1978 in both universes ($p<.001$). In virtually all age groups, the prevalence of acute undernutrition was greater in 1980. The general shift toward thinness in both universes can be readily seen in Figures 1 and 2.

(3) Height-for-Age

Table 4 compares the mean height-for-age percent of median values of survey children in 1978 and 1980. For all survey children the mean height-for-age percent of median was greater in 1980 than in 1978 in both universes. In universe 1 this increase was predominantly among children aged 24-35 months and in universe 5 among children in the 36-47 and 48-59 month age groups.

The prevalence of chronic undernutrition by age in both surveys is shown in Table 5. In both universes the prevalence of stunting for all age groups was lower in 1980 than in 1978. The height-for-age distributions are depicted in Figures 3 and 4.

In both 1978 and 1980, stunting was more common in universe 5 than in universe 1 (1978: $p<.001$; 1980: $p<.001$). The prevalence of stunting was lowest in the group aged 6-11 months. The predominant increase in prevalence of stunting occurred in the three age groups 12-47 months.

(4) Weight-for-Age

The mean weight-for-age percent of median values for each age group are presented in Table 6. For all age groups combined, the mean values in universe 5 were less than those for universe 1 in both 1978 and 1980 (1978: $p<.001$; 1980: $p<.001$). These decreases were greatest in the 12-23 month age group. In universe 5 a large decrease occurred in the 6-11 and the 60-71 month age groups as well.

Weight-for-age prevalences at various cutoff points are shown in Table 7. The prevalence of combined second and third degree Gomez classes of undernutrition is greater in 1980 than 1978 for each universe (universe 1: $p=.003$; universe 5: $p=.042$). Also, the prevalence of both Gomez classes is greater in universe 5 than universe 1 for each year (1978: $p<.001$; 1980: $p<.001$). Within each universe the greatest increases occurred in the two age groups

6-11 months and 12-23 months. Weight-for-age distributions are graphically presented in Figures 5 and 6.

(5) Wasting, Stunting, and Concurrent Wasting and Stunting (Waterlow Classification)

The prevalence of wasting only, stunting only, and concurrent wasting and stunting (based on the Waterlow cross-classification[6] of weight-for-height and height-for-age) is presented in Table 8.

From 1978 to 1980 the prevalence of wasting increased in both universes with the predominant increase occurring in the two age groups 6-11 months and 12-23 months.

The prevalence of stunting only, decreased between 1978 and 1980 with the decrease being statistically significant in universe 5 ($p<.002$).

From 1978 to 1980 the prevalence of concurrent wasting and stunting increased in both universe 1 ($p=.02$) and universe 5 ($p=.001$) and occurred primarily in the younger age groups.

(6) Diarrhea

Diarrhea prevalences are presented in Table 9. In both surveys a case of diarrhea was defined as 4 or more watery stools per day for more than 2 days during the preceding 7 days. In 1978 the

prevalences of diarrhea in both universes were essentially the same, 9 and 11 percent. In the 1980 survey, diarrhea prevalences increased substantially in both universes to 16 percent in universe 1 ($p<.006$) and 17 percent in universe 5 ($p<.03$). The increase in diarrhea prevalence, although not statistically significant, was greatest in the three age groups 6-11 months, 12-23 months, and 24-35 months. These prevalences are similar to that found in a comparable survey of the Arab Republic of Yemen conducted in the late summer of 1979 (16%) and lower than that found in a survey conducted in the Republic of Haiti in the late summer of 1978 (44%).

(7) Breast-Feeding, Food Supplementation, and Weaning Practices

Data were available for 932 children aged 6-35 months in 1978 and 939 children of the same age in 1980 on the use of major food sources. The percentage of survey children using different food sources by selected age groups at the time of the 1978 and 1980 surveys is shown in Table 10. At the time of interview in 1980, significantly more children aged 6-11 months were breast-feeding exclusively than in 1978 (Universe 1: $p<.001$; Universe 5: $p<.02$). Conversely, fewer children aged 6-11 months were receiving a food supplement.

The age of completed weaning from breast-feeding for children aged 24-71 months at the time of the 1978 and 1980 surveys is shown in Table 11. In 1980 a greater percentage of children were weaned completely by 23 months-of-age than in 1978.

(8) Anthropometry and Diarrhea

The mean weight-for-height percent of median for all preschool children with and without diarrhea is presented in Table 12. In both universes in 1978 the mean weight-for-height percent of median in all preschool children with diarrhea did not differ statistically from that in children without diarrhea. On the other hand, in 1980 in both universes the mean weight-for-height percent of median for all preschool children with diarrhea is substantially less than the mean in those without diarrhea (universe 1: $p<.002$; universe 5: $p<.001$).

The prevalence of acute undernutrition in all preschool children with diarrhea is compared to those without diarrhea in Table 13. In 1980 in both universes, the prevalence of acute undernutrition was higher in children with diarrhea. These differences were statistically significant only in universe 5 ($p<.003$), and this increase was found predominantly in the 6-35-month-age group.

The combined second and third degree Gomez classes and mean weight-for-age percent of median of children less than age 24 months with and without a history of diarrhea is shown in Table 14. In 1978 the mean weight-for-age values are not different for children with diarrhea than those without diarrhea, but in 1980 the mean values are significantly lower in both universes for children with diarrhea (universe 1: $p<.05$; universe 5: $p<.03$).

The prevalences of combined second and third degree undernutrition in children aged 6-23 months with and without a history of diarrhea are presented in Table 14.

It is interesting that a history of recent diarrhea was significantly associated with acute undernutrition in 1980, but not in 1978. Since the 1980 survey was done during a period of increased diarrheal illness, a history of recent diarrhea may represent diarrheal illness of longer duration (or more frequent) illness. Because diarrheal history was ascertained for the 7 days prior to the survey only, the frequency and duration of diarrheal illness in the 1980 survey children cannot be compared with the 1978 survey children. Although 1980 survey children may have suffered prolonged or more frequent bouts of diarrhea, this cannot be verified by available survey data.

Increased rates of recent diarrhea can only partially account for the difference in nutritional status between the 1978 and 1980 survey. Children surveyed in 1980 were more likely to be acutely undernourished than children in 1978 regardless of a history of diarrhea. In universe 5, in 1980, 9% of children without history of diarrhea were acutely undernourished compared with 2% in 1978 ($p<0.001$), in universe 1, 4% of children without a history of diarrhea were acutely undernourished compared with 1% in 1978 ($p<0.005$), (Table 13). Part of the increased risk of acute undernutrition in 1980 survey children without history of diarrhea may have been due to diarrheal illness occurring more than 7 days prior to the interview and thus not elicited by the questionnaire; however, this speculation cannot be verified by available survey data.

(9) Anthropometry, Breast-Feeding, and Diarrhea

As noted previously, a substantial increase in the prevalence of children aged 6-11 months breast-feeding only was noted from 1978 to 1980. Table 15 shows the mean weight-for-height percent of median for children in two categories: (1) breast-feeding only and (2) breast-feeding with food supplementation or not breast-feeding at all. The data suggest no consistent differences between the two groups.

Prevalences of acute undernutrition, combined second and third degree undernutrition, and diarrhea are shown in Table 16 for children aged 6-11 months in the same two food source categories. Among children aged 6-11 months in 1980, the prevalence of diarrheal illness for children breast-feeding only was not significantly greater than for children breast-feeding with food supplementation or not breast-feeding at all.

(10) Hemoglobin Status (Preschool Children)

The prevalence of hemoglobin values below 11.0 gm/100 ml in 1978 and 1980 is shown in Table 17. Children with a hemoglobin value below 11.0 gm/100 ml are considered anemic. For all preschool children the prevalence of anemia has not significantly changed in universe 1 or universe 5 between 1978 and 1980. In 1980 as in 1978, the highest prevalence of anemia occurred in the two age groups 6-11 months and

12-23 months. In both surveys the prevalence of anemia in universe 5 was greater than in universe 1 (1978: $p<.001$; 1980: $p=.09$). In 1978 and 1980 in both universes, anemia was more common in stunted children than in children with normal stature (Table 18).

(11) Hemoglobin Status (Mothers)

The hemoglobin data available on mothers of survey children are not representative of the general population of women in Egypt since only those women with at least one child aged 6 months through 71 months were included in the survey. Survey criteria for anemia in nonpregnant women, whether lactating or not, is a hemoglobin value less than 12 gm/100 ml. In pregnant women a value less than 11.0 gm/100 ml indicates anemia, while a hemoglobin value less than 9.5 gm/100 ml indicates more severe anemia. The distribution of hemoglobin values among all mothers of survey children in 1980 in both universes has remained essentially unchanged from that in 1978 (Table 19).

(12) General Illness and Fever

The percent of preschool children with general illness in the 7 days preceding the survey interview is presented in Table 20. The percent with a recent history of fever as indicated by the mother is shown in Table 21. Among all preschool children in universe 5, the prevalence of both indices increased in 1980. For general illness, increases have occurred in all age groups 12 months and older in universe 5 and

ages 36 months and older in universe 1. The greatest increases in the prevalence of fever occurred in the age groups between 6 months and 35 months in universe 5 and ages 24-35 months in universe 1.

(13) Angular Stomatitis

Angular stomatitis was observed in 10.3 percent of the universe 1 population in 1980. Although this represents a sizable increase from the 1978 rate (4.0 percent), the difference was not statistically significant. In universe 5 the 1980 rate (3.2 percent) approximated the 1978 findings (2.8 percent). In both universes in 1980, the prevalence of angular stomatitis increased with increasing age of the survey children.

(14) Signs of Vitamin D Deficiency

As in the 1978 survey, the interviewers observed the presence or absence of six clinical signs commonly associated with vitamin D deficiency. These signs included: craniotabes, frontal bossing, rachitic rosary or deformed chest, enlarged wrist or double malleoli, leg deformity (bowing) in children aged 12 months or older, and open anterior fontanelle in children aged 24 months or older. In both surveys clinical signs of Vitamin D deficiency were infrequently found. No children with craniotabes were observed in either year. In 1980, 6 percent of all survey children in both universes had frontal bossing; 1.5 percent of the children (over 23 months of age)

surveyed had an open anterior fontanelle; 0.5% of the survey children had abnormally enlarged epiphysis of either wrist; and only one child each was identified with a rachitic rosary and bilateral bowing of the legs. The finding of a single sign in a child is not sufficient to diagnose Vitamin D deficiency. The likelihood of deficiency increases with an increasing number of signs occurring in a child. In 1980 no children in universe 5 and only two children in universe 1 had two or more signs of vitamin D deficiency.

(15) Other Clinical Signs

In 1978 the prevalence of a number of other clinical signs and symptoms was determined to be infrequent: night blindness (0.4 percent), pedal edema (0.2 percent), corneal scars (0.2 percent), and Bitot's spots (.04 percent). In the 1980 survey only one child was found with pedal edema; no children had Bitot's spots, corneal scars, or a history of night blindness.

(16) Knowledge and Use of Oral Rehydration Salts

Mothers of survey children with a recent history of diarrhea were asked if rehydration salts were used. In universe 1, 6.1 percent of the children with diarrhea received the salts. In universe 5, 17.8 percent of the affected children received salts.

More mothers in universe 5 (22.0 percent) knew about or used rehydration salts as a treatment for diarrheal illness than in universe 1 (14.5 percent).

Mothers using or with knowledge of rehydration salts acquired that knowledge mostly from local physicians in both universe 1 (92.4 percent) and universe 5 (74.7 percent). A much smaller number of mothers found out from neighbors or friends in universe 1 (7.6 percent) and universe 5 (15.2 percent).

SUMMARY

Comparison of the results of both Surveys reveal substantial changes in nutritional status indices between January-February 1978 and August-September 1980. These changes have occurred in the age group specific distribution of mean values and also in the prevalence of undernutrition as defined by values below selected cutoff points. The differences in results between the surveys reflect the intermingled effects of seasonal variations in diarrheal illness and feeding habits as well as long term food and economic policies.

Specific identification and measurement of these ecologic factors are beyond the scope of the survey methodology. However linear-growth retardation (stunting) in preschool children, as measured by their height-for-age in comparison to that in a reference population, does provide an indication of the adequacy or inadequacy of long term patterns of food intake. Acute loss of body weight (wasting) and overweight, as measured by weight-for-height, reflects primarily the adequacy or inadequacy of recent food intake. The prevalence and severity of acute catabolic illnesses also affect these indicators. The prevalence of undernutrition as measured by weight-for-age in the 6-23-month-age group is a sensitive indicator of short term deficits in food intake and recent diarrheal and other catabolic illnesses.

In the 18-month period between the 1978 and 1980 surveys, the mean height-for-age percent of median of preschool children increased and the prevalence of stunting decreased in both rural areas. Increased growth and the presumed associated improvement in nutritional status of children in this population may be one measure of the effectiveness of long term national or governorate policies designed to produce improvement in agricultural productivity, food availability, and food distribution at the rural village level. In contrast to small improvements in the long term nutritional status of preschool children from 1978 to 1980, the short term nutritional status of children during the 1980 Survey deteriorated compared with the 1978 Survey. At least part of the deterioration may be explained by the seasonal increase in diarrheal illness.

In universe 1 in Lower Egypt and in universe 5 in Upper Egypt, preschool children were substantially thinner in August-September 1980 than in January-February 1978. The increased prevalences of wasting in all preschool children and an increased prevalence of low weight-for-age in children aged 6-23 months also support the fact that short term undernutrition was an important problem in the period immediately preceding the collection of data in 1980.

The significant differences between 1978 and 1980 in the prevalence of short term undernutrition in preschool children in the surveyed rural areas reflect changes in the continuous interplay of a number of manmade and natural factors that influence land use, crop selection, crop output, capital availability, food costs, eating patterns, water availability, and disease prevalence. The influence of each factor on the changes in nutritional status is unknown.

Diarrheal diseases can cause substantial losses in body weight in a relatively short period of time. Wasting, or acute loss of body mass, results from diarrheal illness because of fluid loss, lack of fluid replacement, lack of food intake, and increased catabolic demands. Diarrhea, as a cause of morbidity and mortality, is of special importance in the younger age groups.

During the 1978 and 1980 Surveys, data were collected on the prevalence of recent diarrheal episodes, fever, and general illness. In the 1980 Survey, a recent history of diarrheal illness was more common among 6-month to 35-month-old children than in 1978. Children in the 1980 survey with a history of recent diarrhea were thinner and more likely to be wasted than children without recent diarrhea. Detailed analysis to determine whether the age of a child with recent diarrheal illness is associated with the severity of short term weight loss is not possible due to the small numbers of children in each age group.

Changes in the patterns of breast-feeding, age of initial food supplementation, and age of completed weaning can directly affect both long and short term anthropometric indicators of nutritional status. Short term changes in the nutritional status of infants are particularly sensitive to these factors. Nutritional deficits resulting from the forced or elected adoption of a less optimal pattern of breast-feeding, food supplementation, and weaning during infancy may also be reflected in the long term as suboptimal-linear growth.

The duration of breast-feeding, the age a child first receives supplemental foods and the age a child completes the weaning process are dictated in general by the traditions of a society. Patterns may vary with season and changes occur because of new economic pressures, food availability, and educational programs. Traditionally, Egyptian mothers hesitate to introduce supplementary feeding during the summer months because of fear of diarrheal disease. The occurrence of seasonal variation is supported by the findings in August-September 1980 of significantly more children aged 6-11 months breast-feeding exclusively than in January-April 1978. Food supplementation also began at an older age in 1980 than in 1978.

Based on mother's recall for children aged 24-71 months not breast-feeding at the time of each survey, weaning had been completed at an earlier age in 1980 than in 1978. Earlier completion of weaning may reflect longer term changes in foods available and the ability of families to purchase the necessary foods.

Factors contributing to anemia include nutritional deficiency of iron and folate, blood loss, and chronic parasitic infections. The surveys do not define the individual contributions of these factors but, within the preschool age group, deficiency in absorbable dietary iron is thought to be the primary cause of anemia. High, but not increasing, prevalences of anemia in preschool children indicate this is a continuing problem in both rural areas. Increased anemia rates and decreased mean hemoglobin levels in preschool children, as a result of long term, inadequate dietary intake of protein and calories, suggest that their suboptimal diets lacked adequate absorbable iron as well.

The magnitude of the anemia problem in mothers with preschool children in 1980 remains substantial and at a comparable level with 1978 survey findings. The causes of this anemia in women of childbearing age include inadequate dietary iron in addition to blood loss, chronic infections, and the nutritional demands of pregnancy and lactation.

The survey findings in 1980, as in 1978, of only a small number of preschool children with angular stomatitis or clinical signs of vitamin D deficiency does not preclude the existence of foci of important vitamin deficiencies in both areas.

The 1980 survey results indicate that nearly one-fifth of recent diarrheal illnesses in preschool children were treated with oral rehydration therapy. Approximately one-fifth of the mothers of rural preschool children were aware of oral rehydration therapy as a treatment of diarrheal illness. Most of these mothers had acquired their knowledge of oral rehydration therapy from local physicians in rural primary health clinics.

CONCLUSION

Differences in the prevalence of acute undernutrition, diarrhea, and certain breast-feeding and weaning behaviors were identified in the two surveys. The cross sectional methodology used in these surveys, however, limits the identification of etiologic factors clearly affecting these prevalence changes. Identifying these etiologic factors can be made by a careful retrospective examination of the various agricultural, health, other social, and economic events that have taken place in these areas which may have affected overall growth and development of children.

The study of these factors can only occur through interministerial cooperation and introspection. Such factors as changes in agricultural policies, meteorological conditions, transportation, and purchasing power of rural Egyptians can be responsible for changing prevalences in health, nutrition, and behavioral conditions in rural areas.

Identification of factors related to nutrition and health status can form the basis for a national nutritional surveillance system and need to be actively examined. Do changes in these factors improve or cause deterioration of nutritional status? Can governmental policies be adjusted to prevent these factors from having an adverse effect on the quality of life? A surveillance system should be designed to monitor these various etiologic factors on a regular basis. It should also be appropriately placed in the governmental administrative structure to allow responses to changing conditions that may impact on the growth and development of Egyptian children.

The Ministry of Health has been actively promoting the use of oral rehydration fluid for the symptomatic treatment of diarrheal disease and dehydration since 1978. Oral rehydration salts are distributed selectively throughout Egypt and found in numerous rural and urban primary health clinics. Promotion of oral rehydration therapy in Egypt should include the use of intensive health and nutrition education efforts directed at mothers and school children. The Ministry should consider developing an outreach program to provide oral rehydration knowledge and therapy at the household and neighborhood level.

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Participants in Survey

The following personnel participated in the ARE Nutrition Status Survey II, 1980 and are from the Nutrition Institute, Ministry of Health, Cairo.

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Symbols

Quantity zero . . . . . -

Quantity more than zero but less than 0.5 0

Definitions

Acute Undernutrition:
  Weight-for-Height <85.0 Percent of Reference Median
Chronic Undernutrition:
  Height-for-Age <90.0 Percent of Reference Median

Gomez Classes of Undernutrition:
  Third Degree: Weight-for-Age <60.0 Percent of Reference Median;
  Second Degree: Weight-for-Age 60.0-74.9 Percent of Reference Median;
  First Degree: Weight-for-Age 75.0-89.9 Percent of Reference Median;
  Normal: Weight-for-Age >90.0 Percent of Reference Median

Waterlow Classes:
  Normal: Height-for-Age ≥90 Percent and
          Weight-for-Height ≥80 Percent of Reference Median;
  Wasting Only: Weight-for-Height <80 Percent and
                Height-for-Age ≥90 Percent of Reference Median;
  Stunting Only: Height-for-Age <90 Percent and
                 Weight-for-Height ≥80 Percent of Reference Median;
  Concurrent Wasting and Stunting:
          Weight-for-Height <80 Percent and
          Height-for-Age <90 Percent of Reference Median
  Anemia: Hemoglobin value <11 gm/100 ml.

Significance Testing

All significance testing was done at the 95% confidence level.
$P<.05$ is considered significant.

Table 1. Percentage Distribution of Preschool Children by Sex, Age Group, and Universe: Egypt, 1978 and 1980*

Universe 1

Age (Months)	Male 1978	Male 1980	Female 1978	Female 1980	Total 1978	Total 1980
6-11	4.3%	7.0%	4.0%	7.2%	8.3% (73)	14.2% (127)
12-23	11.6%	12.3%	11.3%	10.2%	22.8% (201)	22.5% (201)
24-35	10.7%	10.4%	9.7%	9.5%	20.3% (179)	19.9% (178)
36-47	9.5%	8.2%	9.1%	8.2%	18.6% (164)	16.3% (146)
48-59	8.3%	7.5%	7.8%	8.9%	16.1% (142)	16.4% (147)
60-71	6.8%	5.5%	6.9%	5.3%	13.8% (121)	10.7% (96)
TOTAL	51.3%	50.8%	48.8%	49.2%	100.0% (880)	100.0% (895)
Mean age ± S.E.					35.7± .7	33.6± .78**

Universe 5

Age (Months)	Male 1978	Male 1980	Female 1978	Female 1980	Total 1978	Total 1980
6-11	5.3%	6.1%	4.8%	6.1%	10.1% (90)	12.2% (108)
12-23	14.7%	11.7%	11.5%	10.9%	26.2% (234)	22.6% (201)
24-35	10.4%	12.4%	10.4%	8.4%	20.9% (186)	20.8% (185)
36-47	11.1%	10.7%	7.6%	7.7%	18.7% (167)	18.4% (163)
48-59	6.8%	7.2%	5.9%	7.7%	12.8% (114)	14.9% (132)
60-71	5.7%	6.6%	5.6%	4.5%	11.3% (101)	11.1% (99)
TOTAL	54.0%	54.7%	46.0%	45.3%	100.0% (892)	100.0% (888)
Mean age ± S.E.					33.2± .6	33.5± .6

*See page 27 for definitions and explanations of symbols and significance testing.
**1978 mean age significantly different than 1980 mean age ($p<.02$).

Table 2. Mean Weight-for-Height Percent of Median Values of Preschool Children by Age Group, and Universe: Egypt, 1978 and 1980 (NCHS/CDC Reference)*

Age (Months)	Universe 1			Universe 5		
	1978	1980	p value*	1978	1980	p value**
6-11	99.97	97.81	.206	100.83	92.01	<.001
12-23	100.31	94.23	<.001	96.82	91.25	<.001
24-35	103.19	100.69	.023	102.93	97.39	<.001
36-47	105.64	102.55	.012	106.06	100.18	<.001
48-59	105.40	100.84	<.001	104.29	99.52	<.001
60-71	101.87	101.12	.580	105.12	100.48	.001
TOTAL	102.91	99.16	<.001	102.18	96.41	<.001

*See page 27 for definitions and explanations of symbols and significance testing.
**Based on two-tailed t-test.

Table 3. Percentage Distribution of Preschool Children by Weight-for-Height Class, Age Group and Universe: Egypt, 1978 and 1980 (NCHS/CDC Reference)*

Universe 1

Weight-for-Height Class

Age (Months)	Acute Undernutrition 1978	Acute Undernutrition 1980	Normal 1978	Normal 1980	Overweight 1978	Overweight 1980	Total Number Examined 1978	Total Number Examined 1980
6-11	3%	6%	93%	93%	4%	2%	73	127
12-23	1%	11%	98%	89%	1%	0%	201	201
24-35	-	2%	97%	97%	3%	1%	179	178
36-47	-	1%	93%	96%	7%	3%	164	146
48-59	-	-	96%	98%	4%	2%	142	147
60-71	2%	2%	98%	97%	1%	1%	121	96
TOTAL	1%	4%	96%	94%	3%	1%	880	895
Age Adjusted	1%	4%	96%	94%	3%	1%		

Universe 5

Weight-for-Height Class

Age (Months)	Acute Undernutrition 1978	Acute Undernutrition 1980	Normal 1978	Normal 1980	Overweight 1978	Overweight 1980	Total Number Examined 1978	Total Number Examined 1980
6-11	2%	29%	98%	69%	-	2%	90	108
12-23	8%	22%	92%	77%	0%	0%	234	201
24-35	3%	9%	93%	90%	4%	2%	186	185
36-47	-	1%	90%	98%	10%	1%	167	163
48-59	-	4%	99%	95%	1%	1%	114	132
60-71	-	-	98%	98%	2%	2%	101	99
TOTAL	3%	11%	94%	88%	3%	1%	892	888
Age Adjusted	3%	11%	94%	88%	3%	1%		

*See page 27 for definitions and explanations of symbols and significance testing.

Table 4. Mean Height-For-Age Percent of Median Values of Preschool Children by Age Group and Universe: Egypt, 1978 and 1980 (NCHS/CDC Reference)*

Age (Months)	Universe 1			Universe 5		
	1978	1980	p value*	1978	1980	p value**
6-11	95.29	95.28	.990	93.56	93.78	.800
12-23	93.79	93.14	.300	91.07	91.55	.314
24-35	93.25	95.23	.002	91.36	92.40	.104
36-47	93.62	94.36	.172	91.49	93.11	.019
48-59	94.94	95.19	.620	92.32	93.52	.039
60-71	94.51	95.14	.279	92.72	91.86	.225
TOTAL	94.06	94.72	.042	91.75	92.68	.006

*See page 27 for definitions and explanations of symbols and significance testing.
**Based on two-tailed t-test.

Table 5. Percentage Distribution of Preschool Children by Height-for-Age Class, Age Group and Universe: Egypt, 1978 and 1980 (NCHS/CDC Reference)*

Universe 1

Height-for-Age Class

Age (Months)	Chronic Undernutrition <85.0 1978	Chronic Undernutrition <85.0 1980	Chronic Undernutrition 85.0-89.9 1978	Chronic Undernutrition 85.0-89.9 1980	Normal 90.0-94.9 1978	Normal 90.0-94.9 1980	Normal 95.0+ 1978	Normal 95.0+ 1980	Total Number Examined 1978	Total Number Examined 1980
6-11	1%	1%	3%	6%	36%	37%	60%	56%	73	127
12-23	2%	3%	19%	21%	41%	38%	38%	38%	201	201
24-35	3%	1%	16%	8%	48%	37%	34%	55%	179	178
36-47	4%	3%	19%	16%	39%	32%	38%	49%	164	146
48-59	1%	2%	7%	8%	43%	37%	49%	52%	142	147
60-71	2%	1%	8%	4%	43%	42%	47%	53%	121	96
TOTAL	2%	2%	14%	12%	42%	37%	42%	50%	880	895
Age Adjusted	2%	2%	13%	12%	42%	37%	42%	50%		

Universe 5

Height-for-Age Class

Age (Months)	Chronic Undernutrition <85.0 1978	Chronic Undernutrition <85.0 1980	Chronic Undernutrition 85.0-89.9 1978	Chronic Undernutrition 85.0-89.9 1980	Normal 90.0-94.9 1978	Normal 90.0-94.9 1980	Normal 95.0+ 1978	Normal 95.0+ 1980	Total Number Examined 1978	Total Number Examined 1980
6-11	6%	3%	11%	16%	46%	38%	38%	44%	90	108
12-23	9%	8%	32%	26%	39%	44%	19%	22%	234	201
24-35	12%	6%	26%	21%	42%	45%	19%	28%	186	185
36-47	10%	6%	23%	19%	44%	45%	23%	31%	167	163
48-59	11%	4%	21%	17%	39%	37%	29%	42%	114	132
60-71	2%	6%	22%	21%	46%	52%	31%	21%	101	99
TOTAL	9%	6%	24%	21%	42%	43%	24%	30%	892	888
Age Adjusted	9%	6%	24%	21%	42%	44%	25%	30%		

*See page 27 for definitions and explanations of symbols and significance testing.

Table 6. Mean Weight-for-Age Percent of Median Values of Preschool Children by Age Group and Universe: Egypt, 1978 and 1980 (NCHS/CDC Reference)*

Age (Months)	Universe 1			Universe 5		
	1978	1980	p value*	1978	1980	p value**
6-11	89.63	87.20	.368	86.12	78.98	.011
12-23	89.68	83.51	<.001	81.88	78.07	.003
24-35	91.47	92.21	.593	88.48	85.14	.030
36-47	93.86	92.35	.266	90.99	88.31	.136
48-59	96.15	92.28	.004	90.74	88.53	.132
60-71	92.29	92.82	.739	92.19	86.44	.003
TOTAL	92.23	89.82	.005	87.66	84.06	<.001

*See page 27 for definitions and explanations of symbols and significance testing.
**Based on two-tailed t-test.

Table 7. Percentage Distribution of Preschool Children by Gomez Class, Age Group and Universe: Egypt, 1978 and 1980 (NCHS/CDC Reference)*

Universe 1

Gomez Class

Age (Months)	Third Degree 1978	Third Degree 1980	Second Degree 1978	Second Degree 1980	First Degree 1978	First Degree 1980	Normal 1978	Normal 1980	Total Number Examined 1978	Total Number Examined 1980
6-11	1%	2%	8%	13%	43%	41%	48%	45%	73	127
12-23	0%	1%	9%	24%	45%	43%	45%	31%	201	201
24-35	-	-	6%	3%	36%	40%	59%	57%	179	178
36-47	-	-	5%	7%	35%	36%	60%	57%	164	146
48-59	-	-	1%	3%	27%	41%	72%	55%	142	147
60-71	-	-	4%	3%	36%	42%	60%	55%	121	96
TOTAL	0%	1%	6%	10%	37%	41%	57%	49%	880	895

Universe 5

Gomez Class

Age (Months)	Third Degree 1978	Third Degree 1980	Second Degree 1978	Second Degree 1980	First Degree 1978	First Degree 1980	Normal 1978	Normal 1980	Total Number Examined 1978	Total Number Examined 1980
6-11	2%	11%	14%	31%	46%	31%	38%	26%	90	108
12-23	3%	6%	24%	30%	51%	47%	22%	17%	234	201
24-35	1%	2%	12%	15%	40%	54%	47%	29%	186	185
36-47	-	1%	8%	6%	36%	55%	56%	38%	167	163
48-59	-	-	10%	5%	39%	54%	51%	41%	114	132
60-71	-	-	4%	5%	37%	65%	59%	30%	101	99
TOTAL	1%	3%	13%	16%	42%	51%	43%	30%	892	888

*See page 27 for definitions and explanations of symbols and significance testing.

Table 8. Percentage Distribution of Preschool Children by Waterlow Class, Age Group and Universe: Egypt, 1978 and 1980 (NCHS/CDC Reference)*

Universe 1

Waterlow Class

Age (Months)	Normal		Wasting Only		Stunting Only		Wasting & Stunting		Total Number Examined	
	1978	1980	1978	1980	1978	1980	1978	1980	1978	1980
6-11	93%	88%	3%	5%	4%	6%	-	1%	73	127
12-23	78%	68%	1%	8%	21%	21%	0%	2%	201	201
24-35	82%	89%	-	2%	18%	8%	-	-	179	178
36-47	77%	79%	-	1%	23%	19%	-	-	164	146
48-59	92%	90%	-	-	8%	10%	-	-	142	147
60-71	88%	94%	2%	1%	10%	4%	-	1%	121	96
TOTAL	83%	83%	1%	3%	16%	13%	0%	1%	880	895
Age Adjusted	83%	83%	1%	3%**	16%	13%	0%	1%**		

Universe 5

Waterlow Class

Age (Months)	Normal		Wasting Only		Stunting Only		Wasting & Stunting		Total Number Examined	
	1978	1980	1978	1980	1978	1980	1978	1980	1978	1980
6-11	83%	59%	-	22%	14%	12%	2%	6%	90	108
12-23	56%	54%	3%	12%	36%	24%	5%	10%	234	201
24-35	61%	70%	-	3%	36%	22%	3%	6%	186	185
36-47	68%	75%	-	-	32%	23%	-	1%	167	163
48-59	68%	75%	-	4%	32%	21%	-	-	114	132
60-71	76%	73%	-	-	24%	27%	-	-	101	99
TOTAL	66%	67%	1%	7%	31%	22%	2%	5%	892	888
Age Adjusted	67%	67%	1%	6%**	31%	22%**	2%	5%**		

*See page 27 for definitions and explanations of symbols and significant testing.
**Significant at P <.05

Table 9. Percentage of Preschool Children with Recent History of Diarrheal Illness by Age Group and Universe: Egypt, 1978 and 1980*

Age (Months)	Universe 1				Universe 5			
	1978		1980		1978		1980	
	Percent	Number	Percent	Number	Percent	Number	Percent	Number
6-11	17%	69	32%	124	19%	88	29%	108
12-23	14%	197	22%	195	14%	230	26%	195
24-35	9%	173	15%	173	12%	180	23%	182
36-71	4%	401	7%	384	6%	365	8%	386
TOTAL	9%	840	16%	876	11%	863	17%	872
Age Adjusted	9%		15%		11%		17%	

*See page 27 for definitions and explanations of symbols and significance testing.

Table 10. Percent Distribution of Preschool Children by Food Source at Time of Survey by Age Group and Universe: Egypt, 1978 and 1980*

Universe 1

Food Source	Age (Months) 6-11 1978	6-11 1980	12-17 1978	12-17 1980	18-23 1978	18-23 1980	24-35 1978	24-35 1980
Breast-Feeding Only	16%	40%	4%	10%	1%	2%	-	1%
Breast-Feeding With Food Supplement	71%	51%	83%	62%	44%	34%	8%	5%
Not Breast-Feeding	13%	9%	14%	28%	55%	64%	92%	94%
Total Number	68	124	103	82	93	112	171	171

Universe 5

Food Source	Age (Months) 6-11 1978	6-11 1980	12-17 1978	12-17 1980	18-23 1978	18-23 1980	24-35 1978	24-35 1980
Breast-Feeding Only	22%	42%	7%	11%	2%	2%	-	-
Breast-Feeding With Food Supplement	74%	55%	81%	74%	56%	53%	16%	13%
Not Breast-Feeding	3%	3%	12%	15%	42%	45%	84%	87%
Total Number	89	91	140	93	89	89	179	177

*See page 27 for definitions and explanations of symbols and significance testing.

Table 11. Age Patterns of Completed Weaning
In Preschool Children (Aged 24-71 Months) by Universe:
Egypt, 1978 and 1980*

	Age in Months at Completion of Weaning								Total Number	
	<6		6-11		12-23		24+			
	1978	1980	1978	1980	1978	1980	1978	1980	1978	1980
Universe 1	2.9%	5.3%	5.5%	6.0%	49.4%	61.4%	42.2%	27.3%	547	531
Universe 5	2.4%	4.9%	3.8%	3.0%	49.2%	57.4%	44.6%	34.8%	500	535

*See page 27 for definitions and explanations of symbols and significance testing.

Table 12. Mean Weight-for-Height Percent of Median Values
school Children Of All Ages by

Table 12. Mean Weight-for-Height Percent of Median Values for Preschool Children Of All Ages by Recent History of Diarrheal Illness and Universe: Egypt, 1978 and 1980*

Recent Diarrhea	Universe 1				Universe 5			
	1978		1980		1978		1980	
	Mean	Number	Mean	Number	Mean	Number	Mean	Number
Yes	101.89	73	96.16	136	101.12	93	92.16	151
No	102.91	767	99.59	740	102.25	770	97.18	721

*See page 27 for definitions and explanations of symbols and significance testing.

Table 13. Prevalence of Acute Undernutrition in Preschool Children by Recent History of Diarrheal Illness and Universe: Egypt, 1978 and 1980 (NCHS/CDC Reference)*

Recent Diarrhea	Universe 1				Universe 5			
	1978		1980		1978		1980	
	Percent	Number	Percent	Number	Percent	Number	Percent	Number
Yes								
Age (Months)								
6-35	-	55	8%	109	8%	71	28%	122
36-71	-	18	-	27	-	22	-	29
TOTAL	-	73	7%	136	6%	93	23%	151
Age Adjusted			7%		7%		23%	
No								
Age (Months)								
6-35	1%	384	6%	383	4%	427	16%	364
36-71	1%	383	1%	357	-	343	2%	357
TOTAL	1%	767	4%	740	2%	770	9%	721
Age Adjusted	1%		4%**		2%		9%**	

*See page 27 for definitions and explanations of symbols and significance testing.
**Significant at P <.005.

Table 14. Combined Second and Third Degree Gomez Classes and Mean Weight-for-Age Percent of Median Values in Preschool Children (Aged 6-24 Months) by Recent History of Diarrheal Illness and Universe: Egypt, 1978 and 1980 (NCHS/CDC Reference)*

Recent Diarrhea	Universe 1						Universe 5					
	1978			1980			1978			1980		
	Second and Third Degree	Number	Mean	Second and Third Degree	Number	Mean	Second and Third Degree	Number	Mean	Second and Third Degree	Number	Mean
Yes	15%	40	87.02	27%	83	83.03	29%	49	84.58	47%	81	74.96
No	9%	226	89.94	19%	236	85.89	24%	269	82.49	35%	223	79.55

*See page 27 for definitions and explanations of symbols and significance testing.

Table 15. Mean Weight-for-Height Percent of Median Values in Preschool Children (Aged 6-11 Months) by Breast-Feeding Status and by Universe: Egypt, 1978 and 1980 (NCHS/CDC Reference)*

	Universe 1				Universe 5			
	1978	Number	1980	Number	1978	Number	1980	Number
Breast-Feeding Only	103.01	48	96.10	63	99.20	66	94.75	50
Other**	99.22	20	96.89	61	100.73	23	90.22	41

*See page 27 for definitions and explanations of symbols and significance testing.
**Other = Breast-feeding with food supplementation or not breast-feeding.

Table 16. Prevalences of Acute Undernutrition, Combined Second and Third Degree Gomez Classes, And Diarrheal Illness for Preschool Children Aged 6-11 Months by Breast-Feeding Status and by Universe: Egypt, 1978 and 1980 (NCHS/CDC Reference)*

Universe 1

	1978				1980			
	Breast-Feeding Only		Other**		Breast-Feeding Only		Other**	
	Percent	Number	Percent	Number	Percent	Number	Percent	Number
Acute Undernutrition	4%	48	-	20	5%	63	7%	61
Combined Second and Third Degree Gomez Classes	10%	48	10%	20	8%	63	20%	61)
Diarrhea	21%	48	10%	20	38%	63	26%	61

Universe 5

	1978				1980			
	Breast-Feeding Only		Other*		Breast-Feeding Only		Other*	
	Percent	Number	Percent	Number	Percent	Number	Percent	Number
Acute Undernutrition	2%	66	4%	23	36%	50	15%	41
Combined Second and Third Degree Gomez Classes	20%	66	9%	23	52%	50	34%	41
Diarrhea	23%	66	9%	22	30%	50	27%	41

*See page 27 for definitions and explanations of symbols and significance testing.
**Other = Breast-feeding with food supplement or not breast-feeding.

Table 17. Mean Hemoglobin (gm/100 ml) Values and Prevalence of Anemia in Preschool Children by Age Group and Universe: Egypt, 1978 and 1980 (NCHS/CDC Reference)*

Universe 1

Age (Months)	Mean Hemoglobin (S.D.) 1978	Mean Hemoglobin (S.D.) 1980	Percent Anemic 1978	Percent Anemic 1980	Total Number Examined 1978	Total Number Examined 1980
6-23	10.5 (1.5)	10.7 (1.5)	65%	56%	54	72
24-71	11.8 (1.4)	11.5 (1.4)	25%	27%	122	104
TOTAL	11.4 (1.5)	11.2 (1.5)	37%	39%	176	176

Universe 5

Age (Months)	Mean Hemoglobin (S.D.) 1978	Mean Hemoglobin (S.D.) 1980	Percent Anemic 1978	Percent Anemic 1980	Total Number Examined 1978	Total Number Examined 1980
6-23	10.0 (1.4)	10.1 (1.5)	74%	66%	65	53
24-71	11.1 (1.4)	11.1 (1.5)	43%	41%	114	122
TOTAL	10.7 (1.5)	10.8 (1.5)	54%	49%	179	175

*See page 27 for definitions and explanations of symbols and significance testing.

Table 18. Prevalence of Anemia
in Preschool Children by Height-for-Age Class
and Universe:
Egypt, 1978 and 1980 (NCHS/CDC Reference)*

Height-for-Age Class	Universe 1				Universe 5			
	1978		1980		1978		1980	
	Percent	Number	Percent	Number	Percent	Number	Percent	Number
Chronic Undernutrition	63%	19	48%	21	64%	66	63%	48
Normal	34%	157	37%	155	49%	113	43%	127

*See page 27 for definitions and explanations of symbols and significance testing.

Table 19. Percentage Distribution of Hemoglobin Values (gm/100 ml) in Mothers of Survey Children: Egypt, 1978 and 1980*

Non-Pregnant Mothers

	Universe 1		Universe 5	
Hemoglobin Value	1978	1980	1978	1980
<9.5	7%	2%	1%	5%
9.5-10.9	11%	12%	10%	11%
11.0-11.9	10%	14%	11%	13%
≥12.0	73%	72%	78%	71%
Total Number Examined	132	145	135	135

Pregnant Mothers

	Universe 1		Universe 5	
Hemoglobin Value	1978	1980	1978	1980
<9.5	6	4%	3%	3%
9.5-10.9	23%	22%	28%	24%
11.0-11.9	26%	37%	25%	27%
≥12.0	46%	37%	44%	47%
Total Number Examined	35	27	36	34

*See page 27 for definitions and explanations of symbols and significance testing.

Table 20. Percentage of Preschool Children With General Illness in the 7 Days Preceding Survey Interview, by Age Group and Universe: Egypt, 1978 and 1980*

Age (Months)	Universe 1				Universe 5			
	1978		1980		1978		1980	
	Percent	Number	Percent	Number	Percent	Number	Percent	Number
6-11	23%	69	20%	124	20%	88	23%	108
12-23	19%	197	20%	195	13%	230	24%	196
24-35	15%	173	18%	173	12%	180	25%	182
36-71	11%	401	17%	384	6%	364	16%	386
TOTAL	15%	840	18%	876	11%	862	21%	872
Age Adjusted	15%		18%		11%		21%	

*See page 27 for definitions and explanations of symbols and significance testing.

Table 21. Percentage of Preschool Children With Recent Subjective Fever History, by Age Group and Universe: Egypt, 1978 and 1980*

Age (Months)	Universe 1				Universe 5			
	1978		1980		1978		1980	
	Percent	Number	Percent	Number	Percent	Number	Percent	Number
6-11	17%	69	19%	124	22%	88	28%	108
12-23	18%	197	18%	195	16%	230	24%	195
24-35	14%	173	20%	173	13%	180	21%	182
36-71	12%	401	13%	384	13%	366	12%	386
TOTAL	14%	840	16%	876	14%	864	19%	871
Age Adjusted	15%		16%		14%		19%	

*See page 27 for definitions and explanations of symbols and significance testing.

FIGURE 1.
Cumulative Distribution of Survey Children by Weight-for-Height Standard Deviations
Universe 1, 1978 and 1980, Egypt

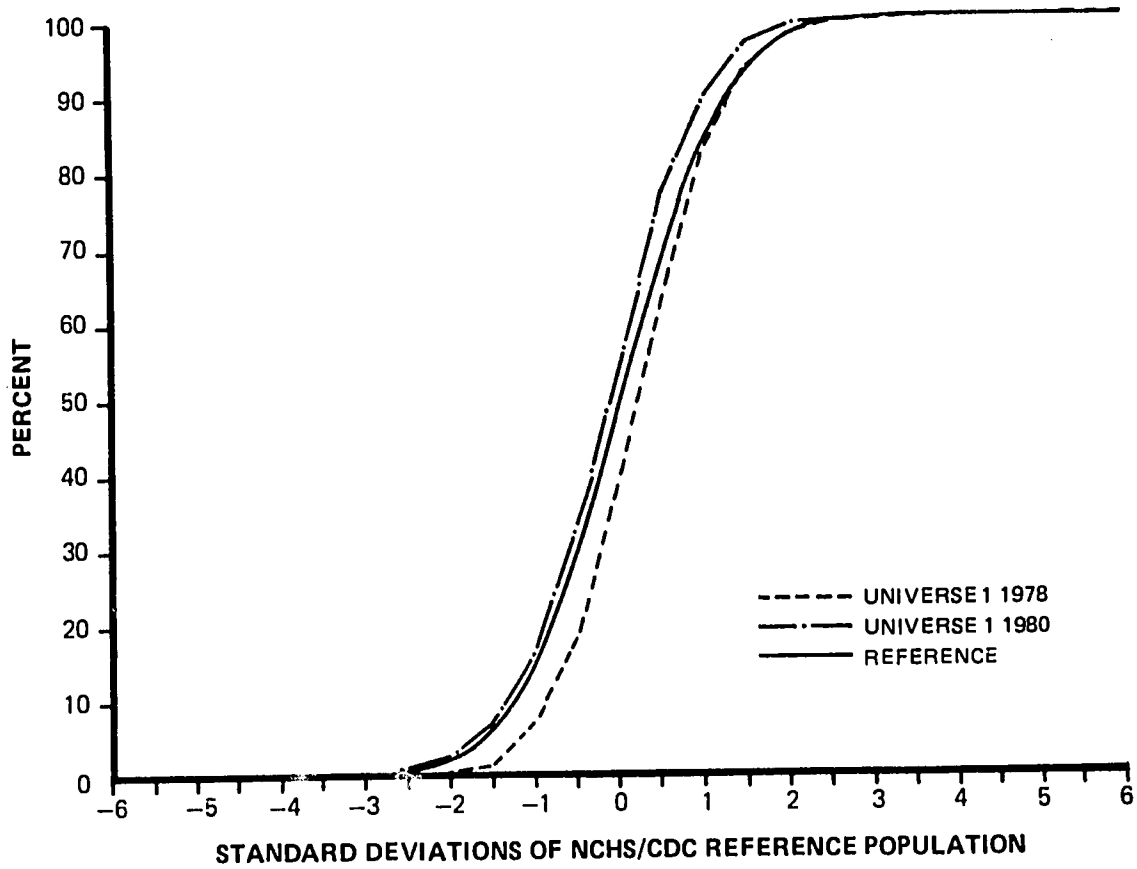


FIGURE 2.
Cumulative Distribution of Survey Children by Weight-for-Height Standard Deviations
Universe 5, 1978 and 1980, Egypt

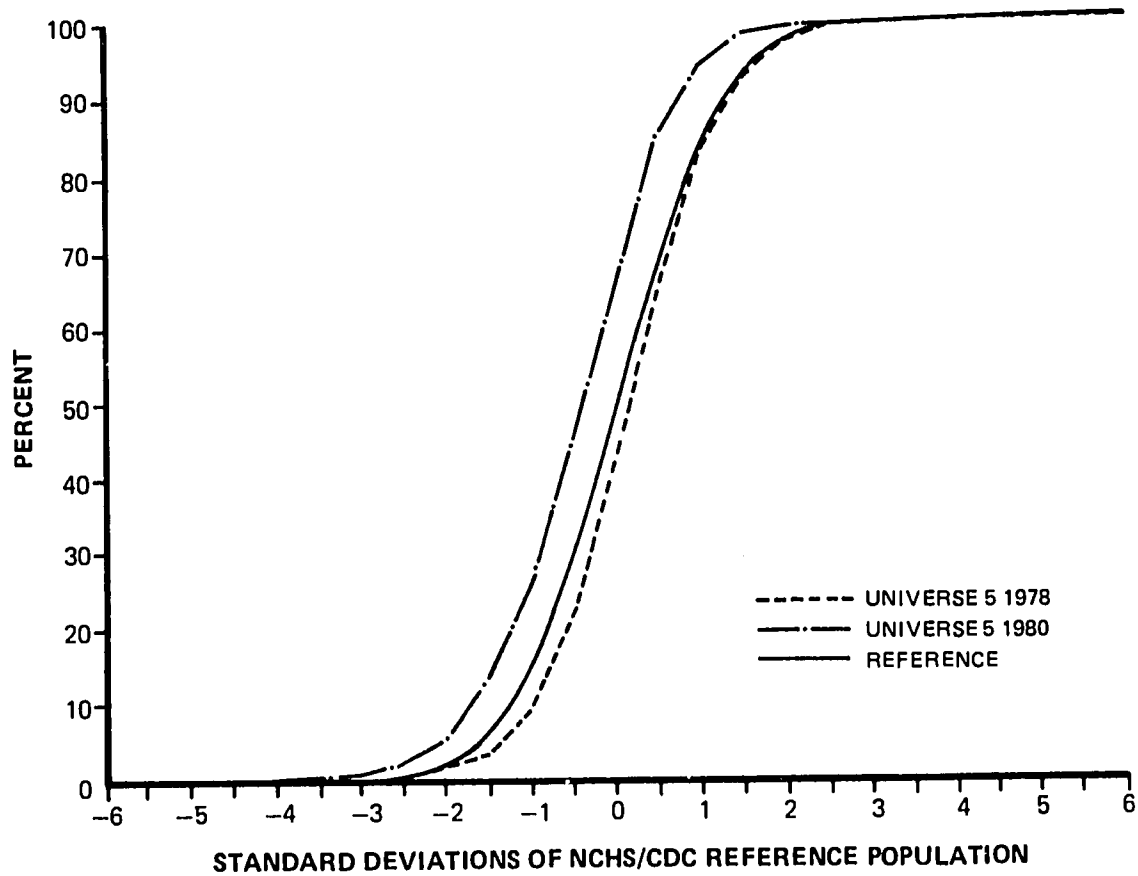


FIGURE 3.
Cumulative Distribution of Survey Children by Height-for-Age Standard Deviations
Universe 1, 1978 and 1980, Egypt

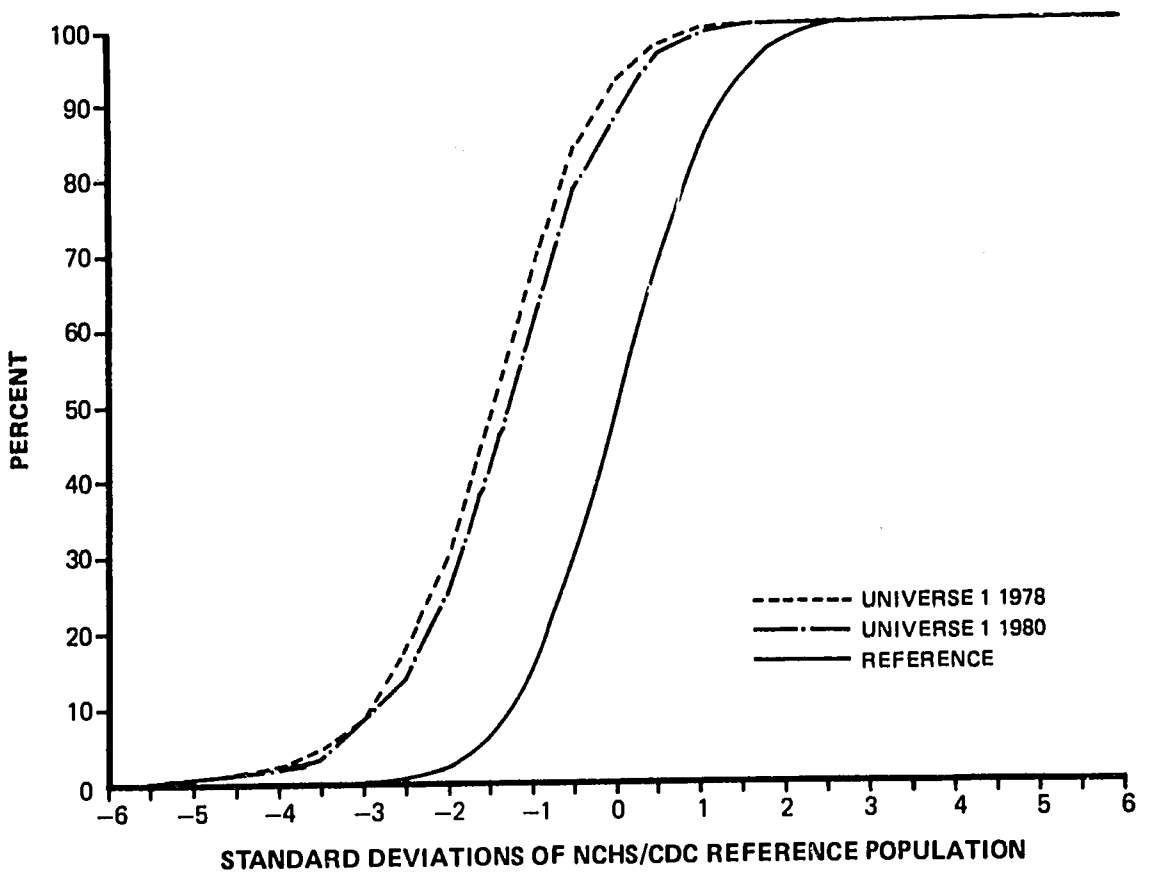


FIGURE 4.
Cumulative Distribution of Survey Children by Height-for-Age Standard Deviations
Universe 5, 1978 and 1980, Egypt

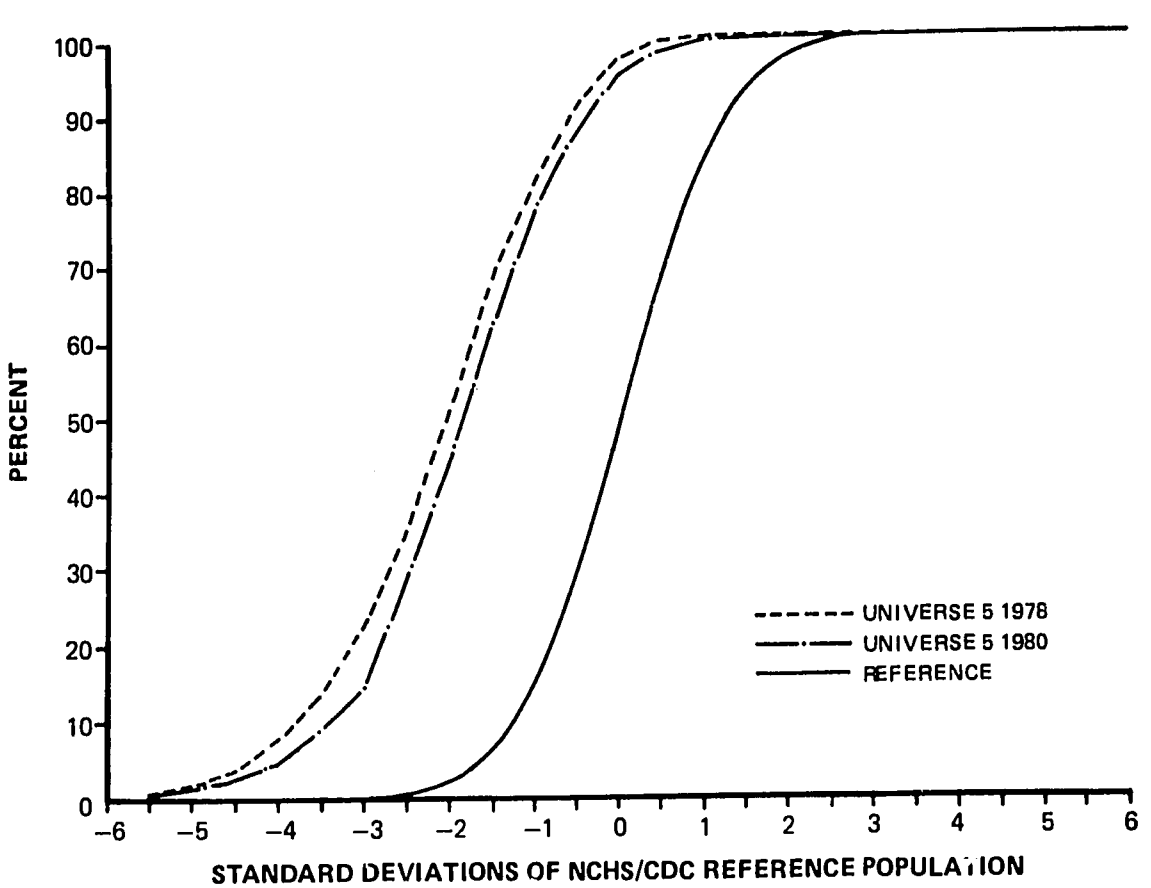


FIGURE 5.
Cumulative Distribution of Survey Children by Weight-for-Age Standard Deviations
Universe 1, 1978 and 1980, Egypt

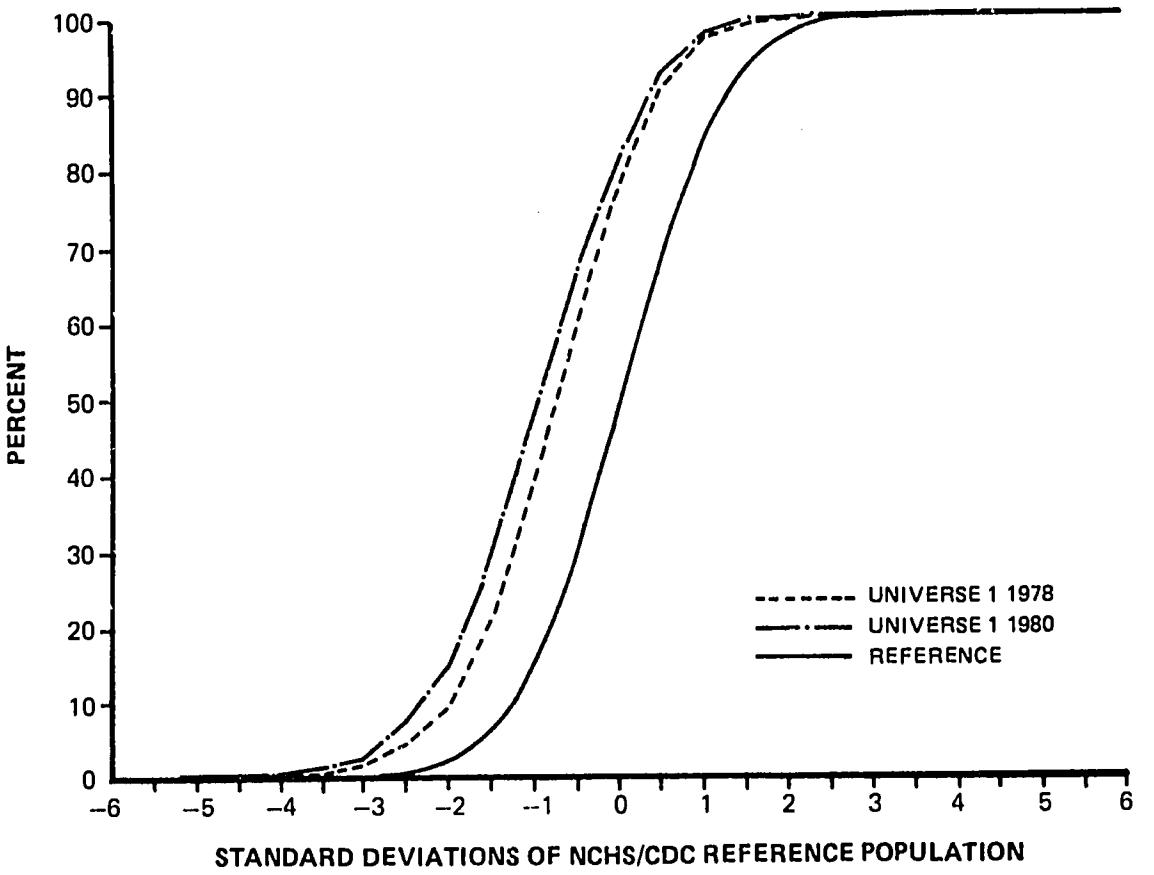
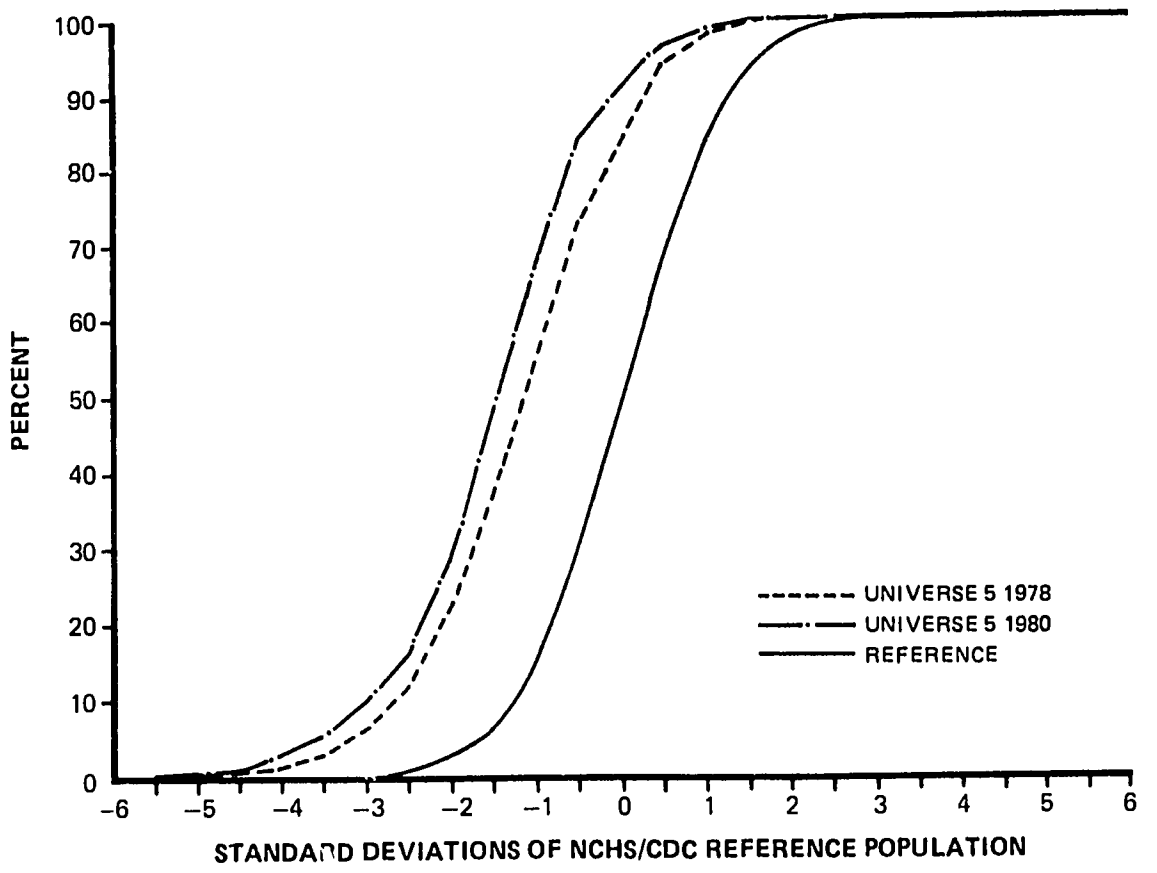


FIGURE 6.
Cumulative Distribution of Survey Children by Weight-for-Age Standard Deviations
Universe 5, 1978 and 1980, Egypt



APPENDIX

ARE Nutritional Status Survey II
1980

I.D. INFORMATION

Universe (1-2) | Governate (3-4) | Sample Site # (5-7) | House Hold (8-9) | I.D. (10-11) | Mother (12) | Team (13) | Date of Visit: Month, Day, Year (14-19)

HOUSEHOLD INFORMATION

Child Name _____ Sex (20) 1 M 2 F

H.H. Head Name _____

Household Size (21-22)

Child < 6 mos. (23) 1 yes 2 no

AGE DATA

Date of Birth: Month, Day, Year (24-29)

Age in Mos. (30-31)

Source for age data (32) 1 Verified Record 2 Estimate

Birth Order (33-34)

MOTHER DATA (35)

1 Present
2 Absent

Mother only - ask:

"Are you pregnant?" (36) 1 yes 2 no 9 unknown

"Are you breast feeding any child?" (37) 1 yes 2 no 9 unknown

"Is this child presently breast feeding at all?" (38) 1 yes 2 no 9 unknown

If no: "At what age did this child last take any breast milk?"

(39) 1 < 3 mos. 2 3-5 mos. 3 6-11 mos. 4 12-17 mos. 5 18-23 mos. 6 24+ mos. 9 unk.

"At what age did you first introduce 'other' foods to this child?"

(40) 1 < 3 mos 2 3-5 mos. 3 6-11 mos. 4 12-17 mos. 8 not yet given 9 unk.

Mother only: "In the past seven (7) days has this child:

a) been sick, that is, has been unable to carry on normal daily activities such as playing, eating, etc?" (41) 1 yes 2 no 9 unk

b) had fever for more than two (2) days?" (42) 1 yes 2 no 9 unk

c) had diarrhoa, that is, four (4) or more watery stools per day for more than two (2) days?" (43) 1 yes (Go to d) 2 no (Go to e) 9 unk

d) If yes to c):
Are you giving child rehydration salts? (44) 1 yes (Go to f) 2 no 9 unk

e) If no or unknown to c):
Have you heard about rehydration salts for treatment of diarrhea in children?" (45) 1 yes 2 no 9 unk

f) If yes to d):
Who told you about rehydration salts?" (46) 1 Doctor 2 Nurse 3 Dayah 4 Neighbor or friend 5 Other 9 Unk

FATHER DATA (47)

1 Present
2 Absent

"Can you read and/or write?" (48) 1 yes 2 no

If "yes"

"What is the highest certificate you hold?"

(49) 1 none 2 primary or equiv. 3 preparatory or equiv. 4 secondary or equiv. 5 college or higher

"What is your present full time occupation?" (see manual) (50-51)

MEASUREMENTS

Weight (52-54) ___.___ kg

Height (55-58) ___.___ cm.

Bilateral Pedal Edema (59) 1 yes 2 no 9 unknown

EYE EXAMINATION

Bitot Spots (either eye) (60) 1 yes 2 no 9 unknown

Corneal Scar (either eye) (61) 1 yes 2 no 9 unknown

Total Sight Loss (either eye) (62) 1 yes 2 no 9 unknown

Conjunctivitis (either eye) (63) 1 1+ 2 2+ 3 3+ 4 None 9 unknown

EYE HISTORY

History of Total Loss of Sight (one or both eyes) (64) yes → If "yes" cause: 2 congenital 4 infection 3 trauma 9 unknown; 1 no; 8 unk

If child is 2 years or greater ask:
"Does this child have night blindness?" (65) 1 yes 2 no 9 unknown

CLINICAL SIGNS

Does the child have Angular Stomatitis? (66) 1 yes 2 no

Does the child have:

Cranio tabes (67) 1 yes 2 no

Frontal Bossing (68) 1 yes 2 no

Chest Rachitic Beading (69) 1 yes 2 no

Enlarged Wrists (70) 1 yes 2 no

Open Ant. Fontanelles (71) 1 yes 2 no

Leg Deformity (72) 1 yes 2 no

LAB WORK

Child's blood drawn (75) 1 yes 2 no

Child's Hemoglobin (76-78) ___.___ gms.

Filter papers taken (79) 8 none 1 one 2 two

Mother's blood drawn (80) 1 yes 2 no

Mother's Hemoglobin (81-83) ___.___ gms.