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THE NUTRITIONAL SITUATION OF THE METROPOLITAN AREA OF GUATEMALA CITY

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SUMMARY The Republic of Guatemala is situated in Northern Central America. Its current population is estimated to be 9,467,232 inhabitants. Sixty-five percent are indigenous; 65.2% of the nation's population lives in rural areas. The metropolitan Guatemala City area is formed of the Capital of the Republic and the municipalities of the department (state) of Guatemala. It comprises 20.6% of the nation's population. Of the metropolitan residents over 7 years of age, 22.3% have had no formal schooling, 50% have had only primary school education, and 21% have both primary and secondary education. Forty percent of the population is in the economically active age; 54% of that participates in the economy. The voluntary unemployment rate is around 3.3%. The primary productive activities are: manufacturing industry (23.4%); social, community and personal service (27.8%); and trade (19.7%). With respect to health statistics: overall, the infant, and the 1- to 4-year-old mortality rates in 1989 were 11.1, 71.4 and 6.7 per 1000, respectively. The maternal death rate in childbirth was 12.9 per 10000. Among infants, the principal causes of death and illness are gastroenteritis and respiratory infections. In adults and the elderly, the leading cause of death is circulatory disease. With respect to the nutritional situation there are differences in the weaning patterns between the metropolitan area and other areas of the country with the earlier introduction of foods and with a reduced period of breastfeeding. The nutritional problems documented in distinct studies have been: 1) low-birth-weight; 2) protein-energy malnutrition, particularly of the chronic type (stunting) in preschoolers, school children, and adolescents; 3) iodine deficiency in school children; 4) vitamin A deficiency in preschoolers, women of childbearing age, and the elderly; 5) iron and zinc deficiency in children and pregnant women; and 6) B-complex deficiencies (riboflavin, B6 and B12) in a segment of older persons studied. Guatemala City seems to have a better nutritional status (lower percentage of deficiency) as compared with the rural interior of the country. Little information is available on the nutritional situation of young adults, and in all groups of the middle-class and upper-class populations.

HISTORICAL AND GEOGRAPHICAL ASPECTS

The Republic of Guatemala is situated in Central America. To the south is the Pacific Ocean, to the east are the republics of Honduras and El Salvador, and to the north is Mexico and Belize. Its origins are Mayan, a civilisation that extended from Mexico to Honduras. At the time of the arrival of the Spaniards, the territory was organised into indigenous nations with characteristics of feudal economies. The period of the Conquest saw the destruction of the indigenous organizations, the adoption of Spanish culture, and the establishment of Spanish cities.

The first capital of Guatemala was founded in 1524 in the central highlands. It was moved to nearby areas in 1527 and 1541 due to uprisings of the native populations and volcanic eruptions. In 1543, a capital was established in the Panchoy valley (Antigua Guatemala) where it lasted 230 years. In this period, it became a small Central American metropolis, surrounded by small indigenous villages. Its economy was based on agriculture and household industry. In 1773, the city was destroyed by the Santa Maria earthquakes, and in 1776, the city was moved to its current location (1).

Since the colonial era, Guatemala has been basically an agricultural country. It presently has a surface area of 109,000 km2. With a censused population of 8,663,559 in 1989, and a 3% annual growth rate, the population in 1992 is estimated at 9,467,232 inhabitants. Sixty-five percent of the population is indigenous; 65.2% of the population lives in rural areas, in small communities of less than 2000 inhabitants (2). In 1986, 64.5% of the population was classified in "extreme poverty" ("misery")(i.e., income insufficient to satisfy food requirements); 18.9% were classified as "poor," (i.e., income insufficient to supply necessary goods and services); and the remaining 16.6% were the non-poor (i.e., able to satisfy their needs for food, goods and services)(3).

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THE METROPOLITAN REGION DEMOGRAPHIC ASPECTS

Populations

This region comprises the Department of Guatemala, which includes the capital city and the municipalities that make up the state. In 1989, it had 1,787,396 inhabitants which represented 20.6% of the nation's population. Assuming the same 3% national growth rate, the population in 1992 should be at best 1,953,135. Ninety percent of the population is non-indigenous and 75% of the metropolitan area population lives in urban zones. With respect to age and gender distribution, in 1989 the male:female ratio was 0.92 and the dependency rates [(minors and elders)/(population from 15 to 64 years) x 100] was 72.5 (4). Children less than 5 years of age represented 15% of the population; children from 5 to 14 years made up 25%. Productive adults, 15 to 64 years, constituted 56% and those over 65 years were 4%.

Migration

Guatemala City is the main centre of attraction for migrants from the interior of the republic. In the category of "migration. at one time in one's life" — change in place of residency between birth and the time of interview — the migratory balance (immigrant-emigrants) equals 15.1% of the metropolitan area population. In the category of "recent immigrants," which referred to the five years immediately prior to the interview, the migratory balance is equivalent to 1.5% of the metropolitan area inhabitants (5).

Socioeconomic characterictics

It is important to point out that more than half of metropolitan families do not have adequate water supply nor disposal facilities for excrement. With respect to schooling, 22.3% of the population over 7 years of age has no formal education; 50% have studied up to some level of primary school, and 21% have studied at the secondary school level. Forty percent of the population is in the economically active age, with a rate of participation of 54% (men, 73.9% and women, 38.5%). The rate of voluntary unemployment in 1989 was 2.9% for male and 3.6% for females (4). The activities in which the majority of metropolitan workers are employed are: manufacturing industry (23.4%), social, community and personal services (27.8) and trade (19.7).

Mortality

The rates of total, infant and 1- to 4-year mortality in 1989 were 11.1, 71.4 and 6.7 per thousand inhabitants, respectively (4, 6, 7). In terms of maternal mortality in childbirth, the national rate for 1989 was 12.9 per 10,000 live births (8). The Ministry of Health estimates that there is a 36% under-reporting of pregnancy-related perinatal deaths. Making the correction for under-reporting, the true maternal mortality would be 20.2 per ten thousand live births (8). For the public hospitals in Guatemala City, this figure varies from 3 to 14 deaths per 1000 live births.

Insofar as infant mortality is considered to be a good indicator of population health status, Table 1 presents a breakdown of this index with respect to socioeconomic characteristics. The factors associated with increased infant mortality in Guatemala are: 1) living in a rural area; 2) being of indigenous ethnicity; 3) low maternal education; such characteristics usually accompany poverty and a low accessibility to health services. One feature of infant mortality relevant to the urbanisation process is the fact that it is higher in working women. As women in the work place are increasingly more common, attention to the factors associated with this situation is warranted.

TABLE 1
INFANT MORTALITY RATES IN THE METROPOLITAN AREA RELATED TO SOCIOECONOMIC CHARACTERISTICS

Indicator	1983 (Rate X1000)
Place of residence:	
Urban area	58.1
Rural area	76.6
Ethnic group:	
Indigenous	91.7
Non indigenous	60.9
Maternal schooling (level acquired):	
None	107.0
1-3 y	53.2
>4 y	50.0
Working status:	
Employed	83.4
Unemployed	61.7
Water source:	
Private tap	46.8
Communal tap	85.6
Well	78.3
Rivers, lakes, etc.	83.6

Source: Refernce # 6

In adults and the elderly, the five primary causes of death in decreasing order of frequency are: 1) circulatory disease, 2) death from non-specific causes; 3) endocrine and immune disorders; 4) respiratory disease; and 5) infections and parasitoses (9).

Fecundity and birth rates

The birth rate for the Republic as a whole was 40.3 per 1000 in 1984. Assuming a 2.5% under-reporting of births, the true rate is closer to 41.3 per 1000. The general fecundity rate—which is a more refined measure than birth rate—was 21.3%. Breaking down fecundity by place of residence, the highest level (6.7 children) are found in rural areas as compared to a lower rate (5.3 children) in urban areas. In terms of geographic trends, the metropolitan region was the one with the lowest rates of fecundity (5.1 live children). The highest fecundity rates, between 6.5 and 7.9 children, were seen in the departments in the western and central provinces of the Republic. The other feature of fecundity was the ethnic contrast with indigenous mothers (6.5 children) being higher than non-indigenous (5.2 children) (10).

Morbidity

The pathologies most commonly affecting the infant population are acute respiratory infection and diarrhoeal disease. With respect to acute respiratory illness (ARI) a longitudinal study of under-five-year-old children was conducted (11). The observed incidence was 7.2 episodes per year. The median duration was 11 days. Six months to 23 months was the age of peak ARI incidence, and males were affected more than females. In terms of the type of ARI, studies from the same community (12) reported that colds (upper respiratory infections) were present on 70% of the occasions, pharyngitis on 10%, bronchitis on 9% and broncho- pneumonia on 5%. Otitis media was observed in the remaining 2.5%. Studies from marginal settlements of Guatemala City reported an incidence of 40.4% for ARI (13).

Acute diarrhoeal disease is most commonly seen in the weaning period. This situation has been attributed to the suspension of breast feeding and the introduction of foods of a general lesser hygienic quality (Solomons et al, 1990). The diarrhoeal incidence in peri-urban settlements of Guatemala City are 15.2% (13). Research in the peri-urban zones demonstrate the most common diarrhoeal pathogens to be adherent **Escherichia coli,** enterovirus, **Salmonella** spp., **Shigella** spp and **Campylobacter** (15).

In adults and the elderly, in addition to the previously mentioned causes of mortality, musculoskeletal diseases, fractures, non-specific symptoms, digestive disorders and respiratory disease require the attention of health service organizations in Guatemala (9).

Nutritional status

There are few studies directed toward evaluating the nutritional status of the metropolitan areas that have a sample-selection and sample-size that make them representative of this population. In recent years, diverse investigations have been undertaken in the peri-urban communities of Guatemala, which include different age-groups and a focus on specific nutrients. In Table 2, the age-groups and communities involved in nutritional research in Guatemala are presented. For this summary, the information is grouped under the headings; 1) feeding patterns; 2) indicators of protein-energy status; and 3) micronutrient nutriture.

TABLE 2
AGE-GROUPS STUDIED AND COMMUNITIES INVOLVED IN NUTRITIONAL STUDIES IN METROPOLITAN AREA OF GUATEMALA CITY AREA

Preschool children:
Cerro Gordo
Guajitos
El Limon
Colonia Maya
Peronia
El Milagro
School children:
Guajitos
El Limon
Pregnant women:
Guajitos
Elderly:
Guajitos
Whole families:
El Amparo
Nueva Chinautla
El Milagro

FEEDING PATTERNS

Preschoolers

In Figure 1, we present two important aspects of infant feeding: 1) the pattern of breast feeding and 2) the timing of introduction of complementary feeding in three regions of the country (6). The children in the metropolitan areas are given foods other than breast milk earlier, and as a consequence, the overall nursing duration is shorter than in the interior of the country (6). In children seen at well-baby care clinics of the Guatemalan Institute of Social Security (IGSS), 68% of the mothers reported having introduced foods (including liquids) between 0 and 2 months of age (16). In order of their introduction into the diet, the liquids were: sugar water; pure water; barley water; gruels; Incaparina (a vegetable mixture) and coffee. For

solid items, this order was: banana; yellow squash, eggs, guisquil, sweet rolls, and potatoes. Chocano (17) in another study of infants in Guatemala also reported an early introduction of complementary foods.

School children

Information on the feeding pattern in school children (18) indicate that the foods most frequently consumed (i.e. by more than 85% of the population) are: rice; beans; sweet rolls; tortilla; meat; and coffee. Grouping the foods by nutritive values, no differences are apparent between children of the present capital and those of the former capital (Antigua Guatemala).

Pregnant Women

With relation to dietary patterns in pregnant women of marginal urban area of Guatemala City, a great dietary diversity (larger number of items consumed) was seen; this was due to a long list of items that are eaten only occasionally. Diversity was not correlated with nutrient intake (19).

Elderly

During 1990, CeSSIAM conducted studies in a poverty-stricken community of Guatemala City aimed at evaluating the nutritional status of the elderly (20). In Table 3, the foods reported most frequently to be consumed by the elderly of Guajitos are shown, based on 24-hour recall data and on a food-frequency questionnaire of vitamin A-rich foods (Table 3A). The pattern of the elderly differs little from that seen in younger age-groups in Guatemala City.

TABLE 3
FOODS MOST COMMONLY CONSUMED BY SUBJECTS OVER 60 YEARS OF AGE

Rank	Food	Frequency
1	Sugar	156
2	Tortilla	112
3	Coffee	110
4	Onion	92
5	Tomato	65
6	Oil	60
7	White bread	55
8	Sweet roll	55
9	Black beans	43
10	Rice	35
11	Egg	33
12	"Guisquil"	32

Total number of responses= 1343; Number of subjects=85.

TABLE 3A
VITAMIN A-RICH FOODS MOST FREQUENTLY CONSUMED BY SUBJECTS OVER 60 YEARS OF AGE

Rank	Food	Percent
1	Tomato	90
2	Egg	82
3	Fresh cheese	68
4	Plantain	67
5	Carrot	56
6	Margarine	48
7	Liquid milk	40
8	Pork sausage	38
9	Banana	36
10	Papaya	35
11	"Guicoy"	33
12	Cream	31
13	"Quilete"	25

Total number of subjects interviewed = 85.
Source: Reference #20.

Indicators of protein-energy status

Among the nutritional alterations that affect the Guatemalan population, protein-energy malnutrition is probably the one that is most widespread, due to insufficient nutrient intake and repeated episodes of infectious diseases. In the infant population, the most severe damage is due to chronic undernutrition, manifested from birth as low-birth-weight (LBW) and later as retardation of longitudinal growth.

Dietary intake

Data on energy and protein intake have been reported for children in suburban areas of the metropolitan region (21). The mean age-adjusted energy intake adequacy was 84+/-20% with an interval of 53 to 130%. For protein, the mean adequacy of age-adjusted recommended intake was 22+/-40%, with a range of 47 to 195%. During 1986-87, Alarcon and Rivera (22) undertook a study in a poverty-stricken area aimed at evaluating the effect of the economic crisis on the alimentary-nutritional situation. The findings showed that, at the beginning of the study in 1986, the per cent of families that did not meet the energy intake recommendations were 91%, 57% and 54% for families of low, middle and high socioeconomic status, respectively. For proteins, the percentage of the population with intake adequacy less than 100% of the recommended were 54%, 29% and 10% for the respective low, middle and upper strata. Protein constituted 12.3% of the total energy, and 30% was derived from foods of animal origin.

With the increasing participation of women in the labour

force, the day-care centres for children are becoming important. Quan (23) showed that the diet served in one such centre in Guatemala did not contribute sufficient energy to support a child over three years of age, whereas the protein density was sufficient for children up to age 5 years.

ANTHROPOMETRIC INDICATORS

Neonates

One of the prime manifestations of undernutrition seen is low-birth-weight (LBW) and, more specifically, intrauterine growth retardation (IUGR). The indicator is also an index of maternal nutrition, insofar as a strong association has been shown between birth weight and maternal weight both before pregnancy and during pregnancy. National hospitals of Guatemala reported a LBW incidence of 15% in 1983 and of 10% in 1988, with an estimated overall incidence of IUGR of 9.4% (24, 25, 26). In the hospital system of the IGSS, which serves the working class with limited economic resources in Guatemala City, the reported incidence of LBW was 12% (26, 27). The two private hospitals of the capital which serve the upper class elite reported a LBW incidence of 5.1% (28).

Preschool children

Studies undertaken at the Institute of nutrition of central America and Panama (INCAP) in preschool children from 1982 to 1983 in the poverty-stricken communities of Guatemala City reported a prevalence of 8 % of acute PEM, using a weight-for-height chart (29).

In children from 0 to 36 months, residing in the rural communities of the metropolitan system in the Department of Guatemala, the prevalence of PEM was 27% using a Z score of less than minus two for weight-for-height reference standards (29a). Information provided by the Ministry of Health General Division of Health Services (DGSS) for the metropolitan region indicate that 31% of children 1 to 6 years of age had moderate (Gomez, Grade II) undernutrition and 4.3% had severe (Gomez, Grade III) under-nutrition. A study of acute diarrhoeal disease which is being carried out currently in a poverty-stricken rural community of Guatemala City in children between 6 months and 6 years reported a deficit in height-for-age of greater than minus two standard deviations in 39% of 1678 children measured; 21.8% had a deficit of weight-for-age and 2.2% a deficit of weight-for-height (30).

School children

In Table 4 and 5, the percentage of children between 4 and 18 years of age with PEM, based on anthropometric indicators measured by Martinez (31) are shown. School children from rural areas had a greater percentage of deficiencies in all of the indices (H/A, W/A, W/H). About 50% of the children had chronic growth retardation (<85% adequacy of H/A).

Adolescents

With respect to the adolescent population, a study of national secondary schools in Guatemala City showed that about 25% of those examined of both genders had a retardation of stature of greater than minus two standard deviations as compared to the reference populations (32, 33). Currently, studies of body composition are being conducted which should shortly yield more insight into the nutritional status and development of this age-group.

Comparing the data of this study, which has been limited to Guatemala City, with data of children between 11 and 18 years from urban areas of the Republic (31) one can infer that nutritional status of adolescents is better in the capital, given that there are lower percentages of deficiencies in height-for-age and weight-for-age.

Elderly

Little information is available on the nutritional status of the elderly. Studies conducted in institutions are not representative of the remainder of the population who live in the community. In the country, this sector is represented, in its majority by "the Young Old," that is non-institutionalized persons from 60 to 75 years of age (9). In Table 6, the indicators of body composition of elderly of a rural and a peri-urban community of the metropolitan area of Guatemala City are shown. In general, they are characterized by having lesser stature and lower weight than older people in developed societies; however, there are differences between urban and rural elders in terms of Body Mass Index (BMI), with the rural elders' BMIs being lower, which indicates a lesser quantity of adipose tissue (34, 35). This situation can be explained by some combinations of lower energy intake and greater physical activity by virtue of more strenuous life-styles. The loss of height, as assessed by the armspan/height ratio, is similar in the two groups and represents a net loss of around 4% of the height that had been achieved in younger adult life (34, 35).

MICRONUTRIENT STATUS

Three micronutrient deficiencies — iodine, vitamin A, and iron— have been reported in Guatemala as public health problems.

With respect to iodine, in the 1950s endemic goitre had a prevalence of 38% (36); based on these findings, laws were passed for the iodination of salt and by 1961 it had achieved 90% of its goals. Interviews conducted in recent years reported goitre prevalence between 10 and 15%. Subsequently, the programme deteriorated, and by 1987, the prevalence of goitre in school children at the national level was 20.4%, In the urban area of Guatemala City, the prevalence was 22.4% (31). Using urinary iodine levels as the indicator, 60% of the school children had ioduria of <50 µg/g of creatinine and 36% had ioduria of

TABLE 4
PERCENTAGE OF CHILDREN FROM 4-11 YEARS WITH PEM IN THE METROPOLITAN AREA, AS CLASSIFIED BY ANTHROPOMETRIC INDICATORS

Age (Years)	Sex	Ht/Age (< -2 SD)		Wt/Age (> -2 DE)		Wt/Ht (> -1 DE)	
		I	II	I	II	I	II
	Female	43.3	50.2	20.8	20.6	13.9	22.5
4 - 9	Male	36.0	32.8	15.4	30.0	13.1	27.3
	Both	39.5	41.8	17.8	25.3	13.7	23.1
	Female	40.1	52.3	17.1	30.1	13.9	22.5
10 - 11	Male	36.6	53.6	12.9	34.1	13.1	23.7
	Both	38.2	52.9	14.9	32.3	13.7	23.1

Source: Reference #31.
I= Within capital city (urban)
II= Surrounding area (suburban)

TABLE 5
PERCENTAGE OF ADOLESCENTS, FROM 12-18 YEARS WITH PEM IN THE METROPOLITAN AREA, AS CLASSFIED BY ANTHROPOMETRIC INDICATORS

Age (Years)	Sex	Ht/Age (> -2 DE)		Wt/Age (>-2DE)	
		I	II	I	II
	Female	44.3	60.9	24.0	39.1
12 - 13	Male	49.6	62.1	19.5	29.1
	Both	47.3	61.4	21.4	33.1
	Female	62.5	62.0	39.1	51.0
14 - 18	Male	53.8	46.4	11.5	21.4
	Both	59.2	56.4	24.5	40.5

Source: Reference # 31.
I= Within capital city (urban)
II= Surrounding area (suburban)

<30 µg./g of creatinine, which represents a severe iodine deficiency. The most severely affected group were females from 12 to 19 years of age from urban areas with weight-for-age deficits of greater that two standard deviations and arm muscle areas below the 10% percentile of the reference population (31).

With respect to the concentration of iodine in salt for human consumption, 83% of salt specimens had content below 60 µg/g; 13% had levels between 60 and 100 µg/g and 4% had levels > 100 ppm (31).

TABLE 6
ANTHROPOMETRIC INDICATORS IN THE ELDERLY IN TWO COMMUNITIES IN THE METROPOLITAN DISTRICT

Index	Suburban	Urban
	Women	
Age(years)	68.5 ± 7.3	67.8 ± 8.2
Weight (kg)	44.5 ± 8.5	53.2 ± 11.2
Height (cm)	141.5 ± 6.4	146.5 ± 6.3
BMI (kg/m^2)	22.2 ± 3.7	24.8 ± 4.4
Height / MUAC	0.98 --	0.97 ± 0.02
	Men	
Age(years)	70.1 ± 7.9	71.8 ± 8.0
Weight (kg)	49.9 ± 8.2	60.4 ± 12.7
Height (cm)	155.1 ± 5.7	158.8 ± 5.9
BM (kg/m^2)	20.7 ± 2.5	23.9 ± 4.3
Height / MUAC	0.97	0.96 ± 0.02

BMI: Body mass index (weight / $height^2$)
Source: Refernce #34, 35.

Vitamin A

Deficiency is also a problem that has been documented since the 1950s. This deficiency showed an important reduction when the measure of sugar fortification with vitamin A was implemented; however, just as with the iodination programme for salt, fortification of sugar was discontinued, which gave way to a recurrence of hypovitaminosis A. Table 7 presents the percentage of vitamin A in three studies conducted in a peri-urban community of Guatemala and a rural community of the metropolitan area (34, 35 y 37) More than 60% of the subjects studied had intakes of vitamin A that did not satisfy the recommendations of three age groups (preschoolers; mothers of childbearing age; and elderly). In relation to serum levels of retinol, the lowest percentage of deficiencies were in the group of elderly, 7% with levels < 30 µg/dl. The greater percentage was in pregnant women 52% of whom had levels < 30 µg/dl, but physiological changes that occur during pregnancy such as expansion of plasma volume could partially explain the big difference with respect to other age groups and non-pregnant women in the same community.

With respect to iron deficiency, the values for haematocritas an indicator of risk of anaemia from different studies conducted in peri-urban areas of Guatemala City (35, 38, 39, 40 and 41) are presented in Table 8. The greatest prevalence of subnormal haematocrits in the urban population is found in preschoolers and the elderly. In Table 9, the haematological indices of women from 14 to 29 years in Guatemala City, from a rural highland region and from the coastal plain are shown. The least degree of deficiency was demonstrated in the urban women (40).

OTHER MICRONUTRIENTS

In Table 10, the values for vitamin status for the elderly of a poverty-stricken urban community and for a rural community of the metropolitan region are shown (35,41). In both groups, there were deficiencies among the vitamin B-complex, specifically in riboflavin (vitamin B2), vitamin B6 and vitamin B12. The urban elderly had a greater degree of deficiencies than did the rural group.

In children of a peri-urban community of Guatemala, zinc status was studied; Cavan et al (42) found 7% of the population with plasma zinc levels <70 µg/dl and 6% with hair zinc content <70 µg/dl.

CONCLUSION

In conclusion, the information reviewed allows for the identification of nutrition and health problems that affect primarily the inhabitants of the poverty-stricken rural areas of the metropolitan region of the capital city of the nation; these reflect the status of the populations with very scarce economic resources and with less accessibility to health-care service. In addition, these areas host a population immigrant from other regions of the country and the nutritional status could reflect influences from the conditions of their places of origin. Very little information is available for the middle- and upper-classes of the metropolitan areas in which nutritional problems of over-consumption might be expected to be the most common. The findings show that nutrient deficiencies are more frequent in the rural interior of the country than in the metropolitan area. Nonetheless, Guatemala City has a high percentage of its poor population suffering from chronic protein-energy malnutrition. Deficiencies of vitamin A, iron and iodine are about as common in the metropolitan area as in the rest of the Republic. Nutrition with respect to other micronutrients, e.g. trace elements, has been less well studied. Given the important role they play in physical growth and health maintenance, that situation must be rectified rapidly.

TABLE 7
PERCENTAGE DEFICIENT IN VITAMIN A INDICATORS
IN COMMUNITIES OF GUATEMALA CITY

Groups studied	n	Indicator		Reference
		Dietary intake	Plasma retinol	
Preschool children(<6 years)	150	63.0	12.0	37
Women of reproductive age	48	89.9	15.0	37
Pregnant women	51	65.0	52.0	37
City elderly (>60 years)	110	67.0	7.0	34
Country elderly (> 60 years)	164	---	21.0	35

TABLE 8
HAEMATOCRIT VALUES IN SUBURBAN COMMUNITIES OF THE METROPOLITAN AREA

Groups studied	n	Median (Min - Max)	% Def. (<38)	Reference
Preschool children (6-36 months)	82	38.0 (30 - 54)	37.8	38
School children (5-10 years)	531	42.3 (32 - 52)	7.0	39
Women of reproductive age	104	20.2 ----	3.8	40
City elderly (> 60 years)	110	43.0 (27 - 54)	6.1	41
Country elderly (>60 years)	164	41.0 (21- 52)	18.0	35

TABLE 9
PREVALENCE OF ABNORMAL HAEMATOLOGICAL INDICATORS IN WOMEN OF THREE REGIONS OF GUATEMALA

Haematological variable	(Guatemala) City (urban)	South Coast (rural)	Highlands (rural)
Haemoglobin	7.6	12.5	45.4
Haematocrit	3.8	6.2	36.3
MCV	---	---	56.6
MCH	0.9	---	36.3
Protoporphyrins	4.0	18.7	39.3
Serum iron	16.3	37.5	60.6
TIBC	---	6.2	12.1
Ferritin	15.0	26.0	47.0

Source: Reference #40

TABLE 10
PERCENTAGE OF ELDERLY WITH VITAMIN DEFICIENCIES IN TWO COMMUNITIES OF THE METROPOLITAN AREA

Vitamins	Cut off point	Population	
		Country (n= 164)	City (n=114)
Retinol (µg/dl)	< 30	21.0	7.1
Vitamin E (µg/dl)	< 500	15.0	3.5
Thiamin (C.A)	> 1.30	1.0	2.6
Riboflavin (C.A)	> 1.29	70.0	20.3
Vitamin B6 (C.A)	> 2.20	0.0	15.0
Vitamin B12 (C.A)	< 200	38.0	36.3
Folates (ng/dl)	< 3.0	9.0	1.8

Source: Reference # 35, 41.

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