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Maternal and Infant Nutrition Reviews



SUDAN

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MATERNAL AND INFANT NUTRITION REVIEWS

SUDAN

A Guide to the Literature

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INTRODUCTION

MATERNAL AND INFANT NUTRITION REVIEWS: A RESOURCE FOR NUTRITION PLANNERS AND EDUCATORS

The MATERNAL AND INFANT NUTRITION REVIEWS (MINR) profile existing data on nutritional status and nutrition-related beliefs and practices of mothers and children in developing countries. MINRs also contain information on current nutrition policies and programs of governments, the United States Agency for International Development, and other bilateral, international agencies and Private Voluntary Organizations (PVO). There are thirty-five MINRs in all, profiling forty-four different countries. (See list on next page).

Maternal and Infant Nutrition Reviews summarize important information obtained from available literature, government documents, consultant reports, and personal correspondence. The data is presented in bulleted form under six major headings: nutrition and health status, dietary beliefs, dietary practices, nutrition status correlations, nutrition and health policies and programs, and commentaries. A bibliography at the back of each monograph describes the listed documents in terms of type of study, methodology, sample characteristics and location, and a summary. Special thanks are extended to Dr. Richard Lockwood for his assistance in reviewing this report and supplying information, and to Michael Gerber of AMREF and Mary Ann Micka of USAID, Khartoum.

Nutrition planners and policy makers can use MINRs to help identify a given country's data base. For example, the information contained in each review enables the reader to identify key planning factors such as problem areas of malnutrition, prevailing beliefs about breast feeding, the extent of bottle feeding, types of weaning foods, the government's inter-agency five-year nutrition plan, the amount of donated food being distributed at MCH centers, and major PVOs involved in administering food and nutrition programs.

MINRs can be used as background documents for consultants going into the field and for program developers in-country. They can provide a frame of reference for an in-country workshop aimed at developing a national nutrition strategy. Technical assistance in organizing a workshop of this kind is available through the International Nutrition Communication Service. MINRs can also be used as a resource document in the development of journal articles and textbooks.

MINR data is stored on a computerized word processing system that allows for updates and individualized literature searches on specific topics. Patterns in a particular country or group of countries can be analyzed in accordance with user needs. A nutrition information retrieval service is available free to those working in developing countries and for a small fee to all others. Orders, inquiries, and comments should be addressed to:

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MINR Country Reports:

AFRICA:	NEAR EAST:	ASIA:	LATIN AMERICA AND CARIBBEAN:
Cameroon	Egypt	Bangladesh	Bolivia
Gambia and Senegal	Jordan	Burma	Costa Rica
Ghana	Morocco	India	Dominican Republic
Kenya	Tunisia	Indonesia	Ecuador
Lesotho	Yemen	Nepal	Guatemala
Liberia		Pakistan	Haiti
Mali		Philippines	Honduras
Sudan		South Pacific*	Jamaica
Tanzania		Sri Lanka	Panama
Zaire		Thailand	Peru

*South Pacific Region includes the nations of Cook Islands, Fiji, Kiribati, Papua New Guinea, Solomon Islands, Tonga, Tuvalu, Vanuatu, and Western Samoa

MATERNAL AND INFANT NUTRITION REVIEWS

CLASSIFICATION SYSTEM

1. Nutrition and Health Status
 - 1.1 General
 - 1.2 Women, Pregnant
 - 1.3 Women, Lactating
 - 1.4 Infants 0-6 Months
 - 1.5 Infants 6-24 Months
2. Dietary Beliefs
 - 2.1 General
 - 2.2 About Pregnancy
 - 2.3 About Lactation
 - 2.4 About Breast Milk Substitutes (including bottle feeding)
 - 2.5 About Weaning
3. Dietary Practices
 - 3.1 General
 - 3.2 Women
 - 3.2.1 During Pregnancy
 - 3.2.2 During Lactation
 - 3.3 Infants 0-24 Months
 - 3.3.1 Breast feeding
 - 3.3.2 Weaning
 - 3.3.3 After Weaning
 - 3.4 Health and Medicine
4. Nutrition Status Correlations
5. Nutrition and Health Policies and Programs
 - 5.1 Policies
 - 5.2 Programs
6. Commentaries

Bibliography

TABLE I
LOCATIONS STUDIED

PROVINCE	District	Village or town	AMREF, 1979	AMREF, 1980	Ernster, 1976	Karrar and Omer, 1981	Karrar-Osman et al., 1977	Karrar-Osman and El Amin, 1977	Karrar-Osman, 1979	Lockwood, 1981	Mahmoud El Hennawi, 1979	Nur et al., 1978	Nutrition Division, 1973	Nutrition Division, n.d.	Shadad et al., 1981	Shazali et al., 1977	Shazali et al., n.d.	Sukkar et al., 1976	Taha, 1978a	Taha, 1978b	Taha, 1979a	Taha, 1979b	Zumarawi et al., 1981			
BAHR EL-GHAZAL	Gogrial	Mangol	X																							
		Panjak	X																							
BLUE NILE	Gezira	El Fawar																	X	X		X				
		El Fugara																		X	X		X			
		El Kamlin																		X	X		X			
		Karaiba														X	X			X	X		X			
		On Oweid																		X	X		X			
		Tanta																		X	X		X			
		Remeitab			X																					
		Wad Medani																					X			
		Unspecified villages									X									X	X		X			
		Rufaa	Dellawat	Dellawat										X												
				Dellawat Elfoq											X											
				Shamfa Bahar											X											
				Shamfa Bara'et											X											
(Unspecified)																										
	Butri				X																					
DARFAR	EQUATORIA (WESTERN)	Yambio	Nabima	X																						
			Nyaka	X																						
KASSALA	KHARTOUM	Khartoum	El Haq Ahmed			X																				
			El Kalakla					X																		
			El Massid			X																				
			El Nuba			X																				
			El Trayia			X																				
			Idd Hussein					X																		
			Kaqabi			X																				
			Khartoum (urban)									X			X										X	
			Khartoum North							X															X	
			Omdurman							X						X									X	
			Soba West											X												
			Tayba El Hasanab				X					X														
			Unspecified villages																							
			KORDOFAN (SOUTHERN)		El Efin								X													
					El Kweik									X												
NORTHERN																										
UPPER NILE																										

HIGHLIGHTS

1. **NUTRITION AND HEALTH STATUS:** There have been no national nutrition surveys in Sudan, and much of the country-wide data is at least five years old. Diseases resulting from poor environmental sanitation constitute the bulk of the Government's health problems. The most common diseases are: malnutrition and anemia; gastroenteritis and diarrhea; malaria; heart, respiratory and circulatory problems; and measles. 30% of the over 5 million Sudanese are estimated to be undernourished. Malnutrition is most prevalent in the eastern districts of the Red Sea Hills and Kassala and in the western district of Darfur. In 1975 the government estimated that 50% of all children 0 to 4 years old were malnourished. Recent rural surveys have shown childhood malnutrition to range from 20% to 76%. Children's growth curves in Gezira, for example, showed sharp declines after 6 months of age in both 1951 and 1972, indicating no significant improvement between the study periods. Anemia and vitamin A deficiency are the other major nutritional problems. Low income, ignorance of nutritious feeding patterns, disease, and food scarcity are considered the general causes of malnutrition. Malaria is endemic all over the country, gradually increasing in prevalence from north to south.

2. **DIETARY BELIEFS:** The best study to date on local food practices is Culwick's classic 1949-50 study. Many mothers restrict their food intake during pregnancy because of fear of the fetus growing too large and causing a difficult delivery. A common belief among town women is that rest and special diet should cleanse the new mother's body and make her gain weight. Many urban women also believe that extra foods should be eaten during lactation to increase the flow of milk. Several potentially harmful and helpful beliefs surrounding breast feeding have been identified. Most mothers, in rural and urban areas, believe that mother's milk is best for their infants. An example of this belief is found in a song some mothers sing to their children while teaching them to walk: "Tatai Tatai laban umak Ha Hai," meaning "walk, walk, your mother's milk is good." However, some mothers believe that breast milk alone is sufficient for the child as long as he is taking it, no matter what his age or size. The most common reason for weaning is a new pregnancy. Most mothers believe that the milk of a pregnant mother is harmful to the infant. In Omdurman, most women believed that bottle feeding does not take more time or energy than breast feeding. The major foods recommended for young children included milk, juices, eggs, custard, fruits, liver, bananas, porridge/asida, honey, potatoes, vegetables, cassava, and groundnuts. Harmful foods often cited include kisra and mulah, spiced foods, meat, cheese, and sour milk.

3. **DIETARY PRACTICES:** The chief staple is sorghum (dura) which is ground into flour and made into either kisra, a thin pancake, or lugma, a stiff porridge. Pennisetum millet (dukhn) is important on the sandy soils in the western part of the central rainlands. Cassava is an important staple in the South. The best foods in the house are given to the father and the older males. In general, women are not fed as well as men. Lunch is considered the main meal of the day. Women tend to eat leftover kisra, called mos, to make up for their small portions of the family meals. The daily per capita calorie supply in 1977 was estimated to be 2184 calories. Sudan appears to have one of the highest levels of consumption of animal protein in the Middle East. In Gezira, the average daily intake of protein per person ranges from 39.4 gm. to 75.3 gm., well above the minimum requirements recommended by FAO/WHO in 1973. The main dietary deficiencies are vitamins A and C. The hungry months are

June and July. Many mothers restrict intake during pregnancy. Maternal nutrition is best, however, during the postpartum period. Neighboring women bring the nursing mothers nutritious foods such as chicken, meat, milk, and wheat bread with milk during the first 40 days after birth. In an urban sample, 79.3% of the women drank hot, strong, black coffee, with no sugar, immediately after delivery, believing it would "cleanse the uterus." Most mothers start breast feeding on the day of delivery, use both breasts during each feed, feed on demand, and keep their infants by their sides at night for night feeds. Breast feeding is usually continued well into the second year. Delayed introduction of supplementary foods for a year or more is a major nutritional problem, even though supplementary fluids, such as sugared water, fruit juices, and diluted powdered and liquid milk, are often introduced very early. Milk and sorghum paps, usually highly diluted to increase their bulk, have traditionally been given in addition to breast milk. The weaning process is often sudden. The infant frequently is physically separated from the mother, or the mother paints her breast with pepper, starchy material, or quinine to repel the child. Women tend not to breast feed when pregnant. The use of bottle feeding appears to be increasing in several places. Many mothers stop breast feeding and giving other foods when their children develop diarrhea.

4. **NUTRITION STATUS CORRELATIONS:** The incidence of childhood protein-calorie malnutrition was positively correlated with low income, father's occupation as a laborer, early birth order, decreased literacy, and lower levels of maternal education. The worst malnutrition occurs during the planting season.

5. **NUTRITION AND HEALTH POLICIES AND PROGRAMS:** Sudan does not have a national nutrition policy, although it has a relatively large service delivery infrastructure. Nutrition activities in the Ministry of Health are carried out by the Nutrition Division (established in 1966) and include: data collection on food consumption and nutritional status, establishment of growth norms, creation of provincial units to provide minimal nutrition services and to serve as monitoring units, nutrition education of mothers through Maternal and Child Health clinics, participation in the nutrition component of professional training, and a pre-school feeding program in conjunction with Catholic Relief Service (CRS). The Ministry of Education runs a Nutrition Training Center in Khartoum, trains home economics teachers for primary and junior secondary schools, and offers short term nutrition courses for nutrition educators who are assigned to Adult Education and Community Development Centers. \$1.85 million worth of PL-480 Title II food commodities--bulgur, non-fat dried milk, vegetable oil, and soybean oil--was approved for 1982 distribution by Catholic Relief Service in maternal and child feeding programs. Foster Parents Plan supports a supplementary feeding program, in conjunction with CRS, directed to 5,000 preschool children. The most important element in the government's health strategy (1977/8-1983/4) for the rural areas is the Primary Health Care Programme (PHCP) in the Southern region of the Sudan. The key component in the PHCP is the Community Health Care Worker (CHW), recruited from the community and trained and employed by the Regional Ministry of Health. The goal is to train 33,000 CHWs by the year 2000. Currently there are about 2,200. UNICEF and USAID are involved in several nutrition-related projects.

1. TARGET GROUP NUTRITION AND HEALTH STATUS

1.1 TARGET GROUP NUTRITION AND HEALTH STATUS, GENERAL

NATIONAL

MAJOR DISEASES: Communicable endemo-epidemic diseases are highly prevalent in the Sudan and affect particularly the child population. In general, diseases resulting from poor environmental sanitation constitute the bulk of the Government's health problems. (National Health Programming, 1975)

MAJOR HEALTH PROBLEMS: The ten most common diseases seen in clinics throughout the country are malnutrition and anemia; gastroenteritis; malaria; heart, respiratory and circulatory problems; measles; cerebrospinal meningitis; tuberculosis; hepatitis; cancer; and accidents. (National Health Programming, 1975)

UNDERNUTRITION: 5.15 million Sudanese, 30% of the population, were considered undernourished (intakes below 1526 calories per day) in 1972-74. The per person daily calorie supply was 2067 in 1972-74. (FAO, 1977)

MALNUTRITION: Malnutrition is most prevalent in the eastern districts of Red Sea Hills and Kassala, and in the Western district of Darfur. It is usually associated with the long periods of drought in these areas when food is very scanty. (National Health Programming, 1975)

CAUSES OF MALNUTRITION: Low income, ignorance of nutrition in the immediate environment, and food scarcity are the general causes of malnutrition in various parts of Sudan. (Ibn Oaf et al., 1980)

MALARIA: Malaria is endemic all over the country, with about one million cases reported in 1974. A 1975 estimate from Gezira district lists a 19.7% prevalence rate among the child population. (National Health Programming, 1975)

MALARIA OR FEVER - BAHR EL GHAZAL PROVINCE: Malaria or fever was the most frequent complaint among the villagers of the two Southern Sudan villages surveyed in 1979. 33% of the blood samples from Mangol and 19% from Panjah showed malaria parasites. (African Medical and Research Foundation, 1979)

1.2 TARGET GROUP NUTRITION AND HEALTH STATUS, WOMEN, PREGNANT

RURAL

WOMEN'S HEMOGLOBIN LEVELS - BAHR EL GHAZAL: About 24% of all Panjak village women in the 15 to 44 year old range had low hemoglobin levels (Tallquist method), whereas only 4% of the Manzal village women showed low levels. The Tallquist test is not necessarily a reliable measure, given its observational component. (African Medical and Research Foundation, 1979)

1.3 TARGET GROUP NUTRITION AND HEALTH STATUS, WOMEN, LACTATING

RURAL

WOMEN'S HEMOGLOBIN LEVELS - BAHR EL GHAZAL: About 24% of all Panjak village women in the 15 to 44 year old age range had low hemoglobin levels (Tallquist method), whereas only 4% of the Manzal village women showed low levels. The Tallquist test is not necessarily a reliable measure given its observational component. (African Medical and Research Foundation, 1979)

1.4 TARGET GROUP NUTRITION AND HEALTH STATUS, INFANTS 0-6 MONTHS

NATIONAL

INFANT MORTALITY RATE: In 1973, the Department of Statistics estimated the infant mortality rate to be between 135 and 145 deaths per 1000 live births. (National Health Programming, 1975)

RURAL

INFANT MORTALITY RATE: The infant mortality rate in Karaiba village, near Medani, ranged from 87 to 138 deaths per 1000 live births between 1971 and 1974. (Shazali et al., 1977)

URBAN

BIRTH WEIGHTS AND MORTALITY: 25% of 1144 newborns examined in Khartoum Hospital had birth weights below 2250 grams. The death rate was 36% among these infants and 4% in the rest of the sampled infants. (Karrar-Osman, 1979)

1.5 TARGET GROUP NUTRITION AND HEALTH STATUS, INFANTS 6-24 MONTHS

NATIONAL

MALNUTRITION - WEIGHT FOR AGE: Based on results of three surveys, the Government estimated in 1975 that 50% of all children 0 to 4 years old were malnourished. 40% of the children were thought to suffer first degree malnutrition (75% to 89% of Boston weight for age standards). 9% were classified as second degree (60% to 74% of standard) and 1% as third degree (less than 60% of standard). (National Health Programming, 1975)

VITAMIN A DEFICIENCY: According to the surveys conducted in Khartoum and Gezira provinces, hypovitaminosis A is fairly prevalent, but xerophthalmia does not appear to be a major public health problem. (Mahmoud El Hennawi, 1979)

MAIN CAUSES OF MALNUTRITION: Infections, diarrheal diseases, ignorance, taboos and traditional practices of feeding are considered the main etiological factors leading to malnutrition in the preschool age children. (El Shazali, 1979)

CHILD MORTALITY RATE: The child death rate (the number of deaths of children aged 1 to 4 per thousand in the same age group in a given year) was 29 in 1979, down from the 1960 rate of 47, according to calculations from available sources. (World Bank, 1981)

DISEASES: Figures from official national statistical reports and from hospital data showed that respiratory disease, diarrhea and malaria are the main causes of hospital admissions. (Karrar and Omer, 1981)

GASTROENTERITIS: Gastroenteritis is a major health problem, representing 16% of all cases admitted to hospitals in Sudan. (Mahmoud El Hennawi, 1979)

GASTROENTERITIS: It is estimated that there is a 10% increase per year in the number of reported cases of gastroenteritis. (National Health Programming, 1975)

MALARIA: Malaria is endemic all over the country, gradually increasing in prevalence from north to south. In Gezira province the prevalence rate in children was 20% in 1974. (Mahmoud El Hennawi, 1979)

RURAL

PEM - GEZIRA: Of 1291 0-4 year old children examined in Gezira, only 47% (611) were classed as normal weight for age according to Gomez standards. 35% (446) of the children were classified as having Grade I (mild) malnutrition, 17% (220) as having Grade II (moderate) malnutrition, and 1% (14) as having Grade III (severe) malnutrition. Comparable height for age deficits were also found. (Taha, 1978a)

PEM - EASTERN GEZIRA: 1.7% of the 814 children 0 to 5 years old surveyed in the southern half of Kufaa district fell below 60% of weight for age reference standards, and 42% (353) fell between 60% and 80% of the weight for age standard. (Nur et al., 1978)

PEM BY AGE - EASTERN GEZIRA: Among a sample of 814 preschool children, malnutrition (defined as less than 80% of weight-for-age standard) increased from 20% in the 0 to 11 month age group, to 46% of the 12 to 23 month age group and 62% of the 24 to 35 month age group. (Nur et al., 1978)

PEM AND AGE - WAD MEDANI HOSPITAL: Of the 150 Wad Medani study children, marasmus and marasmic-kwashiorkor patients were older than kwashiorkor patients (17.2 months, S.D. 8.7; 20.3 months, S.D. 7.1; and 12.4 months, S.D. 5.4 respectively). They also showed a higher degree of stunting (height for age), suggesting a more chronic condition than the kwashiorkor patients, who showed an acute syndrome. (Taha, 1979a)

PEM TYPES - WAD MEDANI HOSPITAL: Using the Wellcome classification system (i.e. weight for age deficit and the presence or absence of edema), marasmus was the predominant type of PCM, accounting for 55% (83) of the 150 malnourished children admitted to Wad Medani hospital;

1.5 TARGET GROUP NUTRITION AND HEALTH STATUS, INFANTS 6-24 MONTHS (Cont.)

marasmic-kwashiorkor accounted for 31% (47); and kwashiorkor accounted for the remaining 13% (20). (Taha, 1979a)

GROWTH PATTERNS - GEZIRA: The growth of children in Gezira was similar to Boston standards up to the sixth month; thereafter growth clearly lagged behind the standard and the gap persisted through at least the fourth year. (Taha, 1978a)

PEM - KARAIBA: Among 203 children under five years old in Karaiba, 11.3% had third degree malnutrition (Gomez classification), 21.7% had second degree malnutrition, 45% had first degree malnutrition and only 21.7% were classed as normal. (Shazali et al., 1977)

GROWTH PATTERN TRENDS: The pattern of a sharp reduction in growth after the first few months of life was seen in studies of the Gezira area in both 1951 and 1972. Growth curves from both periods suggest that there has been no improvement in nutritional status of Gezira children during the intervening years. (Taha, 1978a)

PEM TREND - KARAIBA: The rate of third degree malnutrition dropped from 11.3% to 7.4% among the 189 Karaiba children under five sampled in a one year follow-up. 21.7% had second degree malnutrition, no change from the previous year, 42% had first degree malnutrition, a decline of 3%, and 29% of the children were classified as normal, an increase of 8%. (Shazali et al., n.d.)

PEM - EL HASANAB: Signs of malnutrition were seen among the preschool children of the villages of El Hasanab. (Karran-Osman et al., 1977)

HEIGHT AND WEIGHT TRENDS - EL KALAKLA: In 1968 the mean height and weight of the preschool children (6 months - 6 years) of El Kalakla were below the 10th percentile of the British standard. In 1975 the mean weights of preschool children in the same village were still about the 10th percentile and the mean heights of children above age 30 months were about the 25th percentile. (Sukkar et al., 1976)

PEM - SOUTH KORDOFAN PROVINCE: In a preliminary baseline survey for UNICEF, 50% of the 60 children sampled were classified as having first or second degree malnutrition (based on weight for age) and 1% had third degree malnutrition. (Ibn Oaf et al., 1980)

UNDERNUTRITION - WEIGHT FOR AGE - SOUTH KORDOFAN: 42% of the 12 El Kweik children under 2 years old and 15% of the 13 El Efin children under 2 years old were undernourished (less than 80% of NCHS/CDC weight for age standards) according to a pilot nutrition survey undertaken. None of the under one year olds in El Efin were malnourished, whereas 44% of the El Kweik infants were. (Lockwood, 1981)

UNDERNUTRITION - WEIGHT FOR AGE - SOUTH KORDOFAN: 59% of the 22 El Kweik village children under five and 38% of the 26 El Efin children were undernourished (less than 80% of NCHS/CDC weight for age standards). In

both villages, the Nuba children showed a better nutritional status (45% and 31%) than the Arab children (73% and 45%). (Lockwood, 1981)

MALNUTRITION - WESTERN EQUATORIA: Only 7% of the 43 children (3) under five in the villages of Nabima and Nyaka had mid-arm circumference measurements less than 12.5 cm., indicating malnutrition. Another 5 children (12%) measured between 12.5 cm. and 13.5 cm., indicating possible malnutrition. (African Medical and Research Foundation, 1980)

BAHR EL GHAZAL PROVINCE: 18 to 20% of 1 to 5 year olds surveyed in Panjah village were classified as suffering malnutrition (based on mid-arm circumference and/or weight for age). 13% to 26% of the 1 to 5 year old children in Mangol were also so classified. A weight to head circumference ratio measurement gave even higher rates of malnutrition in the two villages. (African Medical and Research Foundation, 1979)

CAUSES OF MALNUTRITION: The Government of Sudan has stated that the main cause of protein energy malnutrition in rural areas is faulty infant feeding practices. (Ibn Oaf et al., 1980)

HEMOGLOBIN LEVELS - SOUTH KORDOFAN: A rough measure of hemoglobin levels in children under five suggested that 82% of the boys and 33% of the girls age 0-4 in the village of Nabima had low levels; in the village of Nyaka, the rates were 38% and 25%. (African Medical and Research Foundation, 1980)

HEMOGLOBIN LEVELS - BAHR EL GHAZAL: About 30% of the 0 to 4 year old children in two Bahr el Ghazal Province villages from whom blood samples were obtained showed low hemoglobin levels (Tallquist method). (African Medical and Research Foundation, 1979)

VITAMIN A DEFICIENCY: 16% of the male and 12% of the female rural children 0 to 6 years of age were found to have xerosis during a 1978 survey in 26 villages (N=2,378). 1.9% of male and 1.3% of female children had Bitot's spots with xerosis, for an overall rate of 1.64%. (Mahmoud El Hennaw, 1979)

CONJUNCTIVITIES - BAHR EL GHAZAL PROVINCE: In the village of Panjah, 22% of the 0 to 4 year old boys and 3% of the girls (14% of the total) surveyed had conjunctivitis. In Mangol, 19% of the boys and 24% of the girls (20% of the total) 0 to 4 years old had conjunctivitis. (African Medical and Research Foundation, 1979)

NUTRIENT DEFICIENCY SYMPTOMS: Among the 203 children under five years old in the village of Karaiba, clinical symptoms of iron-deficiency anemia (e.g. pale conjunctiva) were found in 22 cases; clinical symptoms of B-vitamin deficiencies (e.g. angular stomatitis, atrophic papillae and cheilosis) were recorded in 23 cases; clinical symptoms of vitamin A deficiency (e.g. Bitot's spots, keratomalacia and conjunctival xerosis) were detected in 10 cases; and other clinical signs indicative of nutrient deficiencies were seen in 7 cases. (Shazali et al., 1977)

1.5 TARGET GROUP NUTRITION AND HEALTH STATUS, INFANTS 6-24 MONTHS (Cont.)

NUTRIENT DEFICIENCY SYMPTOMS: Among 189 children under 5 years old in Karaiba followed up after one year, there were 13 cases of pale conjunctiva, 6 cases of angular stomatitis, 4 cases of atrophic papillae, 4 cases of cheilosis, and 8 cases of other nutrient deficiency symptoms. (Shazali et al., n.d.)

CHILDHOOD DISEASES - BLUE NILE: In a study of 293 children under five in Butri village the major causes of morbidity were respiratory illnesses (cough) and febrile (fever) and diarrheal diseases. The peak incidences of all three diseases were during the summer rainy season. (Karrar and Omer, 1981)

CHILDHOOD DISEASES - GEZIRA: Among 1560 children in the Gezira, there were 1184 (75.9%) cases of gastroenteritis, 1099 (70%) of respiratory infections, 70 (4.9%) of measles and 588 (37.7%) of whooping cough. (Taha, 1978b)

COMMON DISEASES - EASTERN GEZIRA: According to the responses of 454 women, 50% of their children had diarrhea in the last year, 29% had measles, 24% had whooping cough and 16% said the child had pneumonia during the year. 30% of the mothers surveyed in the Rufaa district stated that their children had had two or more of the above diseases. (Nur et al., 1978)

COMMON DISEASES: Cases of marasmus and kwashiorkor were found among the Idd Hussein children during a food consumption survey. The other common diseases found among the children were gastroenteritis, diarrhea and malaria. (Karrar Osman & El Amin, 1977)

MEASLES: The incidence of measles was 14% in the first year of life among a sample of 17 infants in Butri village, Blue Nile province. (Karrar and Omer, 1981)

URBAN

WEIGHT FOR AGE - PORT SUDAN: Only 34% of children examined in Port Sudan were classed as normal weight for age, while 26% were considered to have first degree PCM, 18% second degree PCM, and 22% third degree PCM. (Taha, 1978a)

WEIGHT FOR AGE - KHARTOUM: 47% of children examined in Khartoum were normal weight for age, but 31% had first degree PCM, 18% second degree and 4% third degree PCM. (Taha, 1978a)

MALNUTRITION - WEIGHT FOR AGE - KHARTOUM: A 1973 study of 300 preschool children in Khartoum found that 44% of the 0 to 1 year old children were malnourished (2% with third degree malnutrition). 58% of the 1 to 3 year olds were malnourished (4% with third degree malnutrition). 33% of the 3 to 5 years were malnourished. (Mahmoud El Hennawi, 1979)

VITAMIN A DEFICIENCY - KHARTOUM: 6.3% of the boys and 5.6% of the girls 0 to 6 years old were found to have xerosis in a 1978 survey in Khartoum. 2.1% of the boys and 0.7% of the girls had Bitot's spots with xerosis, for an overall rate of 1.57%. (Mahmoud El Hennawi, 1979)

2. DIETARY BELIEFS

2.1 DIETARY BELIEFS, GENERAL

RURAL

FOOD TABOOS - WESTERN EQUATORIA: Most "taboos" in the Nabima and Nyaka villages applied to all people or to an entire clan. The most widespread taboo was against eating wild pigs, mentioned by at least 70% of the respondents. The most common reason given for taboos was that a food caused leprosy. A wide variety of meats and a few other foods (cassava leaves, okra, beer) were also mentioned as forbidden foods. (African Medical and Research Foundation, 1980)

FOOD TABOOS - BAKI EL GHAZAL: About three quarters of the heads of household said that there were foods which should not be eaten. However, the tabooed foods (e.g., hippo, giraffe, crocodile, monkey and python) were generally not important foods. These taboos were closely tied to the traditional belief system in which each family is "related to" a particular animal. (African Medical and Research Foundation, 1979)

MEAT PREFERENCE: Mutton was the meat with the highest social ranking, being closely associated with a system of traditional ideas and practices. Village families with social standing claimed "never" to eat beef, which they professed to regard with contempt. In practice, however, people were almost completely dependent on what was available in the marketplace. (Review of 1951 study.) (Ernster, 1976)

MILK ATTITUDES AND ACCESS: The idea of selling milk in the village was repugnant to most Gezira villagers, and this attitude interfered with milk distribution. (Review of 1951 study.) (Ernster, 1976)

WOMEN'S FOOD: Men regarded the paps made from kisra (bread) and lugma and drunk only by the women with good-natured contempt. They explained them as being useful for giving women the plumpness they desired. To the women they were regarded as a way of making up any insufficiency in the amount of food remaining for them after the rest of the family had eaten. (Review of 1951 study.) (Ernster, 1976)

ALCOHOL: Islamic law bans alcoholic beverages. (Ernster, 1976)

2.2 DIETARY BELIEFS ABOUT PREGNANCY

NATIONAL

RESTRICTED INTAKE: Many mothers restrict their food intake during pregnancy. During the first few months the reason given was morning sickness. Fear of the fetus growing too large and causing obstructed labor was another common reason. (El Shazali, 1979)

BREAD RESTRICTION: Kisra (the national bread) is avoided in the first seven days after delivery because of the belief that it will make the remnants of the placenta rotten and smelly. (El Shazali, 1979)

2.2 DIETARY BELIEFS ABOUT PREGNANCY (Cont.)

CAMEL MEAT AVOIDED: In some areas, pregnant women would not eat camel meat, for fear that it would prolong pregnancy. This could be harmful in areas where the normally available meat is camel, for example in North Kordfan. (El Shazali, 1979)

BREAST MILK: Women believe the milk of a pregnant mother is unhealthy for the child. (Ibn Oaf et al., 1980)

RURAL

FASTING: Pregnant and lactating women were excused from the Ramadan month of fasting, but there were rules about making up the days later. This debt, combined with genuine piety and the urge to be in the mainstream, led most women to observe the fast even when technically exempt. (Review of 1951 study.) (Ernster, 1976)

RECOMMENDED FOODS: All of the Gezira families studied emphasized milk, butterfat (semn), dates, pap (preferably of wheat flour) and meat as the best foods at confinement. Coffee was always the first thing to be offered after the birth. (Review of 1951 study.) (Ernster, 1976)

FOOD TABOOS: Several meats (wild pig, giraffe, buck zebra, elephant and porcupine) were mentioned by 1 to 4% of the households in Nabima or Nyaka as being forbidden for pregnant women in particular. (African Medical and Research Foundation, 1980)

URBAN

EFFECTS OF FOOD CRAVINGS: 20% of the 108 pregnant women studied believed that food cravings in pregnancy, if not fulfilled, would be directly imprinted on the child. Birth marks and congenital malformations were attributed to food cravings. (Karrar-Osman, 1979)

SPICY FOODS: 9.9% of the pregnant women interviewed believed that heavily spiced foods would affect the child, and therefore avoided them. (Karrar-Osman, 1979)

BREAST FEEDING AND CONTRACEPTION - OMDURMAN: 40% of mothers in El-Gamaeir (a poor area of Omdurman) and 26% of mothers in El Molzmin (more privileged areas) felt that breast feeding protects against pregnancy and that there is no need for other contraceptive measures, according to a survey of 300 mothers. This represents a significant difference between these two groups (privileged and underprivileged, $p < .002$). (Shadad et al., 1981)

2.3 DIETARY BELIEFS ABOUT LACTATION

2.3.1 DIETARY BELIEFS ABOUT LACTATION, MOTHER

URBAN

BREAST MILK IS BEST - OMDURMAN: 85% of the 300 mothers from three areas of Omdurman agreed with a survey statement that breast milk is the best food for babies under 4 months of age. However, 12% disagreed with the statement, 15% in El Gamaeir and 10.5% in the other more privileged areas. (Shadad et al., 1981)

NECESSITY OF BREAST FEEDING - OMDURMAN: 12% of the 300 mothers interviewed agreed with the statement that it was no longer necessary to breast feed if the mother could afford to buy milk powder. 2% were doubtful and 86% disagreed. There was a significantly higher rate of agreement with the statement among mothers from the peri-urban area El-Gamaeir than from the more privileged mothers of El Thawra and El-Molazmin (23% to 6.5%; $p < .001$). Shadad et al., 1981)

BREAST MILK AND PREGNANCY - OMDURMAN: A majority of surveyed mothers in both El-Gamaeir (83%) and the more privileged areas of El-Molazmin and El-Thawra (64%) agreed that the breast milk of a pregnant mother is harmful to the baby. However, the underprivileged mothers were significantly more likely to agree than the privileged mothers ($p < .001$). (Shadad et al., 1981)

POST-PARTUM PERIOD: Most women believed that for a period of 40 days after delivery, a mother should not do any household work, and that a grandmother or close relative should help out. (Karrar-Osman, 1979)

POST-PARTUM PRIVILEGES: A common belief among the town women interviewed was that during the 40 day post-partum period, rest and special diet should make the new mother gain weight. Weight gain was a sign of social prestige for a woman's mother or close relative who was caring for her because it showed she had been well cared for. (Karrar-Osman, 1979)

POST-PARTUM DIET: 92.6% of the 108 women interviewed in three towns believed that the diet should be changed during the post-partum period to compensate for loss during delivery and for the production of more milk. (Karrar-Osman, 1979)

EXTRA FOODS: 44.4% of the women interviewed believed the diet should be changed during lactation. The extra foods added to the diet were believed to increase the volume of milk produced. The information on what foods to add was received by these women from their mothers (in 58.3% of the cases), friends and others (20.3%), own experience (13.8%), and midwives (7.6%). (Karrar-Osman, 1979)

WARM FOODS POST-PARTUM: Some foods such as warm pigeon and chicken soup were thought to be warm and would "soothe the stomach and keep on the flow of dirt" and would compensate for losses during delivery. 32.1%

2.3.1 DIETARY BELIEFS ABOUT LACTATION, MOTHER (Cont.)

believed that drinking hot strong black coffee with no sugar immediately after delivery would keep up the flow of "unclean blood and...clean the uterus." (Karrar-Osman, 1979)

FOODS AVOIDED: Dietary practices during the post-partum period are based on beliefs that some foods cause stomach trouble, especially colic, during the first few days after delivery. These include bread and kisra, a pancake prepared from fermented sorghum flour. (Karrar-Osman, 1979)

QUANTITY OF MILK: A majority of mothers in both the privileged and underprivileged survey areas of Omdurman (78% and 66%) did not believe a mother should discontinue breast feeding and substitute bottle feeding if the quantity of breast milk was insufficient. 20% and 33% respectively did agree that breast feeding should be stopped in this situation. (Shadad et al., 1981)

NURSING AT NIGHT - OMDURMAN: 71% of the mothers from the poorer area surveyed and 52% of the mothers from more privileged areas disagreed in response to the statement that mothers should not have their babies lying beside them at night. The difference between the two groups is significant. (Shadad et al., 1981)

FEEDING SCHEDULE - OMDURMAN: 65% of the 100 mothers from the poor area of El-Gamaeir believed "on demand" feeding was the best breast feeding pattern. Among the 200 more privileged mothers of El-Molazmin and El-Thawra only 36% chose the "on demand" pattern as the best. Most of the privileged area mothers (62%) felt scheduled feeding was best. The difference between groups was significant ($p < .001$). (Shadad et al., 1981)

IMPROVED EMOTIONAL RELATION - OMDURMAN: A majority (89%) of the 300 women surveyed in three areas of Omdurman agreed that breast feeding improves the emotional relationship between mother and child. (Shadad et al., 1981)

BEST WAY TO CALM BABY - OMDURMAN: 53% of mothers surveyed in three areas agreed that the best way to calm a baby is to give him/her the breast, with mothers from the poor area agreeing more frequently than those from more privileged areas (59% to 50%). (Shadad et al., 1981)

EMBARRASSMENT - OMDURMAN: A majority of mothers disagreed with the statement that it is embarrassing to breast feed while visiting friends. However, a significantly higher percent ($p < .001$) of mothers from the more privileged areas agreed with the statement (46%) than mothers from the poorer area (20%). (Shadad et al., 1981)

PERCEPTION OF HUSBAND'S ATTITUDE - OMDURMAN: 86% of the 300 surveyed mothers disagreed with the statement that a husband would not like his wife to breast feed because it spoils the shape of the breast. (Shadad et al., 1981)

LOSING WEIGHT - OMDURMAN: 48% of mothers questioned agreed that breast feeding helps a mother lose weight and 41% disagreed. In the poorer area of El-Gamaeir agreement was 52%. (Shadad et al., 1981)

2.3.2 DIETARY BELIEFS ABOUT LACTATION, INFANTS

NATIONAL

BREAST FEEDING BEST: Most mothers, especially in rural areas, believed that mothers' milk was best for their infants. Mothers were psychologically set to breastfeed and so their milk was usually sufficient. (El Shazali, 1979)

SUPPORT FOR BREAST FEEDING: While teaching their children to walk, some mother sing "Tatai, Tatai, laban umak Ha Hai" meaning "walk, walk, your mother's milk is good." (El Shazali, 1979)

SUFFICIENCY OF EXCLUSIVE BREAST FEEDING: Some mothers believe that breast milk alone is sufficient for the child as long as he is taking it no matter what his age or size. (El Shazali, 1979)

WEANING AND PREGNANCY: The commonest reason for weaning is a new pregnancy. Most mothers believe that the milk of a pregnant mother is harmful to the infant. (El Shazali, 1979)

RESTRICTIONS ON BREAST FEEDING: It is believed that boys should not be breastfed at sunset or they will become stupid. (El Shazali, 1979)

HEAD COVERINGS: Many mothers expressed a belief that they should not breastfeed with their heads uncovered, for fear of their children growing up to be sinful and being publicly exposed. (El Shazali, 1979)

"YALAJJI" PRACTICE: In some tribes, especially in central Sudan, on the day the infant was born, before the first breast feed, the grandfather or another elderly man would hold the newborn, pass his finger over his gums, and hold him up towards the tombs of the holymen "Hamad and Khogali," calling upon them to ensure successful breast feeding. (El Shazali, 1979)

RURAL

MALE-FEMALE WEANING DIFFERENCES: In the Gezira area, the only reason given for breast feeding girls longer than boys was that "a woman is only half a man." (Review of 1951 study.) (Ernster, 1976)

2.4 DIETARY BELIEFS ABOUT BREAST MILK SUBSTITUTES (INCLUDING BOTTLE FEEDING)

URBAN

TIME AND EFFORT - OMDURMAN: In a survey of 300 mothers in three areas of Omdurman, 77% disagreed with the statement that bottle feeding needs less time and effort than breast feeding. 20% agreed with the statement. (Shadad et al., 1981)

2.5 DIETARY BELIEFS ABOUT WEANING

NATIONAL

RECOMMENDED FOODS: Over 50% of mothers identified milk, juices and eggs as good for children. Other foods identified as good were custard (45.5%); fruits (43.6%); liver (37%); biscuit (32.9%); beans (29.7%); bread (27.3%); meat (23.6%); and kisra and mulah (16.3%). (El Shazali, 1979)

HARMFUL FOODS: Among those mothers who believed that kisra and mulah (63% of sample), spiced food (54%), meat (45%), cheese and sour milk (29%) and vegetables (15%) were bad foods for children, 72% thought these foods caused diarrhea, 15% thought they were indigestible and 11% that they retarded growth. (El Shazali, 1979)

RURAL

IMPORTANT FOODS: Approximately 75% of the respondents in the villages of Nabima and Nyaka were aware that there are important foods for children. The foods mentioned most often, in descending order, were bananas, porridge/asida, honey, potatoes, unspecified vegetables, cassava, and groundnuts. Eggs, meat and milk were also mentioned by about one fourth of the respondents. (African Medical and Research Foundation, 1980)

EGGS: In central Gezira, many mothers believe eggs to be harmful to children, causing delays in speech. (El Shazali, 1979)

URBAN

WEANING - OMDURMAN: A significantly larger percent of privileged mothers (50%) than less privileged mothers (26%) agreed that any child should be weaned before the age of one year ($p < .002$). (Shadad et al., 1981)

2.6 DIETARY BELIEFS ABOUT ILLNESS AND CURE

NATIONAL

VOMITING: Some mothers believed that vomiting was beneficial to the baby because it would lead to enlargement of the lumen of the bowels; thus they would delay seeking medical attention. (El Shazali, 1979)

RURAL

CAUSES OF DISEASES: 26 to 34% of the heads of household surveyed in two villages in Bahr el Ghazal Province knew that diarrhea was caused by bad food or water. 46 to 47% knew that scabies was caused by lack of hygiene. 23 to 28% knew that malaria was caused by mosquitoes, but almost as many heads of household believed that malaria was caused by cold water or cold weather. No heads of household knew the cause of tuberculosis. (African Medical and Research Foundation, 1979)

PREVENTION OF DISEASE: The weakest knowledge about diseases was in the area of prevention, according to the survey of two villages in Bahr el Ghazal Province. Less than 2% of the heads of household surveyed were aware of either traditional or modern means of prevention for diarrhea, malaria or tuberculosis. (African Medical and Research Foundation, 1979)

TREATMENT OF DISEASES: None of the heads of household in the two surveyed villages in Bahr el Ghazal Province were aware of modern treatments for diarrhea or malaria. Only about 1% were aware of modern treatment of tuberculosis. 20 to 41% of the heads of household suggested traditional medicines for diarrhea and malaria, but only about 1% suggested traditional treatments for TB. (African Medical and Research Foundation, 1979)

URBAN

DIARRHEA AND BREAST FEEDING - OMDURMAN: 31% of surveyed mothers in the poor area of El-Gamaeir agreed that one should immediately stop breast feeding when a child contracts diarrhea, but 65% disagreed. Among the privileged mothers surveyed, 55% agreed with the statement and 43% disagreed. The difference between the two groups is significant ($p < .001$). (Shadad et al., 1981)

DIARRHEA, BREAST AND BOTTLE FEEDING: 84% of the surveyed mothers in three areas of Omdurman disagreed with the statement that breast feeding often causes diarrhea. In addition, 67% of the mothers agreed that diarrhea occurs more frequently in bottle fed babies than in breast fed babies even if bottles are prepared under hygienic conditions. (Shadad et al., 1981)

3. DIETARY PRACTICES

3.1 DIETARY PRACTICES, GENERAL

NATIONAL

STAPLE FOODS: The chief staple was sorghum (dura) which is grown widely. Pennisetum millet (dukhn) was important on the sandy soils in the western part of the central rainlands. In the northern irrigated areas, some wheat was eaten and in the irrigated areas of the south rice was also available. (Centre for Research on Disasters, 1979)

STAPLE FOODS - SOUTHERN SUDAN: Cassava is an important staple, but sweet potatoes, maize, eleusine millet, sorghum millet and yams were also eaten. Wheat bread is increasingly consumed in the towns. (Centre for Research on Disasters, 1979)

DAILY CALORIE PER CAPITA: The daily calorie supply per person was 2184 calories in 1977, according to food balance sheets. (World Bank, 1981)

FOOD PREPARATION STANDARDS: The mixed urban communities have developed culinary practices based on the best of the rural traditions which may be regarded as representative "Sudanese cookery" and set the standard which those with social aspirations in the villages strive to emulate. (Review of 1951 study.) (Ernster, 1976)

LACK OF FOOD: 60% of the population of Darfur, Red Sea, and Equatoria provinces were affected by the lack of dura in 1975. 60,000 tons of dura were subsidized by the Government to cover the needs of the 1.8 million people affected. (National Health Programming, 1975)

HUNGER AND SEASON - WESTERN EQUATORIA: Most respondents in Nabima and Nyaka said they were hungry in the months of June and July. (African Medical and Research Foundation, 1980)

FAMILY FOOD DISTRIBUTION: The best foods in the house are given to the father and elder males. Children and women get what is left after the men have eaten. (El Shazali, 1979)

MEAT TABOOS AND RITUALS: Moslems, mainly in the North, do not eat pork or non-ritually slaughtered meat. Consumption of beef by cattle-owning nomads is restricted by social custom and ritual. (Centre for Research on Disasters, 1979)

RURAL

STAPLE FOOD - SORGHUM: The staple food was sorghum, and supplied the bulk, i.e., the main dish, in the usual meal. Sorghum was marketed as a grain and made into flour by the consumer. The two main forms were kisra, a thin pancake of dough spread wafer-thin on a hot baking sheet, and lugma, a stiff porridge. (Review of 1951 study.) (Ernster, 1976)

3.1 DIETARY PRACTICES, GENERAL (Cont.)

STAPLE FOODS - SOUTH KORDOFAN PROVINCE: In the Nuba mountains of South Kordofan Province, the main foods are dura, pulses, and small quantities of meat, milk and vegetables. (Ibn Oaf et al., 1980)

SORGHUM: Preferences for different varieties of sorghum were governed by several considerations, notably the yield of straw for fodder, storing qualities, and the elasticity of the dough. Red feterita scored high on all counts, but other things being equal, people of the Gezira liked to have white kisra. (Review of 1951 study.) (Ernster, 1976)

MAIN DIET - GEZIRA: In addition to the staple dish of kisra or lugma, Gezira area meals were accompanied by stews or other side dishes, or by a relish or sauce, or simply by water and condiments. At its poorest, this could be not only extremely monotonous and limited in range, but also meager in amount. (Review of 1951 study.) (Ernster, 1976)

MAIN DIET - SOUTH KORDOFAN PROVINCE: In Abye district, the Dinka diet consists of sorghum with meat and vegetable relishes, supplemented by wild fruits and plant leaves. The main deficiencies are vitamins A, C and riboflavin. (Ibn Oaf et al., 1980)

WOMEN'S FOODS: Leftover kisra was broken up and soaked to make a pap called mos which was drunk, with or without sugar, by the women only. A similar pap made from lugma was called a'kara. For the women, these paps were ways of making up for any insufficiency in the amount of food remaining for them after the rest of the family had eaten. (Review of 1951 study.) (Ernster, 1976)

SOURCES OF PROTEIN - GEZIRA: The contribution of cereals to protein intake was 38%, meat 34.8%, milk 8.7%, legumes 9%, vegetables 8.7%, and eggs and fish a negligible percentage in five Gezira villages. (Taha, 1978b)

SOURCE OF NUTRIENTS - SOUTH KORDOFAN: In the Nuba mountains, dura is the main source of calories, proteins, and thiamin. The diet is deficient in vitamins A and C. (Ibn Oaf et al., 1980)

MILK ATTITUDES AND ACCESS: The idea of selling milk in the village was repugnant to most Gezira villagers, and this inherited attitude interfered with milk distribution. (Review of 1951 study.) (Ernster, 1976)

MILK CONSUMPTION PATTERNS: Milk consumption was influenced by seasonal variations, social factors and economic practices. Seasonal population migrations increased milk demand, while fodder reserved determined supply. Additional milk was obtained from flocks and herds coming into the area from outside to consume foliage from harvested cotton bushes. (Review of 1951 study.) (Ernster, 1976)

VEGETABLES: Vegetables consumed in the Gezira diet included Jew's mallow, cowpea leaves, other dark green leaves, and dried vegetables (okra, tomato, and Jew's mallow), all of which are high in nutritional value. (Review of 1951 study.) (Ernster, 1976)

FRESH FRUITS: Fresh fruit was a luxury usually reserved for special occasions, including meals for ending a fast. However, occasionally bananas, melons, guavas, or oranges were eaten on normal occasions. Limes were fairly common. (Review of 1951 study.) (Ernster, 1976)

BEANS: The most common beans in the Gezira and the towns were bonavist beans, followed by cowpeas, lentils, and pigeon peas. Seen only rarely were chickpeas, horse beans and butter beans. The consumption of pulses increased during the Muslim Ramadan fast for they were a popular food for breaking the fast. (Review of 1951 study.) (Ernster, 1976)

ALCOHOLIC AND NON-ALCOHOLIC BEVERAGES: Several alcoholic and non-alcoholic beverages were made in the Gezira and surrounding area. The non-alcoholic ones were frequently mentioned in the food records. Because of the Islamic ban on the former, they were seldom named, yet there were beer booths in every market and ten women in the studied village were brewing. A majority of the villagers took alcohol moderately often, usually in moderate quantities, but with occasional celebrations. (Review of 1951 study.) (Ernster, 1976)

FOOD PURCHASING: The married women's traditional social position inhibited them from marketing. Servants or elder relatives purchased foods for wealthier homes while husbands were responsible in poorer ones. This caused delays and uncertainty for housewives. (Review of 1951 study.) (Ernster, 1976)

FOOD PREPARATION CONSTRAINTS: Many factors contributed to making village cooking laborious, including: the lack of firm, clean, flat surfaces; the use of large general purpose knives; scarcity of water supplies; lack of separate kitchen facilities; and fly and sand nuisances. (Review of 1951 study.) (Ernster, 1976)

FOOD PREPARATION - GRAIN GRINDING: In the Gezira villages, poor families ground their own sorghum while the well-to-do either hired women to grind it or took it to a mill. (Review of 1951 study.) (Ernster, 1976)

PREPARATION OF DURA PORRIDGE - SOUTH KORDOFAN PROVINCE: In preparing porridge from dura, the outer bean of the grains is removed, reducing the thiamine, riboflavin and calcium content. (Ibn Oaf et al., 1980)

FOOD PREPARATION - DRIED VEGETABLES: Okra, tomato, and Jew's mallow were cut up and sun dried without preliminary blanching in the Gezira villages. (Review of 1951 study.) (Ernster, 1976)

FOOD PREPARATION - STEWS: Stews were cooked conservatively; no liquid was thrown away and lids were used. Vegetables were added after the stews were boiling. However, stews were often cooked for long periods

3.1 DIETARY PRACTICES, GENERAL (Cont.)

and then stood for some further period before being eaten. (Review of 1951 study.) (Ernster, 1976)

NUMBER OF MEALS - WESTERN EQUATORIA: About half the survey respondents in both Nabima and Nyaka said they usually ate two meals each day. 41% in Nyaka said they usually ate 3 meals per day and 30% in Nabima said they usually ate one meal a day. (African Medical and Research Foundation, 1980)

MEAL PATTERNS: Lunch was considered the main meal by a majority (58%) and breakfast was considered the main meal by the rest of the 40 families surveyed in Idd Hussein. Most families (72%) had three meals per day. Meals were taken together by the whole family in 35% of the households, men and male children were fed first and separately in 15%, children ate alone in 8% and women and children ate together in 13% of households. (Karrar-Osman and El Amin, 1977)

DINNER - BAHR EL GHAZAL PROVINCE: 26% of the heads of household in Panjak and 38% in Mangol reported eating only asida (dura porridge) at the previous dinner. 18% in each village reported asida with sesame or groundnut paste as the only foods. 50% and 38%, respectively, of the village heads of households reported eating asida with meat or fish, and some also reported paste and/or vegetables at the previous dinner. All households in both villages drank milk. (African Medical and Research Foundation, 1979)

MEN AND GUESTS FAVORED: Male household members ate separately and were served first. Hospitality was paramount, with guests eating even at the family's expense. (Review of 1951 study.) (Ernster, 1976)

WOMEN LAST: In general women were not fed as well as the men; the women went hungry before anyone else and got the choice foods last. (Review of 1951 study.) (Ernster, 1976)

FAMILY FOOD DISTRIBUTION: In the Gezira community, adult males and guests still receive the bulk of the food. (Taha, 1979b)

FAMILY FOOD DISTRIBUTION: Inequitable intra-family food distribution in favor of adult males was found in five Gezira villages, where there were high average intakes but significant rates of childhood PCM. Traditional rules of hospitality are implicated. (Taha, 1978b)

FASTING: Islamic law imposes the duty of fasting during daylight hours for 30 days during the month of Ramadan, which falls ten days earlier each year. (Review of 1951 study.) (Ernster, 1976)

FASTING: During the Muslim Ramadan fast, normal dietary patterns were totally disrupted. All intake (even of water) was banned during daylight hours. Evening meals were also modified with special "breakfast" foods. (Review of 1951 study.) (Ernster, 1976)

HUNGRY SEASON: All but one head of household surveyed in two Bahr el Ghazal Province villages said they were hungry at some time during the year. Most were hungry for about one month, usually during July. (African Medical and Research Foundation, 1979)

ENERGY INTAKE DEFICITS: The average intake of 2073 calories per person per day in five Gezira villages was 93% of the FAO/WHO 1973 recommended energy intake. Two of the five villages had large mean deficits (784 and 545 calories per person per day), and a third village had a slight deficit (133 calories per person per day). (Taha, 1978b)

PROTEIN INTAKE: A food consumption survey in Gezira showed high protein intakes, which supported previous observations that Sudan as a whole has one of the highest levels of consumption of animal protein in the Middle East. (Taha, 1978b)

PROTEIN INTAKE: The average intake of protein per person per day ranged from 39.4 gm to 75.3 gm, which was well above the minimum requirements recommended by FAO/WHO in 1973, even after correcting for limiting amino acids and special group requirements. (Taha, 1978b)

NUTRIENT INTAKES: Based on three one-day dietary recalls, the average Soba West village diet was adequate in calories, protein, calcium, iron, thiamin, niacin, riboflavin and ascorbic acid. Vitamin A intake was deficient (42% of requirement) because of the low intake of fresh vegetables and fruits, milk and other animal sources of vitamin A. (Nutrition Division, 1973)

NUTRIENT INTAKE: Family per capita food intake was calculated to be adequate for all nutrients except vitamin A in the village of Idd Hussein. (Karrar-Osman and El Amin, 1977)

DEFICIENCIES IN THE DIET: Calcium, vitamin A, riboflavin, and vitamin C were the nutrients most likely to be deficient in the 1949-50 Gezira area diets studied. (Review of a 1951 study.) (Ernster, 1976)

URBAN

DAILY DIET: Dura, wheat bread, meat, milk, and broad beans are everyday items of the diet, providing a good protein intake. (Nutrition Division, n.d.)

NUMBER OF MEALS: Among 39 households of the Nasir Extension area, 33 households took 3 meals per day. 25 households considered lunch the main meal and 14 considered breakfast the main one. One or two servings were usually given at all meals. (Nutrition Division, n.d.)

CALORIE AND PROTEIN INTAKES: The average intake per person per day among 39 households was 124 grams protein and 3,229 calories according to a two day dietary recall, carried out in 1981 or 1982. (Nutrition Division, n.d.)

3.1 DIETARY PRACTICES, GENERAL (Cont.)

VITAMIN AND MINERAL INTAKES: The average vitamin A intake per person per day among 39 Nasir Extension households was 3,088 I.U. which was less than the 3,603 I.U. average requirement but well above the minimum needs. All other vitamin and mineral calculated intakes were above the average requirements. (Nutrition Division, n.d.)

3.2 DIETARY PRACTICES, WOMEN

3.2.1 DIETARY PRACTICES, WOMEN, DURING PREGNANCY

NATIONAL

RESTRICTIONS: Many mothers restrict food intake during pregnancy. What they do eat is not especially nutritious, e.g., pepper and lemon, kisra (national bread) and water, salted fish, and part of raw stomach. (El Shazali, 1979)

PROTEIN RESTRICTION: If pregnant women suspect that they have "salts in urine" (albuminuria) they restrict their intake of foods rich in protein, such as eggs, meat, and milk. (El Shazali, 1979)

MEAT AVOIDED: In some areas, pregnant women avoided eating camel meat because they believed it would prolong pregnancy. This could be harmful in areas such as North Kordfan, where camel is the most readily available meat. (El Shazali, 1979)

LIVER: In the last months of pregnancy some women would eat raw liver. (El Shazali, 1979)

RURAL

NO CHANGES IN DIET: No major changes in diet during pregnancy were found in a 1972 Gezira village survey. Any modification of diet during pregnancy was toward more restricted diets, due to lack of appetite. (Taha, 1978b)

URBAN

FOOD CRAVINGS: 93% of the 108 pregnant women interviewed craved at least one food. 71.2% mentioned a craving for salty, sour and spicy foods; 36.1% for starchy diets low in animal protein; 32.4% for dairy items; 29.6% for meat, fish or poultry; and 13.9% mentioned cravings for clay and other non-food items. (Karrar-Osman, 1979)

FOOD AVERSIONS: 57.4% of the pregnant women interviewed expressed aversions for meat, fish and poultry and 13.2% for sour and salty foods. The reasons cited for the aversions were that the foods caused heartburn, colic, nausea, vomiting and diarrhea or that they had an unpleasant smell. (Karrar-Osman, 1979)

3.2.2 DIETARY PRACTICES, WOMEN DURING LACTATION

NATIONAL

POSTPARTUM DIET: Nutritional traditions are at their best during this period. Neighboring women bring the nursing mother nutritious foods such as chicken, meat, milk, and wheat bread with milk, during the first 40 days after birth. The nursing mother will also be given the best of the foods in her own house, including milk, chicken, meat, soup, nasha (national pudding cooked with dates) and hilba. (El Shazali, 1979)

FOODS FOR MILK PRODUCTION: During the period of breast feeding mothers would take milk, nasha, moss and tahniah, believing these would increase breast milk production. (El Shazali, 1979)

RURAL

EXTRA FOODS: Women who believed that diet should be changed during lactation mentioned that they shared the usual family diet plus extras such as fenugreek, nasha, milk and tahniah. Some also mentioned drinking a pap made from kiswa and sugar. All of these are high-protein, high-energy foods. (Karrar-Osman, 1979)

DIETARY CHANGES: No major changes in diet during lactation were noted in a 1972 Gezira village consumption survey. About half of the women increased their milk and cereal intake during lactation. (Taha, 1978b)

POST-PARTUM PRIVILEGE: Nursing mothers' special needs were recognized for 40 days of privilege after delivery but after this period no further attention was given in the Gezira village studied. (Review of 1951 study.) (Ernster, 1976)

SPECIAL FOODS: One Gezira informant said there were no longer special foods for the nursing mother, but in the earlier nomad days they would have had plenty of meat, milk and shalahob (hot milk and butterfat). Those who could afford it gave liver, and the poor took "merissa" (a beer made from sorghum) to improve their milk supply. (Review of 1951 study.) (Ernster, 1976)

URBAN

BLACK COFFEE POST-PARTUM: 79.3% of the women interviewed took hot strong black coffee with no sugar immediately after delivery. Many (47.2%) stated that it was a habit and they didn't know the reason, but 32.1% said that they believed it would keep on the flow of "unclean blood and this will clean the uterus." (Karrar-Osman, 1979)

POSTPARTUM SPECIAL DIET: During the 40 day postpartum rest period a special diet consisting of high protein, high energy foods is given to mothers. It includes chicken, pigeon, meat, masha (a thin porridge made either of fenugreek, milk, ghee, sugar and sometimes garadiga or of sorghum, flour and sugar). Other foods mentioned include date madida

3.2.2 DIETARY PRACTICES, WOMEN DURING LACTATION (Cont.)

(dates plus ghee) and hargel (an herb with a very strong smell, boiled and sugar added). (Karrar-Osman, 1979)

LIMITS TO SPECIAL DIET: The intake of special foods postpartum and during lactation by the women interviewed might be limited by the low income of their families. (Karrar-Osman, 1979)

3.3 DIETARY PRACTICES, INFANTS 0-24 MONTHS

3.3.1 DIETARY PRACTICES, INFANTS 0-24 MONTHS, BREAST FEEDING

NATIONAL

BREAST FEEDING PRACTICES: Most mothers started breast feeding on the day of delivery, used both breasts during each feed, fed on demand and kept their infants by their sides at night for night feeds. (El Shazali, 1979)

DURATION: The average duration for full breast feeding was 6 months in A.G.T. Carter's 1981 study of 3115 married women of Northern Sudan. (Lockwood, 1982)

BREAST FEEDING SUFFICIENT: In the Nuba area, Western Sudan, infants were not given water for 40 days because breast milk was thought sufficient. (El Shazali, 1979)

NURSING LYING DOWN: Many mothers breast fed while they were lying down during the day. (El Shazali, 1979)

EXTENDED BREAST FEEDING: Most mothers continue to breastfeed their children well into the second year. The average period in Khartoum is 14.8 months. (El Shazali, 1979)

ABRUPT WEANING: The weaning process is often sudden. The infant frequently is physically separated from the mother, or the mother paints her breast with pepper, starchy material, quinine or cotton to repel the child. (El Shazali, 1979)

DIARRHEA: If a child develops diarrhea or vomiting the mother will stop breast feeding and switch to starchy foods low in nutrients. (Ibn Oaf et al., 1980)

RURAL

BREAST FEEDING PATTERNS - GEZIRA: 36.5% of 208 mothers in Karaiba started breast feeding their infants on the first day after delivery. 60% started on the second day and 3.5% started on the third day. 65.5% of mothers breast fed 6 or more times per day, 23% feed five times per day and 11.6% feed four times per day. 65% of the mothers used both breasts at each feeding while 35% used one breast per feed. The mothers'

preferred breast feeding positions were lying down (42%), sitting down (30%), or both positions (27%). (Shazali et al., 1977)

FEEDING PATTERNS - EASTERN GEZIRA: Of the 189 women asked whether they breast fed their children, 95% said yes and 5% said they bottle fed their children. (Nur et al., 1978)

PATTERN BY AGE: EL HASANAB: 56 of 57 infants 3 to 6 months of age in the villages surveyed in El Hasanab were breast fed; 30 were breast fed exclusively. In the 7 to 9 month age group, 44 of 64 were still receiving breast milk and none were exclusively breast fed. Of the 10 to 12 month old infants, 30 of 50 were receiving breast milk plus special supplementary foods. Among the 13 to 24 month olds, only 20 of 92 young children were receiving any breast milk. (Karrar-Osman et al., 1977)

EXTENDED BREAST FEEDING - WESTERN EQUATORIA: Of the parents who could recall, virtually all said that their children received breast milk throughout the first year. Almost all children were weaned by the end of the second year. (African Medical and Research Foundation, 1980)

DURATION - BAHR EL GHAZAL: In two villages in Bahr el Ghazal Province, breast feeding was reported by a majority (about 85%) of heads of household to be continued for two or three years. (African Medical and Research Foundation, 1979)

PROLONGED EXCLUSIVE BREAST FEEDING: Infants were breast fed until weaning at 18 or 24 months of age with no supplements of other foods, according to observations made during the food consumption survey in Idd Hussein. (Karrar-Osman and El Amin, 1977)

DURATION - SOUTH KORDOFAN: The duration of breast feeding was at least 1 year for 100% of the 36 sampled mothers, Nuba and Arab, in both El Kweik and El Efin villages. 12% of the Arab and 26% of the Nuba mothers continued to breast feed past 2 years. (Lockwood, 1981)

PREGNANCY AND BREAST FEEDING - WESTERN EQUATORIA: 74% and 82% of the respondents in Nabima and Nyaka respectively said that women did not breastfeed when pregnant. (African Medical and Research Foundation, 1980)

PREGNANCY AND WEANING - GEZIRA: If pregnancy intervened before her child was due to be weaned, a woman would continue to nurse it for about two months or until the fact of the pregnancy was definitely established. If the baby was very young for weaning (by local standards), she tried to continue for longer. (Review of 1951 study.) (Ernster, 1976)

WEANING REASONS - GEZIRA: 48% of Karaiba village mothers gave pregnancy as the reason for weaning their young child, 10% claimed maternal illness, 7% cited child illness and 36% mentioned unclarified child-based reasons. (Shazali et al., 1977)

3.3.1 DIETARY PRACTICES, INFANTS 0-24 MONTHS, BREAST FEEDING (Cont.)

REASONS FOR WEANING - GEZIRA: In the Gezira community the most common reason for weaning was a new pregnancy (46.5%), followed by intentional choice (38%), child's illness (8.0%), and mother's illness (7.5%). In a hospital sample of infants with PEM the most common reasons given for weaning the child were child's illness (41%), followed by a new pregnancy (28%), intention (25%), and mother's illness (6%). (Taha, 1979b)

TREND TOWARD EARLIER WEANING - GEZIRA: There has been a decline in the length of breast feeding in the Gezira since the 1950's when descriptions and religious traditions suggested that weaning continued at least until the end of the second year. Now, more children are often deliberately weaned at a younger age. (Taha, 1979b)

ENDING BREAST FEEDING: The majority of children in the two surveyed villages were weaned from the breast during the second year of life. It is the custom to physically separate the infants from their mothers at weaning and give them to their maternal grandmothers. (Lockwood, 1981)

ABRUPT WEANING: Weaning was abrupt for 63% of the infants in the Gezira sample and was accomplished by applying a noxious substance to the breast, taking the child away from home, or simply denying him the breast. (Taha, 1979b)

ABRUPT WEANING: 77% of the 135 Karaiba children were weaned suddenly and 23% were gradually weaned. (Shazali et al., 1977)

WEANING AGES: Of a Gezira area sample of 1295 infants living at home 5% were weaned before 6 months of age, 19% at 7-12 months, 56% at 13-18 months, and 20% at 19 to 24 months. (Taha, 1979b)

WEANING AGES: Among 135 children in Karaiba, 4% were weaned at 4 to 8 months of age, 7% at 9 to 12 months, 32% at 13 to 18 months, 44% at 19 to 24 months, and 13% after 24 months. (Shazali et al., 1977)

WEANING AGES AND SEX: Usually boys were weaned between 18 and 24 months and girls between 24 and 30 months unless a pregnancy intervened, but a sickly child might be kept at the breast longer. (Review of 1951 study.) (Ernster, 1976)

WEANING AGE AND PEM: 39% of the children admitted to the hospital in Gezira with PCM had been completely weaned in the first year of life, while only 24% of children from the larger community were weaned in the first year of life. (Taha, 1979b)

WEANING AGES AND PEM: Of 150 Gezira infants hospitalized for PCM, 100 had been completely weaned: 4% before 6 months of age, 35% between 7 and 12 months of age, 37% between 13 and 18 months and 24% between 19 and 24 months of age. (Taha, 1979b)

URBAN

PREVALENCE - OMDURMAN: The prevalence of breast feeding appears to be 100% in both urban and periurban areas of Omdurman. (Shadad et al., 1981)

FEEDING PATTERNS: The breast feeding rate among a group of 287 children 6 to 26 months old attending 4 MCH clinics selected for distribution of dried skim milk (DSM) was 78.4%. In four similar clinics (N=339) selected as controls for the DSM clinics (and found to have a more advantaged clientel) the breast feeding rate was 64.9%, which was significantly different. 70% of both groups of mothers said they gave fresh cow's and/or goat's milk to their children each day. (Zumrawi et al., 1981)

3.3.2 DIETARY PRACTICES, INFANTS 0-24 MONTHS, WEANING FOODS

NATIONAL

DELAYED SUPPLEMENTATION: 25 of 265 (9.3%) children over nine months old received no supplements to breast milk, and 11 of 128 (8.6%) were still not receiving solid supplements at 18 months of age. (El Shazali, 1979)

DELAYED SUPPLEMENTATION: Kisra and mulah, the main food and daily dish, were not introduced in the first year of life. Meat, vegetables and fruits were also introduced very late. (El Shazali, 1979)

SUPPLEMENTARY FLUIDS: Sugared water, juices (especially lemon), and dilute powdered and liquid milk are introduced early. The average ages at introduction of these foods were 1.2 months, 2.5 months, 2.7 months and 4.2 months, respectively. (El Shazali, 1979)

WEANING PATTERNS: Children are abruptly weaned onto adult foods. Local vegetables and eggs are not used to supplement breast feeding after six months. Children often have difficulty digesting the adult foods and competing with siblings for scarce food. (Ibn Oaf et al., 1980)

WEANING PRACTICES: There is no special food or separate cooking for preschool children. Children also have the last priority in feeding, coming after the guests, father, older boys, older girls and the mother. When they are served early, their portion is usually only diluted stew added to local bread and made into a paste by the mother's fingers. (Shazali, 1972)

RURAL

LACK OF WEANING FOODS - GEZIRA: There are no traditional weaning foods in the Gezira area. Children are weaned from the breast or the bottle directly onto an adult type diet. Weaning foods are customarily added to children's diets too late, in insufficient quantity and nutritional quality. (Taha, 1979b)

LACK OF SUPPLEMENTARY MIXED FEEDING - GEZIRA: There was an absence of all but small and casual supplementary mixed feedings among mothers in a Gezira village. (Review of 1951 study.) (Ernster, 1976)

WEANING FOODS - GEZIRA: Milk and sorghum paps, usually highly diluted to increase their bulk, have traditionally been given in addition to breast milk. Other sources of protein such as legumes, meat, fish, and eggs were seldom used. There was no special cooking for children. (Taha, 1979b)

3.3.2 DIETARY PRACTICES, INFANTS 0-24 MONTHS, WEANING FOODS (Cont.)

AGE AT SUPPLEMENTATION - SOUTH KORDOFAN: 35% of the 17 Arab mothers and 26% of the 19 Nuba mothers in El Kweik and El Efin villages introduced supplements in the first four months. 36% and 43% of Arab and Nuba mothers respectively did not introduce supplements until after 7 months. (Lockwood, 1981)

MOST COMMON WEANING FOODS - SOUTH KORDOFAN: The most common weaning foods introduced were goat's milk and a sorghum (dura) porridge among Arab and Nuba children in both El Kweik and El Efin village. Other foods introduced were starch from dura, rice, stew (from the family pot), lemon juice and biscuits. (Lockwood, 1981)

WEANING FOODS AND AGE STARTED - GEZIRA: The major weaning foods in Karaiba village are sugared water, which was first given to 119 children at an average age of 1.2 months; powdered milk, which was given at an average age of 2.7 months to 76 children; liquid milk at 4.2 months to 104 children; rice water at 4.2 months to 56 children; custard at 6.1 months to 87 children; soup at 6.6 months to 34 children; egg at 7.0 months to 96 children; nasha at 7.3 months to 62 children; fruits at 9.8 months to 32 children; meat at 10.3 months to 78 children; kisra and mulah at 11.3 months to 56 children; and vegetables at 14.6 months to 27 children. (Shazali et al., 1977)

AGE AT SUPPLEMENTATION - WESTERN EQUATORIA: Almost all children in Nabima and Nyaka villages were given supplemental foods in addition to milk by six months of age. 50% of Nabima children had received additional food by four months of age; 57% of Nyaka children had received additional foods by the third month. (African Medical and Research Foundation, 1980)

INTRODUCTION OF FIRST FOODS - BAHR EL GHAZAL: About three fourths of the heads of household surveyed in two Bahr el Ghazal Province villages reported that their children received their first foods during the 6th month. Less than 5% started solid foods later than 6 months and 16 to 26% started solid foods before 6 months. (African Medical and Research Foundation, 1979)

AGE AT SUPPLEMENTATION - GEZIRA: In the Gezira community 25.5% of the mothers started to give supplemental foods before or during the infant's sixth month; 55.3% started between 7 and 12 months; and the remaining 19.2% started after 12 months. (Taha, 1979b)

AGE AT SUPPLEMENTATION - GEZIRA: In a Gezira hospital sample of 150 infants, 16.7% first received supplementary foods during their first six months of life; 68.7% first received supplements at 7-12 months; 10% after 12 months; and 4.6% had not yet been given supplementary foods. (Taha, 1979b)

SUPPLEMENTARY FEEDING - EASTERN GEZIRA: Of 115 women asked when they had begun supplementary feeding, 31% responded that they had begun between one and four months, 54% between five and eight months, and 15% from nine months or later. (Nur et al., 1978)

WEANING FOODS - EL HASANAB: The types of foods used during supplementary feeding and during the weaning period are rice, custard pudding, kisra, bread, dura and millet pap, potatoes, milk and tea with milk. (Karrar-Osman et al., 1977)

WEANING FOODS - EASTERN GEZIRA: The major supplementary foods given to children in the Rufaa district survey were milk and/or egg (71%; 91 of 131); bread, sorghum, biscuit and/or custard (19%; 24 of 131); and sugar and water (10%; 14 of 131). No women mentioned fruits and vegetables. (Nur et al., 1978)

FEEDING METHODS - EL HASANAB: Supplementary foods are fed to young children by bottle, spoons, cups or hand, and most of these are in poor hygienic condition. (Karrar-Osman et al., 1977)

GRADUAL WEANING - EASTERN GEZIRA: 71% of the 160 women surveyed in the southern half of Rufaa district said that they weaned their children gradually. (Nur et al., 1978)

TYPES OF WEANING FOODS AND PCM - GEZIRA: 86% of the 150 children hospitalized for PCM had received supplementary milk as compared with 100% of the children surveyed in the Gezira community. 62% of the children hospitalized for PCM as compared to 95% of community children received sorghum paps in addition to breast milk. However, 16% of the hospital sample were reported to be receiving meat whereas in the community at large a negligible number were. (Taha, 1979b)

BEER: In Western Sudan some mothers gave marrissa (local beer) to infants to put them to sleep while they fetched water over long distances. (El Shazali, 1979)

BOTTLE FEEDING: Breast feeding has been seriously threatened in the Gezira by the introduction of bottle feedings with highly diluted and invariably contaminated fluids, often milk formula. (Taha, 1979b)

FORMULA AND BOTTLES - SOUTH KORDOFAN: There was no infant formula or bottle feeding among 36 mothers in El Kweik and El Efin villages. (Lockwood, 1981)

BOTTLE FEEDING - SOUTH KORDOFAN: 53% of Gezira mothers used bottle feeding to supplement or replace breast feeding. Only 30% of the mothers with hospitalized infants reported using bottles. (Taha, 1979b)

MILK AND BOTTLES - GEZIRA: Of the 124 children under one year of age, 45% received undiluted milk, 38% received half-diluted milk and 17% received milk more than half diluted. 86% of the infants drank the milk from bottles. (Shazali et al., 1977)

SUPPLEMENTARY MILK - GEZIRA: 61.8% of children studied received less than 100 ml of undiluted animal milk per day in addition to breast milk; 32.3% received 200-300 ml/day; and only 5.9% received an adequate

3.3.2 DIETARY PRACTICES, INFANTS 0-24 MONTHS, WEANING FOODS (Cont.)

supplementary quantity of 400-500 ml/day in the Gezira community. (Taha, 1979b)

FOODS FOR TEETHING: When the infant starts to put things into his mouth and his gums become itchy, some mothers give him a portion of a half cooked lamb's tail, a cooked chicken bone or "fursa" (local butter) to suck. (El Shazali, 1979)

3.3.3 DIETARY PRACTICES, INFANTS 0-24 MONTHS, AFTER WEANING

RURAL

AVERAGE FOOD INTAKES - EL HASANAB: Average food intakes of preschool children (0-6 years) as calculated from dietary recalls suggest that intakes of energy, protein, iron, niacin and ascorbic acid were adequate in all El Hasanab villages. Intakes of vitamin A and riboflavin were below the recommended levels in four of the five villages. (Karrar-Osman et al., 1977)

MALDISTRIBUTION OF FOOD: Despite the apparent adequacy of the average household food intakes, there were signs of malnutrition among the children in Soba West village. This indicates that food was not being distributed within the family according to the physiological needs of the vulnerable groups. (Nutrition Division, 1973)

3.4 DIETARY PRACTICES, HEALTH AND MEDICINE

NATIONAL

DIARRHEA: Most mothers stopped breast feeding and giving other foods when the child developed diarrhea. (El Shazali, 1979)

DIARRHEA: Hot searing of the back and of the abdominal wall is used in the belief that it will stop diarrhea. (El Shazali, 1979)

REMEDIES FOR DIARRHEA AND VOMITING: To treat diarrhea, some women gave "dilka" in water, which contains pleasant-smelling ingredients and fermented sorghum. Others gave garlic and lemon in water to a vomiting child. (El Shazali, 1979)

RESPONSE TO SWELLING: Most mothers stopped giving milk, meat or eggs if the child developed any swelling of the body--even if it was due to malnutrition. (El Shazali, 1979)

TRADITIONAL HEALERS: Traditional healers are popular in the rural areas and among the Moslem tribes of the Western Sudan. (Centre for Research on Disasters, 1979)

PROFESSIONAL HEALTH WORKERS: In 1977, the estimated number of persons for each physician was 8,690 and for each nursing person was 1,280. (World Bank, 1981)

RURAL

VILLAGE MIDWIVES: The village midwives, who differ from the traditional birth attendants (TBAs) in that they receive nine months' formal training from the beginning, are believed to be responsible for about two-thirds of all deliveries in Sudan. Most are illiterate women chosen by their communities. There is at least one training school in each district and 350 are trained each year. The author attributes the drop in maternal mortality in hospital to their good job on first contact. (Bella, 1980)

VILLAGE MIDWIVES: There were 18 village midwife schools in Sudan that had graduated 5,256 midwives as of 1976. In addition to payment for services, they receive 10 Sudanese pounds per month from the town or rural council. Although data is scarce and inaccurate, it still appears that some reduction in neonatal mortality may be due to the safe conduct of home deliveries by midwives. (El Hakim, n.d.)

SANITARY WATER: The main water sources in both surveyed villages in Bahr el Ghazal Province were rivers/streams, pools and hand-dug wells. Most people were satisfied with their water source. Only one head of household (of 199) treated water before drinking it. This respondent boiled the water when it was particularly dirty. (African Medical Research Foundation, 1979)

4. NUTRITION STATUS CORRELATIONS

NATIONAL

BREASTFEEDING DURATION, RESIDENCE, AND EDUCATION: In a study of 3115 married women in Northern Sudan (A.G.T. Carter, 1981), there was no statistical difference in the average length of breastfeeding between mothers with rural and urban residences, or between those with different levels of education. (Lockwood, 1981)

RURAL

SEASONALITY AND MALNUTRITION - SOUTH KORDOFAN PROVINCE: The worst malnutrition occurs during planting season, when the previous year's storage is finished and people are expending energy on planting the new crop. (Ibn Oaf et al., 1980)

PEM, INCOME AND WEANING PRACTICES: In the Gezira community, low income was probably the most important factor affecting food expenditures, intakes, and ultimately, nutrition status. The average annual family expenditure was LS 238, which was less than the LS 300 thought necessary for an "improved diet." Poor weaning practices were also an important factor, which may be easier to correct and have quicker results. (Taha, 1979b)

PEM AND BIRTH ORDER: About 25% of the 150 children with severe PEM were first-born; only 4% were after the fifth in birth rank. The average household size in the Gezira community was six persons. (Taha, 1979b)

PEM AND FATHER'S OCCUPATION: The incidence of PEM was significantly higher among laborers' children than among the tenants', and was the least in children of traders and government employees with better incomes. (Taha, 1979b)

PEM AND MOTHER'S EDUCATION: The incidence of PEM among Gezira children was dramatically lower in families whose mothers had had at least elementary (four years) education. (Taha, 1979b)

PEM AND PARENTS' LITERACY: The level of literacy among parents of children admitted to the hospital for severe PEM was significantly lower than that found in the surrounding Gezira community. (Taha, 1979b)

GROWTH AND STANDARD OF LIVING: Over a 7 year period the preschool children of El Kalakla showed only slight improvement in relative standing on the British height and weight standards even though the village experienced increased incomes, cleaner water supply, electrification, a hard-surface road and improved health care facilities. (Sukkar et al., 1976)

WEANING AND EMPLOYMENT OF WOMEN: In the Gezira, employment of women was not a factor in earlier weaning, because women were not employed outside household duties. (Taha, 1979b)

4. NUTRITION STATUS CORRELATIONS (Cont.)

URBAN

FOOD EXPENDITURES AND FAMILY BUDGETS: Food expenditures averaged 17 pounds monthly among the 39 households surveyed in Nasir Extension. The median income was only 21-30 pounds. Rent, cooking materials, transport, and water expenses account for most further expenses. (Nutrition Division, n.d.)

BREAST FEEDING AND DRIED SKIM MILK: Mothers who were given DSM in their MCH clinics were less likely to stop breast feeding than those given local beans ($p < .005$). This remained significant after controlling for socioeconomic indicators. (Zumrawi et al., 1981)

DSM AND CHILD HEALTH: In a controlled trial among mothers attending MCH clinics, there was no evidence for an association of increased reporting of diarrhea, fever, or vomiting in their 6 to 25 month-olds for either those receiving dried skimmed milk or those receiving local beans, even taking into account breast feeding practices. (Zumrawi et al., 1981)

5. NUTRITION AND HEALTH POLICIES AND PROGRAMS

5.1 NUTRITION AND HEALTH POLICIES

NATIONAL

NATIONAL HEALTH POLICY: The Government of Sudan has announced a national health policy for the period 1977-8 to 1983-4. One of its major objectives is to "cover the population with primary health care, especially in rural areas, through rural health care units." By the year 2000, the goal is to train 33,000 Community Health Workers. (Lockwood, 1981)

NATIONAL HEALTH PRIORITIES: In the 1970/71 to 1976/77 extended Five Year Health Plan, Preventive and Social Medicine services were given top priority. These included control of common endemic and epidemic diseases (e.g. malaria, malnutrition, tuberculosis), maternal and child welfare services, school health services, immunization, health education and environmental health services. Other priorities were expansion of primary health care to rural areas, training of health manpower and consolidating curative services. (National Health Programming, 1975)

HEALTH PROBLEMS AND PRIORITIES: The following were ranked as the most important national health and health-related problems by the 1975 National Health Programming Committee: malaria (nation wide and man-made), lack of primary health care coverage, public lack of health information and hygienic habits, bilharzia (man-made), communicable diseases, lack of safe water, environmental sanitation, protein calorie malnutrition, gastroenteritis, and tuberculosis. Regional problems also included: lack of food (Darfur, Red Sea, E. Equatoria), shortage of educated people, sleeping sickness, Kala Azar (visceral leishmaniasis) and onchocerciasis. (National Health Programming, 1974)

MALNUTRITION: In 1975 the Government's goal was to reduce the prevalence of protein calorie malnutrition by 50% by 1984. Three interrelated strategies were designed to carry out the goal: 1) promotive strategies including teaching nutrition at all levels of general education, growing basic nutritional agricultural products, formation of cooperative societies to ensure community participation in nutritional solutions, and periodic nutrition surveys; 2) preventive strategies including nutritional surveillance, referral and health education by primary health care workers; and 3) creative strategies of hospital admittances. (National Health Programming, 1975)

GASTROENTERITIS: In 1975, the Government's goal was to reduce the incidence of gastroenteritis by 1984 to 70% of the expected level. This would mean approximately 800,000 cases in 1984, a reduction of 2 million cases based on 1975 calculations. (National Health Programming, 1975)

HEALTH EDUCATION: The 1975 Primary Health Care Program's objective is to reach an additional 4.8 million people by 1984 with health education and improved hygiene habits. The strategy is to integrate health education into the training and delivery of health services. (National Health Programming, 1975)

5.1 NUTRITION AND HEALTH POLICIES (Cont.)

NO NUTRITION POLICY: Sudan does not have a nutrition policy, although it has a relatively large service delivery infrastructure. (Ibn Oaf, 1980)

MATERNITY AND "LACTATION" LEAVE POLICIES: According to a 1981 WHO report, the Sudanese Government policy is to allow an 8 week pregnancy leave with full pay (2 weeks before delivery) and also an unpaid 6 weeks' leave for working women. There is also a policy that allows for a 1 hour nursing break which is not remunerated. There are no special nursing facilities available. (Legislation, 1982)

NURSING BREAKS: The law makes no provision for nursing breaks for working mothers of infants. (Richardson, 1975)

FREE HEALTH CARE: It is the policy of the Government to render free health services to all people in the Sudan. This is a socio-political commitment. Given the meager financial resources of the Government, only minimum health care can be furnished, especially in the Southern Region. Thus self-help projects have been encouraged by the Government. (National Health Programming, 1975)

HEALTH EXPENDITURES: In 1978, the central government expenditure on health was \$1 (1975 dollars) per capita. (World Bank, 1981)

HEALTH EXPENDITURES: The total health expenditure for recurrent and development costs actually spent in 1975/76 by the Ministry of Health was 7.8 million Sudanese pounds. This was about 2.5% of the total government budget, and about 0.52 pounds per capita. (Steering Committee, 1976b)

HEALTH EXPENDITURES: The development budget for health increased from 10% of the 1970/71 total Government Health Budget of \$15.4 million to 14% of the 1974/75 Budget of \$22.3 million. The remaining recurrent expenditures for health are split between the Ministry of Health and the Ministry of Local Government. In 1974/75 the Ministry of Local Government took over the budgeting of health and hospital services in the Northern Provinces. (National Health Programming, 1975)

HEALTH SERVICES ADMINISTRATION: The administrative structure of health services in the provinces consists of several levels: provincial, headed by an Assistant Commissioner for Health, responsible for preventive services; district, headed by a Medical Inspector; subdistrict, headed by a Senior Medical Officer; and, at the periphery, health centers, dispensaries, and dressing stations with auxiliaries in charge. (Centre for Research on Disasters, 1979)

PRIVATE PRACTICE: Private practice is allowed for all Sudanese doctors, both part and full time. (Centre for Research on Disasters, 1979)

5.2 NUTRITION AND HEALTH PROGRAMS

NATIONAL

PRIMARY HEALTH CARE (PHC) COVERAGE: The population coverage by primary health care dispensaries and PHC Units varies by province. The better-off provinces like Gezira, Khartoum and the Northern province have a population to PHCU ratio of from 2,900 to 4300 to 1, whereas the provinces in the West, East and South have one PHCU for every 5800 to 23,400 persons. (National Health Programming, 1975)

PRIMARY HEALTH CARE PROGRAM (PHCP): The PHCP in the Southern Region of the Sudan is a community-based health service designed to improve the health and socio-economic conditions of the Region. It is the most important element in the Government's health plan to reach people in the rural areas with a comprehensive health care system that can operate within the limited physical and financial resources available in the Region. Community Health Workers (CHWs), recruited from the local community and trained by the Ministry of Health, are the key component in the PHCP. Their responsibilities include prevention and cure of the main local illnesses, improvement of local sanitation, mother and child health programs, public health education and participation in mass immunization programs. The 700 planned CHWs will be supervised by medical assistants from nearby dispensaries and will serve about 4,000 people within a 16 km radius. Details of the program were published in February 1976. Implementation started in April 1976 with the development of a 9 month training curriculum for CHWs. The first CHWs completed training in 1978. An evaluation component has been built in to the program. (African Medical and Research Foundation, 1979)

HEALTH PLAN (PHCP): Implementation of the Primary Health Care Programme (PHCP) in the Southern region of Sudan, a community-based health service designed to improve the health and socioeconomic conditions of the region, began in April, 1976. It is the most important element in the Government's health plan to reach rural areas. Details of the PHCP are given in "Primary Health Care Programme, Southern Region, Sudan 1977/78-1983/84," published in 1976 and known as the "Green Book." (African Medical and Research Foundation, 1980)

PHCP HEALTH WORKERS: The key component in the PHCP is the Community Health Worker (CHW). This new cadre of health worker is recruited from the community and is trained and employed by the Regional Ministry of Health. The first CHW's completed training in 1978. (African Medical and Research Foundation, 1980)

PHCP HEALTH WORKERS: The planned 700 CHW's will provide field health services under the technical supervision of medical assistants from nearby dispensaries. Each CHW will serve about 4000 people within a 16 kilometer radius. (African Medical and Research Foundation, 1980)

ASSISTANCE TO PHCP: The International Medical and Research Foundation assists the government of Sudan with its Primary Health Care

5.2 NUTRITION AND HEALTH PROGRAMS (Cont.)

Program/Southern Region which is funded by a USAID grant. Other cooperating agencies are Canadian University Service Overseas, Coordination in Development, Maryknoll Fathers and UNICEF. (TAICH, 1979)

COMMUNITY HEALTH WORKERS: There are currently 2200 Community Health Workers in the field, each responsible for about 4000 people. They received a nine month training session. (Lockwood, 1981)

COMMUNITY HEALTH WORKERS (CHW): The overall implementation strategy for the Primary Health Care Program is based on the creation of a new category of personnel, the Community Health Worker, who will be a member of the community s/he will serve and who will be trained in community health. Thus, health activities will be integrated with community development schemes. (Steering Committee, 1976a)

COMMUNITY HEALTH WORKERS: UNICEF, in coordination with the Ministry of Health, is providing assistance in the development and testing of a low cost, low technology methodology to be used by Community Health Workers to monitor nutritional status of infants and children from 0 to 5 years old and to provide appropriate nutrition education for their mothers. (Lockwood, 1981)

MINISTRY OF HEALTH NUTRITION SERVICES: Nutrition activities in the Ministry of Health are carried out by the Nutrition Division (established in 1966) and have included: data collection on food consumption and nutritional status; establishment of growth norms; creation of provincial units to provide minimal nutrition services and to serve as monitoring units; nutrition education of mothers through Maternal and Child Health Clinics; participation in the nutrition component of professional training; and a pre-school feeding program in conjunction with the Catholic Relief Service. (Anonymous, 1977)

MINISTRY OF HEALTH - NUTRITION DIVISION: The Nutrition Division was established in 1966. Six nutrition units have been set up in six Northern Provinces. The major activities have been nutrition surveillance and training rural women who attend MCH clinics. The annual budget exceeds 5,127,000 pounds. The Division has provided a good general picture of the causes of malnutrition in Sudan, but has been limited in its baseline data collection because of its urban base and lack of transport. (Ibn Oaf et al., 1980)

MINISTRY OF SOCIAL AFFAIRS: The Ministry of Social Affairs maintains nurseries and kindergartens for preschool children, where a mid-day meal is provided. The Ministry also maintains an orphanage center. (Anonymous, 1977)

THE MINISTRY OF EDUCATION - NUTRITION EDUCATION AND GARDENING: The Ministry of Education has provided nutrition services through its School Garden and Nutrition Education Department project since before 1969. Training courses in "food science," poultry raising and handicrafts were added in 1971 and serve all twelve northern provinces. Major shortcomings of the project include the single-purpose nutrition extension

workers (the villages can not afford them in addition to teachers and CHWs), the use of imported seeds instead of local varieties, lack of baseline data, and a lack of well defined nutrition problems and focus. Its major strength is the fact that it has sustained the only management and administration system for nutrition education in the North. (Ibn Oaf et al., 1980)

MINISTRY OF EDUCATION - NUTRITION TRAINING: A Nutrition Training Centre was established in the Ministry of Education in Khartoum by the Freedom From Hunger Campaign using funds donated by the Canadian Junior Red Cross in 1964. The Centre trains home economics teachers for primary and junior secondary schools, offers short term nutrition courses for nutrition educators who are assigned to Adult Education and Community Development Centres and has three and four-year degree programs in home science at the University of Khartoum, the Head University College for Women and the Shambat Institute of Agriculture. (Anonymous, 1977)

PL-480 TITLE II FOOD QUANTITIES: \$1.85 million worth of bulgur, non-fat dried milk, vegetable oil and soybean oil (4421 metric tons) has been approved for F.Y. 1982 for use by the Catholic Relief Service in maternal and child feeding programs. (Food for Peace, 1981)

CATHOLIC RELIEF SERVICES (CRS): The Catholic Relief Services (CRS) PL-480 Title II Mother Child Program reaches children under 5 years of age and includes a nutrition education component which encourages prolonged breast feeding, high protein weaning foods and continued participation in the Government of Sudan/Ministry of Health MCH program. The USAID donated commodities cost \$2.5 million in FY 1982. (USAID, 1982)

PRESCHOOL FEEDING PROGRAM: The Catholic Relief Service provided food assistance valued at over \$1.3 million during FY 1978 to 30,000 preschool children in Khartoum and Kassala Provinces. The program was initiated in 1972. (TAICH, 1979)

PRESCHOOL FEEDING PROGRAM: The Foster Parents' Plan supports a supplementary feeding program, in conjunction with Catholic Relief Service, directed to 5,000 preschool children. (TAICH, 1979)

CURATIVE MEDICINE: Until recently the development of curative medical services had received priority attention with the result that a large portion of the Ministry of Health budget is presently committed to the maintenance and operation of facilities and services which are not necessarily the most effective way of controlling endemo-epidemic diseases. (National Health Programming, 1975)

MISSION HOSPITALS: All mission hospitals in the South were closed during the recent war. (Centre for Research on Disasters, 1979)

RURAL

RURAL HEALTH SUPPORT PROJECT: The Government of Sudan/Ministry of Health with the financial support of USAID (\$936,000) will implement a Rural

5.2 NUTRITION AND HEALTH PROGRAMS (Cont.)

Health Support Project in the South and in the Western provinces of Kordofan and Darfur. This project has a strong MCH component including refresher training for village midwives, community health workers and traditional birth attendants. Training will encourage mothers to use prolonged breast feeding and high protein weaning foods. It is estimated that 10% of USAID technical assistance and training will be devoted to nutrition. (USAID, 1982)

UNICEF-SUPPORTED NUTRITION: UNICEF has proposed a five year plan of assistance to Sudan in the field of child nutrition (1981-1985). The health goals are to change rural women's child feeding behaviors and initial diarrhea treatment. The operational objective will be to help coordinate activities at the provincial level between the Ministries of Health and Education and local authorities. South Kordofan Province will be the pilot area. (Ibn Oaf et al., 1980)

COMMUNITY-BASED FAMILY HEALTH PROJECT: The Department of Community Medicine, Khartoum University, has initiated a Community-Based Family Health Project, with about \$10,000 financial support from U.S.A.I.D. Nutrition education is a component of this project, which is delivering integrated health/family planning services at village level utilizing village midwives. Nutrition education includes breast feeding and high protein weaning foods. (USAID, 1981)

INTERNATIONAL NUTRITION COMMUNICATION SERVICE: The International Nutrition Communication Service, through a subcontract to Save the Children Federation, contracted in 1981 with USAID and the Sudanese Government to design and implement a nutrition status survey in the villages of El Kweik and El Efin, South Kordofan Province, and a monitoring methodology for on-going nutrition surveillance. This is part of a larger Zonal Development project by the government of Sudan and UNICEF to provide assistance and training in an integrated development approach. The pilot surveillance project will train 10 community health workers and last for 9 months (January 1982 to September 1982). An evaluation at the end will be used to determine whether it should be expanded to a regional level. (Lockwood, 1981)

NUTRITION SERVICE: Family Planning International Assistance has provided financial assistance since 1977 to Soba/Butri MCH/FP and Nutrition Service Project for an experimental mobile service which includes nutrition education. (TAICH, 1979)

COMMUNICATION TRANSFER PROJECT: The Sudanese Department of Health Education, with the assistance of WHO-DANIDA, is pretesting communication methods and materials designed to bring about behavioral change in relation to specific health problems in Bashagra West, a largely agricultural community, and Abu Deleig, the central village of a nomadic Battaheen tribe. Water-related messages and a sanitation campaign were the focus of the first one-month village project. Child diarrhea was reduced to one fifth the previous rate. Other villages are copying the model.

After pretesting, a full-scale communication campaign is planned with an appropriate technology component and a maternal and child health component. (Gibson, 1980)

HEALTH FACILITIES: The health services in the Gezira area consist of 17 hospitals (including the main province hospital at Wad Medani), 13 maternal and child health centers, 129 dispensaries and 247 dressing stations. (Taha, 1979b)

CASH CROP ORIENTATION OF AGRICULTURE: Farming in Gezira is a tripartite collective sharing system between tenants, Government and Management Board, producing mainly the cash crops cotton, wheat and groundnuts. Only small areas are allocated to growing the local staple, sorghum. (Taha, 1978b)

URBAN

MINISTRY OF HEALTH NUTRITION EDUCATORS: Members of the Nutrition Division of the Ministry of Health (MOH) and graduates of Ahfad Girls' University College at Omdurman together run a four-month course in health and nutrition education for girls with at least 6 years of formal education. Program graduates, called nutrition educators, work for the MOH at MCHC's and hospitals. (Taha, 1978c)

CONTENT OF NUTRITION EDUCATION: Using simple demonstrations and group discussions, nutrition educators at MCHC's focus on the following problem areas: decline in breastfeeding; increased use of bottle feeding; and the lack of a concept of weaning foods. (Taha, 1978c)

MOBILE SERVICE: The Soba/Butri Maternal and Child Health/Family Planning and Nutrition Service Project runs an experimental mobile service which includes nutrition education as part of the program. (TAICH, 1979)

COMPREHENSIVE CHILD HEALTH CENTRE: In 1973 a Comprehensive Child Health Centre was established in Omdurman to reorganize and coordinate the existing 13 MCH centers of the town for both preventive and curative functions. By 1977 it served a total of 30 MCHCs. (Taha, 1978c)

RESETTLEMENT PROJECT: The International Voluntary Service, Inc. has a volunteer working with the National Commission for Reconstruction and Development of Wadi Halfa in a resettlement project with a nutrition education and maternal/child health component. (TAICH, 1979)

6. COMMENTARIES

NATIONAL

LACK OF COORDINATION: The different food and nutrition activities of the separate Ministries lack coordination and clear objectives, and have yet to have a tangible effect on the nation's problems. (Anonymous, 1977)

RURAL

ECONOMICS: Culwick's 1951 study highlighted the fundamental point that the primary limiting factor in matters of diet is economic necessity. The first step in improving a population's nutrition is to loosen the grip of poverty. Only when that has been done is there room for food education. (Review of 1951 study.) (Ernster, 1976)

INTERVENTION PRIORITIES: To prevent malnutrition, improvement of family income is of first importance, but immunization and correction of defective weaning practices are also important, and easier to tackle, with quicker results. (Taha, 1979b)

WOMEN'S STATUS, DIET AND MIGRATION SCHEME: After the introduction of the New Helfa Agricultural Scheme, there was a potential for a "better balanced" diet that depended upon having transportation to New Helfa and the cash to buy food. Shukriya women have lost a great deal of their authority over production due to the Scheme's concentration on a cash economy and the giving of tenancies to men. Thus elite women are more restrained, while poor Shukriya women who are not restrained by social customs can gain money through their labor, cotton-picking, and thus have benefited some. (Murdock, 1979)

RURAL HEALTH CARE DELIVERY: The Program Formulation Team's impressions of the health facilities in Southern Sudan were that they provided only a small coverage of the actual health needs of the rural population. The existing units were static units of limited quantity and virtually no services were taken to the people. The medical staff has been trained for a curative approach and thus has a limited effectiveness. Their recommendation was that a widely scattered medical service related to the expressed and observed needs of the people and focusing on quantity will be more effective. (Steering Committee, 1976a)

NOMADIC POPULATION HEALTH CARE: The delivery of health care to the Nomadic populations is a complex problem. It is suggested that the Primary Health Care Program should give a high priority to the design of an overall strategy for the delivery of health services to the nomads, prior to considering the specific requirements. (Steering Committee, 1976b)

NUTRITION AND LIFE STYLE: Abandoning nomadism and taking to a partly or wholly settled life was not in itself a nutritional step forward. Unaccompanied by economic development, it was seen in villages surrounding the Gezira Irrigated Scheme to mean the same meager diet as before but with less of its valuable items, the animal proteins. (Review of 1951 study.) (Ernster, 1976)

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African Medical and Research Foundation (AMRF)

- 1980 Baseline Survey, Western Equatoria Province. Primary Health Care Programme, Regional Ministry of Health, Southern Sudan.

Original data.

Method: Case study, baseline survey, using interviews of sub-chiefs and head men and of each head of household, and medical examinations of all persons present. Part of a two stage baseline follow-up survey of matched villages similar except for health personnel.

Sample: Interviews: 96 in Nabima and 117 in Nyaka. Examinations: 284 in Nabima and 329 in Nyaka.

Geographic location: Nabima and Nyaka in Yambio District in Western Equatoria Province in Southern Sudan.

This baseline survey of the health and socioeconomic conditions of two communities was conducted in February 1980. Its objectives were: 1) to provide baseline data for the evaluation of the effects of the Primary Health Care Programme (PHCP); 2) to collect health and socioeconomic data to assist the work of all cadres of health personnel; and 3) to provide an opportunity for Community Health Workers to collect community data. There were very few children in the survey sample.

African Medical and Research Foundation (AMRF)

- 1979 Baseline Survey, Bahr El Ghazal Province, February 1979. Primary Health Care Programme, Regional Ministry of Health, Southern Sudan, October 1979.

Original data.

Method: Part of a pre-post experimental design to evaluate the PHCP; baseline survey of two non-random villages, one to receive a CHW (Panjak) and the other not (Mangol); village record; household survey; and medical examinations and treatment.

Sample: 87 heads of households in Panjak and 112 in Mangol were interviewed (all but three of the village heads); 340 (61%) people in Panjak and 348 (46%) in Mangol were examined; Dinka tribal group.

Location: Panjak and Mangol villages of Gogrial District, Bahr el Ghazal Province, Southern Sudan.

This report gives the results of a survey of health conditions, health behavior and socioeconomic conditions in two villages in Bahr el Ghazal Province conducted in February 1979. The objectives were to provide baseline data for the evaluation of the Primary Health Care Program in the Southern Region, to provide data on health and socioeconomic conditions useful for health personnel, and to provide an opportunity for trainee Community Health Workers to study a community. A follow-up survey will be done in each village after a CHW has been in one of the villages for some time. Goals for the intervention were identified from this baseline survey.

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Anonymous

- 1977 "Review of Current Activities in the Field of Food and Nutrition in the Sudan," in Nutrition Planning and Policy for African Countries, M.C. Latham and S.B. Westley (eds.), Ithaca, NY: Cornell International Nutrition Monograph Series, #5.

This short summary of food and nutrition activities in Sudan was presented at a seminar in Nairobi; Kenya, June 2-19, 1976. The author(s) suggests that government and university activities showed a lack of overall coordination and clear objectives, and thus had no tangible effect on the nation's nutritional problems.

Bella, H.

- 1980 "Sudanese part-time village health workers." IPPF Medical Bulletin, 14(1), 3 pp.

This short document describes the Sudanese village midwives and their training programs. A brief evaluation of their effectiveness is presented.

Centre for Research on the Epidemiology of Disasters

- 1979 "Medico-Nutritional Information on Disaster Prone Countries and Glossary of Common Illnesses," Geneva: Licross/Volags Steering Committee for Disasters.

This document gives a brief review of medico-nutrition information for all countries prone to disaster.

El Hakim, S.Y.

- 1980 "Village midwives in Sudan." In Proceedings of the seventh study of the Royal College of Obstetricians and Gynaecologists, edited by H.R. Philpott, pp. 282-292. London, June 1980.

This summary of the growing role of village midwives compares them to traditional birth attendants (TBAs), describes the nine-month training program, and discusses the success of the midwife system in reducing maternal and neonatal mortality.

El Shazali, H.

- 1979 "Nutritional Taboos and Traditional Practices in Pregnancy and Lactation including Breastfeeding," mimeograph; Conference Proceedings, WHO Seminar on Traditional Practices Affecting the Health of Women, Khartoum, Feb. 10-15, 1979. WHO: March, 1979.

This paper highlights Sudanese nutritional taboos and traditional practices during pregnancy, breastfeeding, the weaning period, teething, and gastrointestinal disturbances. Little actual data is

presented, and the basis of most of the statements is unclear, i.e., whether anecdotal or actual quantification. Also unclear is where and when data was collected.

Ernster, M.

- 1976 "Investigation of dietary changes in the Gezira Sudan," Ecology of Food and Nutrition, 5: 217-225.

Review of research conducted in 1949-1950.

Method: Detailed participant observation over a one year period including qualitative and quantitative food recording, height and weight measures on a quarterly basis, and a study of all aspects of the handling of food.

Sample: The village population generally, with less intensive observations in other villages.

Geographic location: Remeitab and other villages inside and outside the Gezira. Irrigation Scheme not specified.

The author reviews Mrs. Culwick's Diet in the Gezira Irrigated Area, Sudan, 1951, for its unique and relevant in-depth description of village life. Mrs. Culwick was commissioned to evaluate dietary changes in the Gezira area as a result of the 1925 irrigation and cotton production scheme. Through participant observation she documents changes in available foodstuffs, food processing and preparation, food consumption and anthropometric measures and thus identifies etiologic factors contributing to malnutrition after a major technical revolution.

FAO (Food and Agriculture Organization of the United Nations)

- 1979 The Fourth World Food Survey. Rome: FAO.

This document attempts to update the review of recent trends in food production and supply against the background of increasing population and more recent evidence regarding the incidence of undernutrition. Some aggregate data on Sudan is presented.

Food for Peace

- 1981 Fiscal Year 1982 Public Law 480 Title II: ISC Approved Quantities/Voluntary Agencies. Washington, D.C.: U.S.A.I.D., October 16, 1981.

This document presents in tabular form the approved quantities of foods for each recipient country under the Public Law 480 Title II programs for fiscal year 1982. Within each country presentation are breakdowns by program sponsor, program category and commodity. Data from Sudan is briefly presented.

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Gibson, D.

- 1980 Health Message Communication in Sudan. Project Support Communications Newsletter, (UNICEF) 4(3):1-3, December 1980.

This brief article describes the "Communication Transfer" project in Sudan, being pretested in Bashagra West and Abu Deleig villages. The primary messages to date are health messages on water and sanitation. The full scale project will include maternal and child health messages and appropriate technology components.

Ibn Oaf, J., Westley Stacy, S. and Etridge, J.

- 1980 Proposal for UNICEF Assistance in Nutrition, 1981-1985. Presented to UNICEF Sudan Preview Meeting, Sessioni IV, October 22, 1980.

This document is a proposal to the 1981 UNICEF Executive Board for a five year plan for \$1.35 million in assistance to the Sudan, in the field of child nutrition. The ultimate health goal is to change the behavior of rural Sudanese women in child feeding practices and oral rehydration therapy for diarrhea. Specifically, the operational objectives involve coordination and cooperation between the national and local authorities. The process will be first attempted in the Zonal Development Program, South Kordofan Province. A brief review of the nutrition situation is presented.

Karrar, Z.A. and Omer, M.I.A.

- 1981 "Morbidity patterns among under-five children in a rural community in Sudan." Trop. Geogr. Med., 33: 75-78.

Original data.

Method: Longitudinal study 1977-1979; questionnaires on morbidity and demography administered twice monthly; regular check-ups and anthropometry.

Sample: 293 under-five children; 82 under 24 months.

Geographic location: Butri village, Blue Nile, about 27 km. south of Khartoum

This paper reports the preliminary findings about morbidity among children under-five. Diseases recorded included cough, fever, diarrhea, skin diseases, measles, whooping cough, and conjunctivitis. A brief discussion of the most common diseases, their severity, age distribution, and seasonality is presented.

Karrar-Osman, Ali

- 1979 "Dietary Practices and Aversions During Pregnancy and Lactation Among Sudanese Women," mimeo; Conference Proceedings, WHO Seminar on Traditional Practices Affecting the Health of Women, Khartoum, Feb. 10-15, 1979. WHO, March, 1979.

Original research.

Method: Questionnaire, interview of randomly selected pregnant MCH Center attendees.

Sample: 108 pregnant women attending MCH centers in three towns; 67.5% of the husbands were laborers with low monthly incomes.

Geographic location: Khartoum, Khartoum North, and Omdurman.

This study investigated the dietary practices and beliefs of low-income women during pregnancy, the postpartum period, and lactation. From these interviews, the author concluded that their nutrition knowledge and practices were poor during the pregnancy period, but quite satisfactory postpartum and during lactation.

Karrar-Osman, A. Abdel Rahman, A., and El Amin, A.

1977 Dietary survey of pre-school children of El Hasanab villages. Sudan J. Fd. Sci. Technol. 9:74-77.

Original data.

Method: questionnaire-interview on household food intake, special foods given to children as supplements and weaning foods, and general household background data; three day dietary recall with the women in charge of food preparation.

Sample: randomly chosen sample of 71 of the 554 preschool children in the villages.

Location: El Hasanab group of five villages, 30 miles from Khartoum on the eastern bank of the White Nile (Tayba El Hasanab, El Nuba, El Massid, El Trayia, Kagabi and El Hag Ahmed).

This brief report summarizes the results of a dietary survey among households with preschool children in the five villages of El Hasanab. Feeding patterns are reported and average food intakes per capita per day are calculated. Intakes, on average, were generally adequate, leading the authors to suggest that faulty (e.g. starchy foods) and unhygienic feeding habits might be the major cause of malnutrition among preschoolers. The use of recall and aggregate data as well as the lack of control for actual poverty make it impossible to clarify the determinants of malnutrition in this sample.

Karrar-Osman, A. and El Amin, A.

1977 Food Consumption survey in Idd Hussein village. Sudan J. Fd. Sci. Technol., 9:71-73.

Original data.

Method: questionnaire-interview including dietary recall and background data; interviewee was the housewife or woman in charge of food preparation.

Sample: 40 families; aggregate data.

Location: Idd Hussein village ten miles south of Khartoum.

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This brief report summarizes the major findings of a food consumption survey in Idd Hussein village. Average household intakes were calculated to be adequate. Cases of malnutrition were seen, however, indicating either intra-family maldistribution of food or extreme poverty among some of the households. The use of aggregate data does not allow for a clarification of this central issue.

Legislation

- 1982 Maternity and "Lactation" Leave Policies. Mothers and Children 2(1):7.

This one page review reprints information on maternity and "lactation" leave policies appeared in 11 Middle East countries that originally appeared in the conference report prepared by the World Health Organization, Eastern Mediterranean Region, "Report on the Regional Scientific Group on Breastfeeding," Cyprus, January 26-30, 1981. The data was provided by an IPPS Study and supplemented with information from members of the Working Group.

Lockwood, R.M.

- 1981 Consultant report for Sudan, December 8-30, 1981: A proposed methodology for testing nutritional surveillance in South Kordofan Province. Newton, MA: International Nutrition Communication Service, Education Development Center, subcontract to Save the Children Federation; submitted to USAID, Contract A.I.D./DSAN-C-0209, 1981.

Original data.

Method: Cross-sectional nutrition status survey; non-random sampling with equal numbers of Arab and Nuba families.

Sample: 22 children under five in El Kweik and 26 children under five in El Efin.

Location: El Kweik and El Efin villages in South Kordofan Province.

This document is an INCS consultant's report submitted to U.S.A.I.D. that discusses the activities of the consultant and the UNICEF and Sudanese government personnel involved in the design and implementation of a nutritional surveillance pilot project in South Kordofan Province. A small preliminary nutrition status survey was carried out in two villages and a methodology for monitoring nutritional status of children under five was designed and implemented. The results of the survey are presented, and the plans for surveillance are discussed.

Lockwood, R.M.

- 1982 Notes on the potential for a weaning foods intervention in the Sudan. A Home and Village Prepared Weaning Foods Project of the Harvard/Massachusetts Institute of Technology International Food and Nutrition Program (HOVIPREP) consultant's report. Boston: January.

This consultant's trip to Sudan was undertaken December 8-30, 1981 at the request of UNICEF to assist in the development of a pilot nutrition surveillance program for the monitoring of pre-school children in South Kordofan Province. In addition, the USAID Office of Nutrition asked the author to explore the possibility of developing a maternal and infant feeding component within the general framework of the community program. This brief document reviews the available information on infant feeding practices in the Sudan, presents the results of a small nutritional status survey in the province (see Lockwood 1981), discusses the government's nutrition and health programs and offers recommendations for a weaning foods intervention.

Mahmoud El Hennawi, M.

- 1979 "Assignment Report: Assessment of Xerophthalmia, Sudan, February 22 - March 16, 1978." World Health Organization, Regional Office for the Eastern Mediterranean, March 1979.

Original data.

Method: eye examination of available children in March 1978.

Sample: 2,709 children 0 to 6 years old; 1,031 children 6 to 12 years old.

Location: urban Khartoum and 26 villages 70 to 140 km from Khartoum in Gezira and Khartoum provinces.

Background information is reviewed and the results of the major eye survey are presented. The percentage of children with Bitot's spots and xerosis did not reach the WHO problem criterion value of 2%, but the surveyed provinces have relatively good nutritional status and other provinces might show levels of avitaminosis A indicative of a true public health problem.

Murdock, M. S.

- 1979 "The impact of agricultural development on a pastoral society: The Shukriya of the Eastern Sudan." A report submitted to U.S.A.I.D. produced under U.S.A.I.D. contract number AID/afr-C-1045 (Control number PN-AAH-053).

In this preliminary analysis of the fifteen-year impact of a large capital-intensive irrigated agricultural scheme, the New Halfa Agricultural Scheme, a special focus is placed on the effects on pastoral herdsmen and on women. The author shows how traditional elites benefited disproportionately from the scheme even though elite women may have actually lost ground. Lower status pastoral women, entering the scheme as wage laborers, may have benefited. The scheme seems to have supplemented rather than replaced the pre-existing economy based on pastoral herding, and rainfed cereal cultivation tends to take second place in the priorities. The location of the project is in the Butana area of the Kassala province with the irrigation scheme along the Atbara river. The traditional pastoral herdsmen in the area were the Shukriya. Neighboring Arab pastoralists

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and the displaced Nubian Halfawis from the Wadi Halfa region were also included in the scheme. No nutrition or health data are included.

National Health Programming Committee, Ministry of Health

- 1975 The Democratic Republic of the Sudan: National Health Programme 1977/78-1983/84. Khartoum: Khartoum University Press, April 24, 1975.

This document shows the Sudanese Government's major priority areas of development in the health sector that have emerged as a result of the National Health Programming Committee deliberations in collaboration with consultants from WHO and with other Ministries and Departments of the Sudanese Government. The Government's present health activities, costs and plans are reviewed for each of the priority areas. Basic demographic, budget and health data are presented.

Nur, S.M., Abdel Aziz, S.M., El Arifeen Sirag, T. et al.

- 1978 Survey of nutritional status of under-five children, Eastern Gezira. Monograph, Ministry of Health, 6 pp., April 16-22, 1978.

Original data.

Method: Recording of age and weight of PLAN office attendees; questionnaire on feeding practices.

Sample: 814 children aged 0 to 5 years and some of the mothers.

Location: Four villages in the southern half of Rufaa district of Eastern Gezira: Sharafa Barakat, Sharafa Bahar, Dellawat and Dellawat Elfog.

This report summarizes the results of a 1978 preschool children survey carried out at a PLAN office in the Rufaa district, Eastern Gezira. The results indicated that women were generally following correct nutritional procedures but that the daily minimum requirements were not being fulfilled for nearly 50% of the preschool children. The quantity and quality of supplementary foods were considered insufficient. Recommendations for supplementary feeding, vaccinations and long term interventions are given.

Nutrition Division, Ministry of Health

- 1973 Food Consumption Survey in Soba West Village. Mimeograph, Khartoum.

Original data.

Method: Interview - questionnaire including three one-day dietary recalls and background data; estimated nutrient requirements were based on 1965 East African data.

Sample: 40 randomly chosen families representing 20% of the community, with the housewife or women in charge of food preparation answering the questionnaires.

Location: Soba West village, 20 miles south east of Khartoum.

This brief report summarizes the results of a food consumption survey carried out in Soba West village in December 1972. Dietary recall data was analyzed by household. The average figures generated, thus, do not allow for a clarification of intra-family food distribution patterns. Although the aggregate showed adequate diets, signs of childhood malnutrition were apparent.

Nutrition Division, Ministry of Health

n.d. Food Consumption Survey in Nasir Extension. Mimeograph.

Original data.

Method: questionnaire on food intake, habits and expenditures; two day record.

Sample: 39 randomly chosen households; about 321 people.

Location: an urban residential area outside Khartoum, east of the International Airport.

This brief report summarizes the major findings of a food consumption survey in Nasir Extension. Using aggregate data, it suggests that the dietary intakes of the study sample were adequate. However, no attempt is made to discuss the issues of inter- and intra-family food distribution.

Richardson, J.L.

1975 "Review of International Legislation Establishing Nursing Breaks," Journal of Tropical Pediatrics, 21(5): 249-58.

The purpose of this paper was to ascertain what legislation existed in various countries to protect the nursing relationship. Breastfeeding could be encouraged or discouraged by the presence or absence of labor laws affecting the nursing mother. The intent of most of these laws is primarily to retain mothers in the labor force and thus, these laws are encompassed in maternity protection labour laws rather than in child welfare laws. Information was gathered mainly from the International Labour Office publication, "Legislative Series."

Shadad, M.M.F., Shames el-Deen, H.S. and Ahmed, K.A.

1981 "Attitude of Mothers in Omdurman Towards Breast-Feeding." Bachelor of Science Thesis, Department of Home Science, Faculty of Education, University of Khartoum, March 1981.

Original data.

Method: Survey questionnaire/interview.

Sample: 300 mothers with children under 3 years of age randomly selected; 100 from El-Gamaier and 200 from El-Thaura and El Molazmin.

Location: three areas of Omdurman: El-Gamaier (underprivileged); El-Thaura and El Molazmin (privileged).

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The purpose of this survey was to investigate the attitude of mothers toward breast feeding and to compare the socioeconomic conditions of the privileged and non-privileged groups surveyed. The survey found generally favorable attitudes towards breast feeding, but it identified undesirable beliefs about breast feeding during pregnancy, diarrhea and contraception. Differences between the urban and peri-urban groups were also highlighted. Although generalizations from the results must be limited, sound recommendations are made.

Shazali, H.

- 1972 Home made weaning foods for Sudanese children. Sudan Medical Journal, 10(2):87-93.

This article presents suggestions for two special homemade weaning foods, Niama and Isma. The ingredients of Niama are sorghum flour, milk, egg and sugar. The ingredients of Isma are sorghum flour, dry meat (sharmout) and oil. These ingredients, also used in the adult diet, are available practically throughout the year. The measurements and cooking methods are familiar to Sudanese households. They are suggested as practical, simple, cheap, and adequate for all children.

Shazali, H., Ahmad, A.M., and Karrib, A.

- 1977 An experiment in community approach in delivery of health service. Sudan Paediatric Journal, 1:41-55.

Original data.

Method: Baseline questionnaire; clinical and anthropometric measurements of children; experimental provision of community medicine including health education, control of endemic diseases, regular anthropometric measurements, nutrition education, vaccination and family spacing.

Sample: Total village population

Location: Karaiba village, 10 km from Medani, Gezira

This paper describes the implementation of community medicine in Karaiba village in 1974. The goal of this community approach experiment in health care is to find an effective alternative to the traditional method of rural health services delivery. Only baseline data is presented.

Shazali, H., Ahmed, A.M. and Karrib, A.

- n.d. An experiment in community approach in delivery of health services in rural areas; Part II. Sudan Paediatric Journal, no date.

This article reports the one year follow-up (1975) of the Karaiba village community health project, which included treatment of acute diseases, health and nutrition education, cooking of home made weaning foods, vaccination, prenatal care, family planning, regular weighing and anthropometric measurements. A \$10,000 grant from the

International Planned Parenthood Federation was used for measles vaccination and buying medical drugs. The village people cooperated fully with the community medical team. Results showed improvements in child spacing, child nutrition status, child morbidity and mortality.

Steering Committee for the PHC Programme Formulation for the Southern Region

1976a The Democratic Republic of the Sudan: Primary Health Care Programme Southern Region, Sudan, 1977/78-1983/84. Juba, February 7, 1976.

This Primary Health Care Program document for the Southern Region is a companion to the National Health Program document and has been formulated with close reference to it. The subject matter is the implementation of full health coverage for the rural population as well as the provision of opportunities for community development. The priority areas are Health Manpower Needs, Health Facilities Requirements, Drugs and Supplies, Health Information System, and Community Self-Reliance and Rural Development. Each area has been thoroughly reviewed and detailed costing and implementation schedules given.

Steering Committee of the Primary Health Care Programme Formulation of the Eastern, Northern, Central and Western Regions

1976b The Democratic Republic of the Sudan: Primary Health Care Programme, Eastern, Northern, Central and Western Regions of the Sudan, 1977/78-1983/84. Khartoum: Khartoum University Press, May 1, 1976.

This document for the Eastern, Northern, Central and Western Regions is a companion to the basic National Health Program document. Its overall objective was to lay out a feasible Primary Health Care Program that will achieve maximum coverage of the rural and nomadic populations and foster community development and participation. The priority areas reviewed include Health Manpower and Facilities, Health Information Systems, Drugs and Supplies and Self-Reliance and Community Development. The document incorporates detailed strategies, costings and scheduling of the implementation of the PHCP for the Regions.

Sukkar, M.Y., Kemm, J.R., Makeen, A., and Habeeb, M.

1976 "Anthropometry in a Sudanese Village: Changes after 7 years," Proc. Nutr. Soc., 35(3): 146A.

This one page summary abstract compares two anthropometric surveys of one village (El Kalakla, 24 km south of Khartoum): one in 1968 and the other in 1975. Very little change in mean height and weight of preschool children was noted over the 7 year period even though the standard of living had increased.

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Taha, S.A.

- 1979a The pattern of severe protein-calorie malnutrition in Sudanese children attending a large hospital in the Sudan, American Journal of Clinical Nutrition, 32(2): 446-451.

Original research data.

Method: Thorough clinical examination, anthropometric and biochemical measurements.

Sample: All 150 severely malnourished children admitted to the Pediatric Department of Wad Medani Hospital in July 1972.

Geographic location: Wad Medani Hospital, 120 miles south of Khartoum

The author investigated the pattern of severe PCM in Sudanese children through clinical and anthropometric measurements. The Wellcome classification system using the degree of weight deficit and the presence or absence of edema was compared to other age-independent indices. Marasmus was the most prevalent pattern found, and along with marasmic-kwashiorkor showed a more chronic history with a higher average age than the more acute disease, kwashiorkor.

- 1979b "Ecological factors underlying protein-calorie malnutrition in an irrigated area of the Sudan," Ecology of Food and Nutrition, 7: 193-201.

Original Research.

Method: 14 representative villages chosen (see Taha 1978a and b for description); plus a detailed clinical history of hospitalized children and a socio-economic questionnaire-interview of their parents.

Sample: 1291 children aged 6 months to 4 years, and 150 children hospitalized with severe PCM.

Geographic location: 14 villages in the Gezira Irrigation Scheme and the Wad Medani Hospital, 120 miles south of Khartoum.

This report summarizes data from a 1972 study of 14 Gezira villages in an attempt to identify the various dietary and non-dietary factors contributing to the high prevalence of malnutrition in the area. Although low income was identified as the primary cause, ignorance about child feeding, with a lack of supplementary foods, inequitable intrafamily food distribution, decline in breastfeeding and an increase in bottle feeding also important causative factors.

- 1978a "The Prevalence and Severity of Protein Calorie Malnutrition in Sudanese Children," Journal of Tropical Pediatrics and Environmental Child Health, 24(5): 203-205.

Original Research.

Method: Clinical and anthropometric measurements (weight for age, height for age).

Sample: 1291 children age 6 months to 4 years.

Geographic location: Ten representative villages of the Gezira Irrigated Area; between the Blue and White Niles, south of Khartoum.

The author reports on the anthropometric and clinical status of children in Gezira, drawing on data from previous studies in Gezira and throughout the country. He concludes that protein-calorie malnutrition is the most urgent pediatric public health problem in Sudan.

1978b "Household Food Consumption in five villages in the Sudan," Ecology of Food and Nutrition, 7: 137-142.

Original Research.

Method: Interview with special questionnaire, 24-hour recall of food intake for family, with prices or amounts specified so that amounts could be standardized through weighing samples; used trained women welfare workers.

Sample: "Housewives" from 494 households in five villages, each representing an administrative area of the Gezira plantation system. Geographic location: Five villages of Gezira, between the Blue and White Niles in south Sudan: On Oweid, El Kamlim, El Fugara, Tanta, and El Fawar.

This study is part of a larger 14-village nutrition survey carried out in the area in 1972. The overall objectives were to determine the magnitude of childhood malnutrition, which was known to be high in the area, and to identify contributing ecological factors. Several limitations to the food consumption data are acknowledged, especially the masking effects of average intakes. Nevertheless, the data are useful in the detection of gross dietary deficiencies. Because some food intake data was collected in the late summer, energy intake may have been at a low point as supplies of locally grown staples dwindled.

1978c "The Comprehensive Child Health Care Centres in the Sudan," Trans. R. Soc. Trop. Med. Hyg., 72(4): 333-7.

Summary article.

This paper describes the experiences of Sudanese health personnel in applying Morley's concept of "under-five clinics" in Omdurman town, part of Khartoum. A discussion of the shortcomings of the previous health services is followed by a review of the objectives, implementation, and obstacles confronted by this small scale project. The major constraints identified were the high initial and operating costs and the previous dichotomy between preventive and curative medicine.

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- 1979 "TAICH Country Report: Development Assistance Programs for Sudan," New York: American Council of Voluntary Agencies for Foreign Services, Inc., Technical Assistance Information Clearing House.

This report describes the programs of several private non-profit U.S. organizations which provide the Sudanese people with technical assistance and material aid. The information given on each organization is based upon data furnished to TAICH by the organization.

USAID

- 1982 Survey of A.I.D. Activities in FY 82 in Maternal and Infant Nutrition. Washington, D.C.: USAID Office of Nutrition.

This U.S.A.I.D. internal document is a collection of telegram responses from U.S.A.I.D. Country Missions to a request from the Washington Office of Nutrition for a brief review of current and planned activities in each country in the areas of breast feeding, promotion, improving weaning practices and maternal nutrition. Four projects were listed by the U.S.A.I.D./Sudan Mission Office.

World Bank

- 1981 World Development Report 1981. New York: Oxford University Press, 1981.

This document offers an integrated discussion of international and national economic policy issues. Food, health and nutrition issues are dealt with briefly in Chapter 7. Country-specific development indicators are presented in chart form in the appendices.

Zumrawi, F., Vaughan, J. P., Waterlow, J. C., and Kirkwood, B. R.

- 1981 Dried skimmed milk, breast-feeding, and illness episodes--a controlled trial in young children in Khartoum Province, Sudan. International Journal of Epidemiology, 10:303-308.

Original data

Method: controlled trial intervention of take-home dried skimmed milk (DSM) or local beans; four pairs of MCH clinics, one furnishing DSM and the other local beans; followed for 3 to 6 months.

Sample: mothers attending the clinic for the first time with a child 6 to 26 months old; 287 children in the DSM group and 339 in the bean group (excluding sick children).

Location: eight MCH clinics in the cities of Khartoum, Khartoum North, and Omdurman.

The purpose of this study was to provide information on the possible harmful or beneficial effects of DSM on young children and to gain information on methodological problems inherent in such studies. The fact that at the start the two groups of mothers significantly differed on socioeconomic indicators (the DSM group was apparently more disadvantaged) makes the interpretation of the results difficult. Interviewer and recall biases may also affect the results.

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Vaughan, J.P., Zumrawi, F., Waterlow, J.C., and B.R. Kirkwood

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