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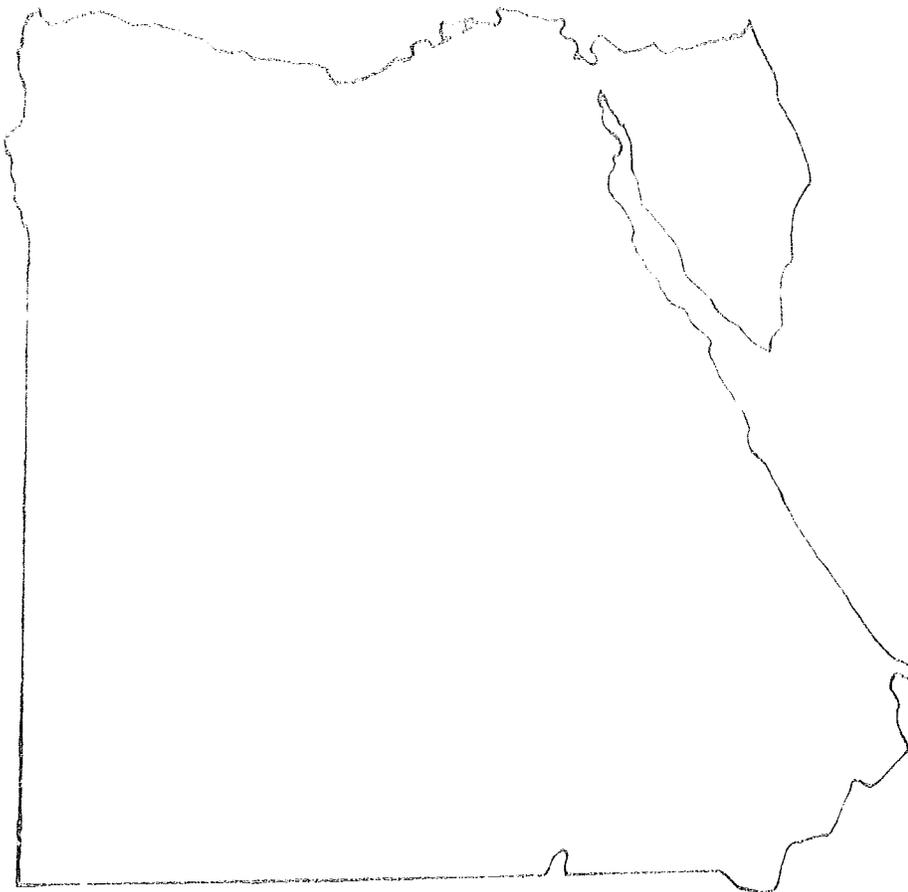
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ARAB REPUBLIC OF EGYPT

National Nutrition Survey

Summary Report and Recommendations



1978

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

ARAB REPUBLIC OF EGYPT
NUTRITION STATUS SURVEY, 1978

conducted by

The Nutrition Institute
Ministry of Health
Arab Republic of Egypt

with the assistance of the

U.S. Department of Health, Education, and Welfare
Public Health Service
Center for Disease Control

in cooperation with the

United States Agency for International Development
Department of State
Washington, D.C.

Summary Report
October, 1978
Revised September 1979

HIGHLIGHTS

In 1978, the Nutrition Institute, Ministry of Health, Arab Republic of Egypt, with the assistance of the Center for Disease Control, Atlanta, Georgia, U.S.A. and the support of the Agency for International Development, Washington and Cairo, conducted a national survey of the nutritional status of Egyptian children of preschool age. The survey's primary purpose was to provide data on the prevalence and regional distribution of protein-energy malnutrition and anemia, and some of their principle correlates. Using population proportionate sampling, 30 survey sites were selected in each of 9 geographically and demographically defined areas (universes) in the 17 Egyptian Governorates which comprise Upper and Lower Egypt. Two additional universes were surveyed in those districts of metropolitan Cairo and Alexandria in which more than 90 percent of the population were classified as "uneducated." The survey obtained data on a total of 11,677 children.

The overall prevalence of retarded linear growth (stunting) consistent with chronic undernutrition, was 21.2 percent in the representative sample (universes 1-9). Rural Upper Egypt had a significantly higher prevalence of stunting than rural Lower Egypt, and urban populations had lower prevalences than rural populations. Extrapolating to the total population in these nine universes, over 1 million Egyptian children from 6 months to 6 years of age are stunted.

Acute undernutrition (wasting) was observed in 0.6 percent of these children. Extrapolating to the same total population, some 30,000 of these children are wasted. Moderate wasting was found in 1.7 percent of the representative sample. About 3 percent of the children in this sample were categorized as being overweight.

The overall prevalence of anemia was 38.4 percent in the total representative sample. Extrapolating to the total population in these nine universes, some 1.4 million Egyptian children in this age range are anemic. A lower prevalence of anemia was found with increasing population size and urbanization.

Although acute undernutrition is not a significant public health problem in this sample of Egyptian children, both chronic undernutrition and anemia must be considered problems of moderate magnitude.

ARAB REPUBLIC OF EGYPT
NUTRITION STATUS SURVEY, 1978

INTRODUCTION

The Nutrition Institute, Ministry of Health, Arab Republic of Egypt, with the assistance of the Center for Disease Control, U.S. Department of Health, Education, and Welfare, conducted a nutrition status survey in Egypt between December 1977 and April 1978. The primary purposes of this survey were to determine, for selected populations, the prevalence of retarded linear growth and wasted body mass among children of preschool age, the prevalence of anemia among these children and their mothers, and the frequency of selected clinical, dietary, demographic, and socio-economic characteristics and their relationships with the nutrition status of the children.

METHODS

1. Sampling

The Arab Republic of Egypt (excluding the Sinai Peninsula) covers an area of 1,002,000 km² (386,200 miles²) in the Northeast corner of the African continent. In 1976 nearly 99 percent of the country's 36.6 million persons lived in 3.5 percent of the country's area, within the valley and the delta of the Nile. The 1976 census classified 44 percent of the population as urban. The country is divided, for administrative purposes, into 25 Governorates. All of the Egyptian people living in 17 of these Governorates comprised the population from which the representative survey sample was drawn. The eight Governorates south of Cairo along the Nile Valley are

designated as Upper Egypt and the nine Governorates north of Cairo in the Nile Delta as Lower Egypt. In these 17 Governorates 900 children were studied in each of nine geographically or demographically defined subpopulations (universes) using a population proportionate, two-stage sampling method which permits valid comparisons to be made between rural and urban populations, and between the rural populations of Upper and Lower Egypt. Within each survey site a starting household, randomly selected from a listing of all houses, and a cluster of nearby households was visited until a total of 30 children within the survey's age range had been examined in each of 30 sample sites within each universe. In four other Governorates, designated as urban, comprising metropolitan Cairo-Giza and Alexandria, a similar sample of 900 children was examined in each of these two universes from those districts in which more than 90 percent of the population was classified as "uneducated" (Table 1). For this survey, the four remaining Governorates of Egypt were excluded due to the relatively small and sparsely distributed populations in these regions. Since completion of this survey, similar survey methods have been and are being employed in these Governorates.

2. Logistics

Eight 3-person survey teams, each consisting of a physician, a social worker and a dietician were trained to administer the survey questionnaire, weigh and measure the children, and obtain blood specimens for hemoglobin determinations. Accuracy and reproducibility

of their measurements were emphasized during 3 weeks of intensive training. The teams measured the length or stature of each survey child to the nearest 0.1 cm with a specially constructed portable measuring board.¹ Weight was determined to the nearest 0.1 kg using a Salter hanging scale. The presence or absence of pedal edema was elicited by firm thumb pressure for 3 seconds on the dorsal surface of both feet. Blood specimens, on a 20 percent subsample of children and their mothers, were obtained for hemoglobin determination. A brief clinical examination was done, searching for classical signs of vitamin deficiencies in the skin and mucous membranes. Data were also collected on certain socio-economic characteristics, and on infant feeding and weaning practices.

A special group of 1,883 children 6 to 72 months of age from socio-economically advantaged families and from private nursery schools in Cairo was also examined. The anthropometric and hematologic indices on these children provide a reasonably valid estimate of the potential nutritional status attainable by the preschool age population of Egypt.

3. Anthropometric Indices

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.^{2,3,4,5} Weight-for-height, body mass in relation to body length, provides an estimate of current nutritional status, either under or over nutrition. Height-for-age is an index of linear growth and reflects past nutritional status. The weight-for-age index, although commonly used, is a composite

index and cannot distinguish between a child who is underweight because of thinness from one who is underweight because of shortness.

Data for all anthropometric indices are presented as percentages of the NCHS/CDC reference median values.* These median values are comparable to those of the commonly used Stuart-Meredith reference values of height-for-age and weight-for-age. The NCHS/CDC data set's larger number of children, more representative sampling, direct calculation of weight-for-height, and more complete statistical description permit improved statistical precision in analyzing anthropometric data.⁶

Children whose weight-for-height values are less than 80 percent of the NCHS/CDC median values are observably thin and are considered wasted, or acutely undernourished. Children with values between 80 and 85 percent of the reference median are considered moderately, acutely undernourished. Use of this intermediate classification permits the identification of a wider spectrum of acute undernutrition and places the problem in broader perspective. Children whose weight-for-height is 120 percent or greater than NCHS/CDC median values are considered overweight. Children whose height-for-age is less than 90 percent of the reference median are considered stunted, or chronically undernourished. Children whose weight-for-age is less than 75 percent of the reference median are equivalent to the Gomez classifications of second or third degree malnutrition.²

*Based on data from a representative sample of the U.S. population⁶

Waterlow has suggested a two-way classification method of using the height-for-age and weight-for-height indices which permits categorizing children as "normal" in both indices, stunted alone, wasted alone, or concurrently stunted and wasted, a category with measurably greater morbidity and mortality risk.⁵

RESULTS

The survey gathered data from 11,677 children of preschool age (Table 2). Questionnaires on 106 additional children were excluded because of obvious errors in age estimation or body measurement data. The age and the sampling procedures for the special group, and for the less advantaged metropolitan areas of Cairo-Giza and Alexandria were different from those used in the first nine universes. They cannot be considered representative of the general populations in these large cities. Data from these sources are shown separately from the total representative sample.

1. Acute Undernutrition

Table 3 presents the distributions of weight-for-height values in the various geographic areas and in the special group. For the total representative sample only 0.6 percent of the children were acutely undernourished, while 3.1 percent were overweight. In this same group 1.7 percent of the children can be considered as moderately undernourished. Results suggest an association of acute illness with weight-for-height values up to 85 percent of median. Prevalences of acute undernutrition and of overweight varied among geographic areas. These differences have little practical meaning because of the overall low prevalence rates.

The weight-for-height distribution curves for the survey children, the special group, and the NCHS/CDC reference population are shown in Figure 2. The curves for both groups of Egyptian children are similar. These children tend to be somewhat heavier than the U.S. children.

2. Chronic Undernutrition

The height-for-age distribution is shown in Table 4. The prevalence of chronic undernutrition ranges from 10.6 to 27.5 percent among the various geographic or demographic areas. Rural Upper Egypt has a significantly higher prevalence than rural Lower Egypt. Prevalences in the non-rural populations are lower, with a decreasing gradient with increasing urbanization. The prevalence of chronic undernutrition among children from the less-advantaged population of Cairo-Giza (19.0 percent) and Alexandria (15.7 percent) is between that of the rural and urban populations. The 1.1 percent prevalence seen in the special group is only 1/19 the prevalence seen in the representative sample and is similar to that found in well-nourished U.S. and European populations.

Figure 3 shows the distribution of the height-for-age values for the survey group, the special group, and the NCHS/CDC reference population. The curve of the special group follows almost exactly the reference population, while the survey group children are shorter by about 1.5 standard deviations.

The distribution of weight-for-age values is shown in Table 5 and is presented in a tabulation similar to the Gomez classification of undernutrition. The highest prevalence of second and third degree undernutrition is in the rural areas of Egypt. The low weight-for-age values are primarily due to low height-for-age rather than low weight-for-height. No children in the special group showed third degree malnutrition, and only 0.5 percent showed second degree malnutrition.

The Waterlow cross-classifications of height-for-age and weight-for-height for Egyptian children is given in Table 6. Only 0.3 percent of the survey children are in the critical category "concurrent wasting and stunting." None of the special group children were in the concurrent wasting and stunting category.

3. Anemia

Anemia is defined as a hemoglobin value less than 11.0 grams/100 ml. Figure 4 shows the prevalence of anemia for the 1,964 preschool children sampled in the geographic areas. Anemia in children is most common in the rural populations. Anemia prevalences for the children generally decreased with increasing population size and urbanization. Prevalences in the less advantaged Cairo-Giza and Alexandria areas are approximately the same as in the rural areas.

4. Feeding Patterns

Figure 5 summarizes the differences in breast-feeding/weaning patterns in geographic areas throughout Egypt. Generally, children are weaned at an earlier age in urban areas than in rural ones.

Cessation of breast-feeding in children 6-11 months of age was found to be associated with acute undernutrition. Wasting was also found to be associated with delayed introduction of supplemental feeding.

5. Nutrition-Related Clinical Signs and Symptoms

The 2.9 percent prevalence of angular stomatitis, a sign suggestive of possible riboflavin deficiency, warrants further investigation to assess the significance of this finding. The low prevalence of signs associated with vitamin D deficiency in children less than 12 months of age, the highest risk group, together with an overall prevalence of 1.4 percent of children of all ages with two or more signs suggests that vitamin D deficiency is not a public health problem in the populations examined. Signs suggestive of vitamin A deficiency were seen in less than 0.5 percent of the sample children.

6. Associations of Nutritional Status with Individual and Household Characteristics

Chronic undernutrition was found more commonly in children whose fathers were illiterate or who had less than a primary school certificate. Children of fathers whose occupations were considered of lower status were more likely to exhibit stunting

DISCUSSION

The Arab Republic of Egypt Nutrition Status Survey was a cross-sectional study of children age 6 to 71 months. This survey provides objective information on the magnitude and distribution of protein-energy malnutrition and anemia in a representative sample of Egyptian children. The survey results can be used as a baseline for planning nutrition programs to improve nutritional status and to help evaluate the effectiveness of such programs.

The low prevalence of wasting and the close approximation of the distribution of weight-for-height measurement to the NCHS/CDC reference population among the children of preschool age in Egypt suggest that acute undernutrition is not a public health problem in the 6-71 month age group in Egypt. On the other hand, 3.1 percent of the Egyptian preschool population are overweight as defined by a weight-for-height greater than 120 percent of the reference median. The three percent prevalence of overweight children is similar to that seen in the NCHS/CDC reference population.

Stunting may result from long-term qualitative and/or quantitative dietary inadequacy. The effects of such inadequacies on stature are subtle and may operate over long periods of time. Firm data on the nature of morbidity and mortality which may result from chronic undernutrition are lacking. Without a method for grading the health implications of chronic undernutrition, truly meaningful height-for-age cutoff values are not available. For purposes of the survey and to permit

comparisons within Egypt, we assume that the risk of ill health related to poor nutrition status increases as the prevalence of chronic under-nutrition increases.

Stunting varied greatly among Egyptian geographic regions. Its prevalence was highest among the rural populations and tended to decline with increasing urbanization of the population and, in general, was much higher than that of the NCHS/CDC reference population.

Acute undernutrition requiring priority action is not a major public health problem among Egyptian children of preschool age. However, Egyptian children show higher prevalences of chronic undernutrition, as indicated by the much higher prevalence of low height-for-age. Only a small percentage of the children are at severe nutritional risk, as indicated by the extremely low prevalence of concurrent acute and chronic undernutrition. For the practical purpose of nutrition planning, survey results suggest that long-term qualitative and quantitative nutrition deficiencies are most prevalent in the rural areas of Egypt.

No anthropometric evidence of significant undernutrition was found among children in the special group. This suggests that: (1) the growth potential of Egyptian children is similar to U.S. children as represented by the NCHS/CDC reference population; (2) these anthropometric reference values are appropriate for evaluating Egyptian preschool children; and (3) differences in anthropometry between the special group and the survey populations are mainly related to environmental influences including

long-term nutritional intake, recurrent infectious diseases, and socio-economic factors.

Anemia is a common problem in preschool age children throughout Egypt. It is less prevalent in the urban areas than in the rural areas. The highest prevalence of severe anemia (hemoglobin less than 9.5 gm/100 ml) and the lowest mean hemoglobin levels occur in the 12-23 month age groups. This suggests that the availability of iron to the child during weaning and during the period of transition to the household diet is particularly inadequate. Anemia has many causes, both nutritional and non-nutritional. Pending further investigation, most of the anemia in this age group is presumably the result of iron deficiency.

Although inadequate numbers of hemoglobin values for the special group children are available for detailed comparison with the general survey population, the results suggest much lower rates of anemia in these more advantaged Egyptian children.

There are important differences in feeding practices for children in urban and rural populations and in the less advantaged urban areas of Cairo-Giza and Alexandria. Children in rural areas are breast-fed longer and weaned at a later age than urban children. Among rural mothers traditional breast-feeding patterns remain influential and possibly weaning foods are less available - either actually or in terms of cost.

The causes of undernutrition cannot be documented in this simple prevalence survey. The survey cannot determine, for instance, which children may be undernourished because of decreased food intake or which may be undernourished because of increased metabolic needs due to infectious or parasitic disease. Also the survey cannot quantify whether increases in morbidity and mortality in these children result from growth retardation or wasting.

There is a need for follow-up studies to determine the causes of malnutrition, to separate the quantitative and qualitative aspects of malnutrition, and to determine what part infectious and parasitic diseases play in creating nutritional problems. Also, a dynamic national nutrition surveillance system must be developed to pinpoint areas of special nutritional need.

Surveillance indicators will need to be identified which will be predictive of short and long-term change in nutrition status within the country. Such data should be collected systematically and continuously. Some data are already being routinely collected by the various ministries in Egypt. For other data, special arrangements for collection will be necessary. As patterns or trends affecting nutritional status are identified, responsible decisions on short and long-term intervention measures can be made.

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Table 1. Description of Sample Universes for 1978 Egypt Nutrition Survey

<u>Geographic Area</u>	<u>Universe</u>	<u>Urban/ Rural</u>	<u>Population Size</u>	<u>Population Total</u>	<u>Governorate</u>
<u>Total Representative Sample^{a/}</u>					
Lower Rural Egypt	1	Rural	<10,000	970,405	Damietta, Kafr El Sheikh
	2	Rural	<10,000	1,611,958	El Ismailia, El Sharkieh
	3	Rural	<10,000	4,465,915	El Dakahlia, El Gharbia, El Menoufieh, El Qalyoubieh
	4	Rural	<10,000	1,490,313	El Beheira
Upper Rural Egypt	5	Rural	<10,000	3,242,975	El Giza, El Fayoum, Beni Suef, El Menia
	6	Rural	<10,000	3,190,003	Asyout, Souhag, Quena, Aswan
Large Villages (country-wide)	7	Rural	10,000-49,999	5,516,152	
Small Towns (country-wide)	8	Urban	10,000-49,999	2,761,724	
Small Cities (country-wide)	9	Urban	50,000+	4,492,427	
<u>Non-Representative Sample^{b/}</u>					
Cairo-Giza ^{c/}	10	Urban		1,334,190	
Alexandria ^{c/}	11	Urban		551,974	
Special Group		A group of socially advantaged children in Cairo			

^{a/}Population Proportional

^{b/}Selected Disadvantaged Areas

^{c/}The universe is composed of all districts in which the percent of population who are uneducated is more than 90 percent.

Table 2. Percentage Distribution of
Preschool Children by Age and Sex: Egypt 1978

<u>TOTAL REPRESENTATIVE SAMPLE^{a/}</u>			
<u>Age in Months</u>	<u>Male</u>	<u>Female</u>	<u>Total^{b/}</u>
6-11	5.3%	4.8%	10.1% (809)
12-23	11.5%	11.0%	22.5% (1816)
24-35	10.5%	10.1%	20.7% (1657)
36-47	10.1%	7.5%	17.6% (1422)
48-59	8.7%	7.3%	16.0% (1267)
60-71	6.9%	6.3%	13.2% (1045)
Total	52.9%	47.1%	100.0% (8016)

<u>CAIRO-GIZA AND ALEXANDRIA^{a/}</u>			
<u>Age in Months</u>	<u>Male</u>	<u>Female</u>	<u>Total^{b/}</u>
6-11	6.4%	7.2%	13.6% (225)
12-23	10.6%	10.0%	20.6% (369)
24-35	9.8%	9.5%	19.3% (345)
36-47	9.6%	8.0%	17.6% (314)
48-59	8.2%	7.8%	16.0% (294)
60-71	6.3%	6.7%	13.0% (231)
Total	50.8%	49.2%	100.0% (1778)

^{a/} See Table 1 for description of geographic areas.

^{b/} All percentages are weighted by universe population proportions. The actual number of persons surveyed are given in parentheses.

Table 3. Percentage Distribution of
Preschool Children by Weight for Height Classes
and Geographic Area: Egypt 1978

Geographic Area ^{a/}	Percentage of Reference Median				Total ^{b/}
	Acute		Normal	Over- weight	
	Severe	Moderate			
	<80.0	80.0-84.9	85.0-119.9	120.0+	
Lower Rural	0.7%	1.7%	94.2%	3.4%	100.0% (3552)
Upper Rural	0.8%	2.1%	94.7%	2.5%	100.0% (1784)
Large Villages	0.3%	1.6%	94.4%	3.7%	100.0% (889)
Small Towns	0.6%	1.9%	94.9%	2.7%	100.0% (894)
Small Cities	0.3%	1.0%	96.0%	2.7%	100.0% (897)
Total Representative Sample	0.6%	1.7%	94.7%	3.1%	100.0% (8016)

Cairo-Giza	0.8%	2.7%	94.0%	2.5%	100.0% (890)
Alexandria	0.2%	0.3%	95.9%	3.5%	100.0% (888)
Special Group	0.1%	1.0%	94.1%	4.8%	100.0% (1883)

^{a/}See Table 1 for description of geographic areas and sample universes.

^{b/}All percentages are weighted by universe population proportions. The actual number of persons surveyed are given in parentheses.

Table 4. Percentage Distribution of
Preschool Children by Height for Age Classes
and Geographic Area: Egypt 1978

<u>Geographic Area^{a/}</u>	<u>Percentage of Reference Median</u>				<u>Total^{b/}</u>
	<u>Chronic</u>		<u>Normal</u>		
	<u>Severe</u> <u><85.0</u>	<u>Moderate</u> <u>85.0-89.9</u>	<u>90.0-94.9</u>	<u>95.0+</u>	
Lower Rural	4.6%	17.2%	41.8%	36.4%	100.0% (3552)
Upper Rural	6.7%	20.8%	39.3%	33.1%	100.0% (1784)
Large Villages	4.6%	19.7%	44.7%	31.0%	100.0% (889)
Small Towns	2.9%	11.9%	41.4%	43.8%	100.0% (894)
Small Cities	1.7%	8.9%	33.2%	56.2%	100.0% (897)
Total Representative Sample	4.5%	16.7%	40.4%	38.5%	100.0% (8016)

Cairo-Giza	3.5%	15.5%	41.1%	39.9%	100.0% (890)
Alexandria	2.9%	12.8%	43.2%	41.0%	100.0% (888)
Special Group	0.1%	1.0%	9.7%	89.3%	100.0% (1883)

^{a/} See Table 1 for description of geographic areas and sample universes.

^{b/} All percentages are weighted by universe population proportions. The actual number of persons surveyed are given in parentheses.

Table 5. Percentage Distribution of
Preschool Children by Gomez Classes
and Geographic Area: Egypt 1978

Geographic Area ^{a/}	Degree of Undernutrition ^{b/}				Total ^{c/}
	3 ^o < 60.0	2 ^o 60.0-74.9	1 ^o 75.0-89.9	Normal 90.0+	
Lower Rural	0.6%	7.8%	37.4%	54.2%	100.0% (3552)
Upper Rural	1.0%	11.9%	41.9%	45.2%	100.0% (1784)
Large Villages	1.2%	8.5%	42.4%	47.8%	100.0% (889)
Small Towns	0.7%	6.0%	35.5%	57.8%	100.0% (894)
Small Cities	0.2%	3.6%	32.6%	63.7%	100.0% (897)
Total Representative Sample	0.8%	8.0%	38.5%	52.7%	100.0% (8016)

Cairo-Giza	0.7%	8.4%	41.7%	49.2%	100.0% (890)
Alexandria	0.5%	4.3%	38.3%	57.0%	100.0% (888)
Special Group	-	0.5%	14.0%	85.6%	100.0% (1883)

^{a/} See Table 1 for description of geographic areas and sample universes.

^{b/} Percentage of reference median weight for age.

^{c/} All percentages are weighted by universe population proportions. The actual number of persons surveyed are given in parentheses.

Table 6. Percentage Distribution of
Preschool Children by Waterlow Classes
and Geographic Area: Egypt 1978

Geographic Area ^{a/}	Waterlow Class				Total ^{b/}
	Wasting	Stunting	Wasting & Stunting	Normal	
Lower Rural	0.5%	21.5%	0.3%	77.8%	100.0% (3552)
Upper Rural	0.2%	27.0%	0.6%	72.2%	100.0% (1784)
Large Villages	-	24.0%	0.3%	75.7%	100.0% (889)
Small Towns	0.3%	14.5%	0.2%	84.9%	100.0% (894)
Small Cities	0.3%	10.6%	-	89.1%	100.0% (897)
Total Representative Sample	0.3%	20.8%	0.3%	78.6%	100.0% (8016)

Cairo-Giza	0.6%	18.8%	0.2%	80.4%	100.0% (890)
Alexandria	0.1%	15.7%	0.1%	84.1%	100.0% (888)
Special Group	0.1%	1.1%	-	98.8%	100.0% (1883)

^{a/}See Table 1 for description of geographic areas and sample universes.

^{b/}All percentages are weighted by universe population proportions. The actual number of persons surveyed are given in parentheses.

^{c/}Wasting: <80% weight-for-height.
Stunting: <90% height-for-age.

FIGURE 1. GEOGRAPHICAL AREAS, NUTRITION STATUS SURVEY:
ARAB REPUBLIC OF EGYPT



FIGURE 2. EGYPT NATIONAL NUTRITION ASSESSMENT SURVEY, 1978
WEIGHT FOR HEIGHT Z-SCORE DISTRIBUTION

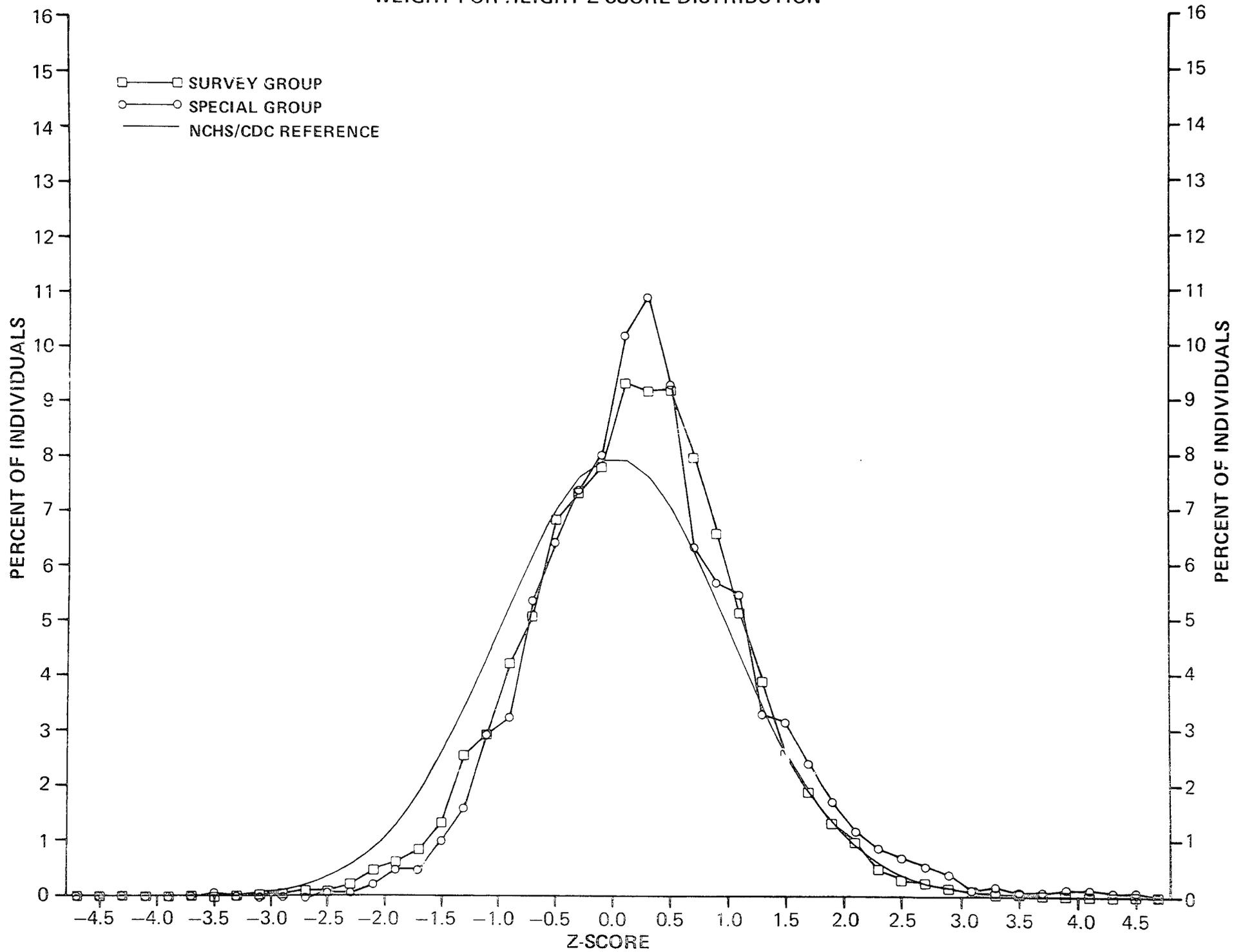


FIGURE 3. EGYPT NATIONAL NUTRITION ASSESSMENT SURVEY, 1978
HEIGHT FOR AGE Z-SCORE DISTRIBUTION

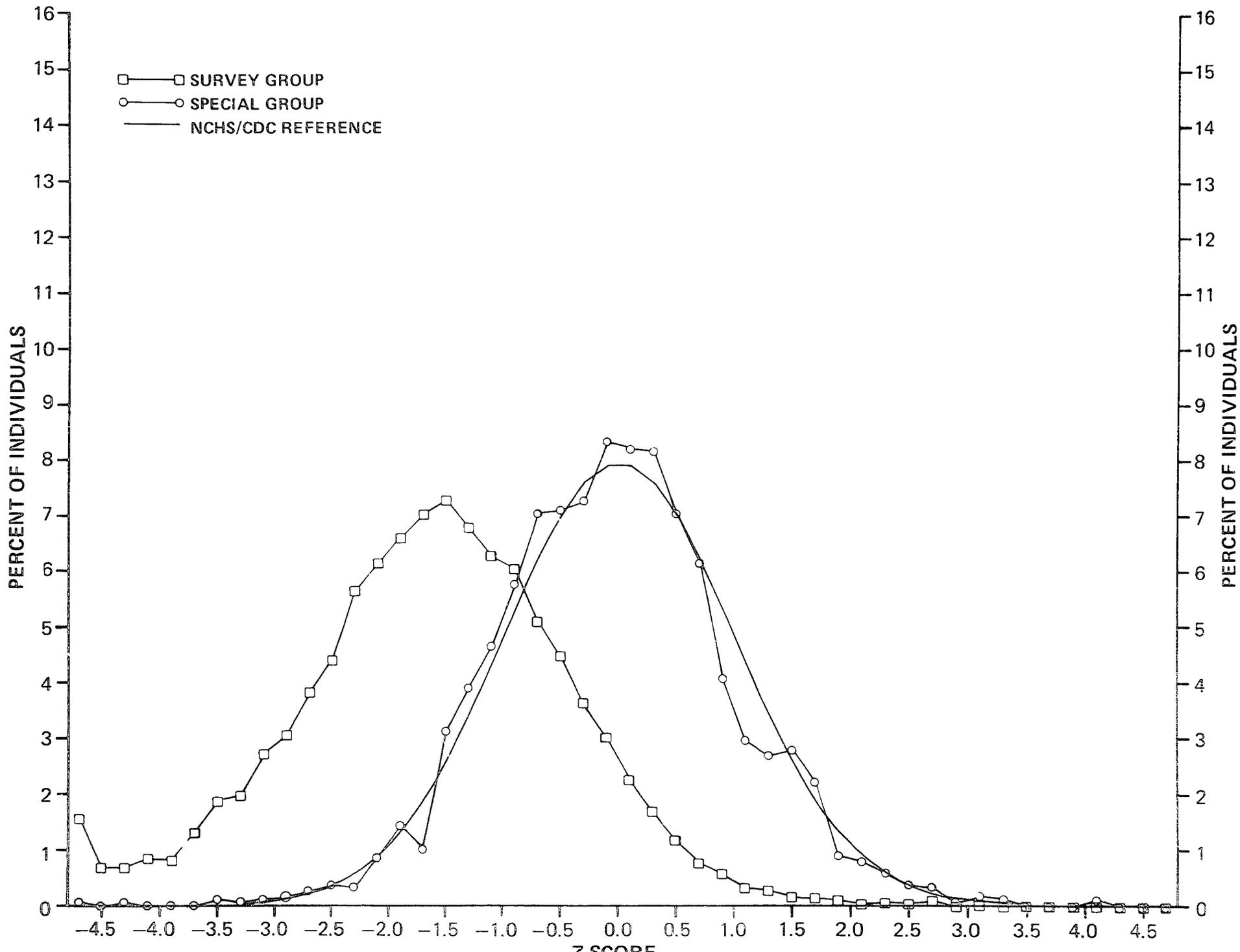


FIGURE 4. PERCENTAGE OF PRESCHOOL CHILDREN CONSIDERED ANEMIC* BY GEOGRAPHIC AREA: EGYPT 1978

(*Anemia Defined as Hemoglobin less than 11gr./100ml)

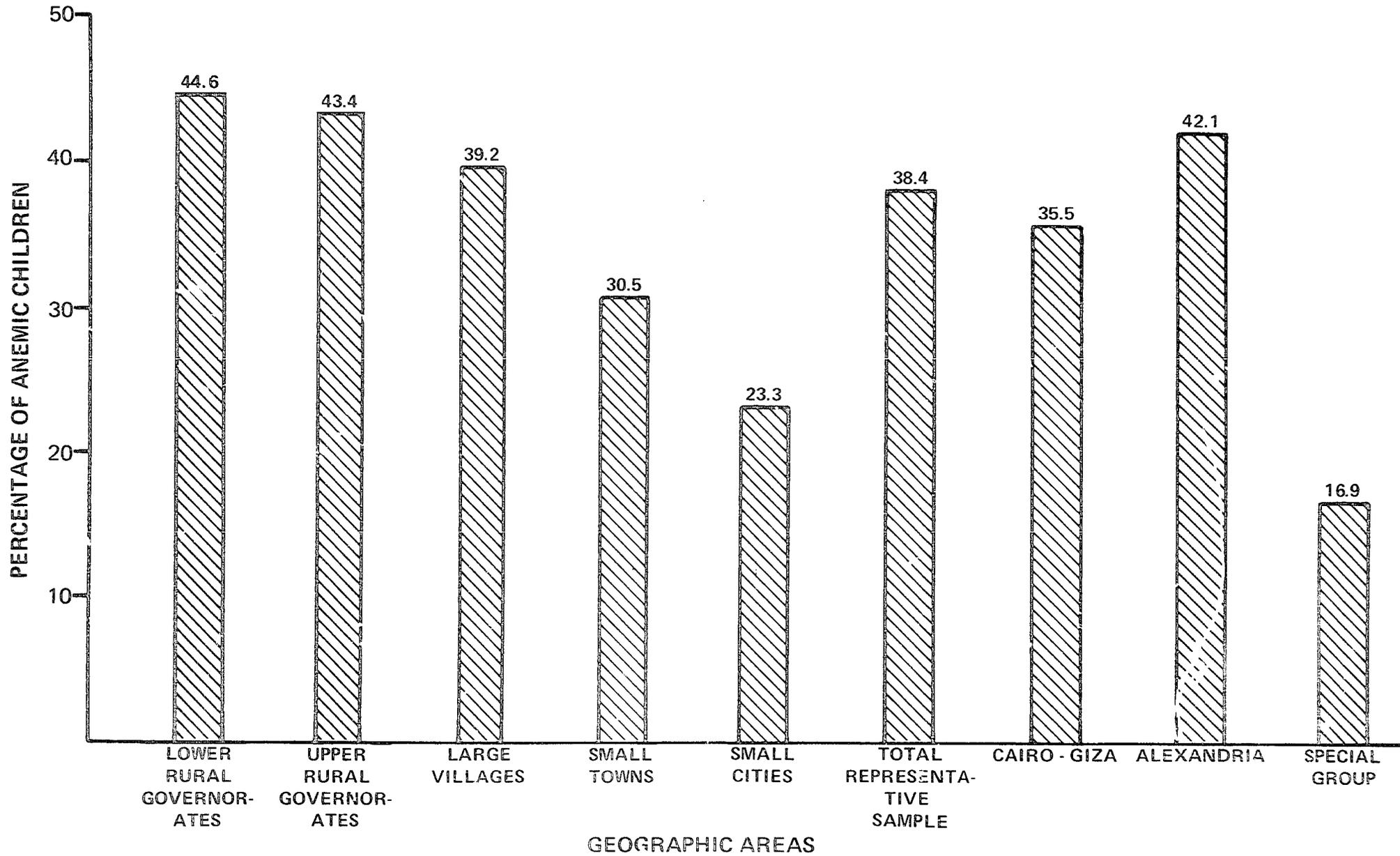


FIGURE 5. PERCENT OF CHILDREN IN SPECIFIC AGE GROUPS COMPLETELY WEANED IN SELECTED GEOGRAPHIC AREAS: EGYPT, 1978

