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**Feeding habits of children under age of five in rural area of Sudan: an overview about the
nutritional situation**

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Abstract

Early introduction of complementary foods in the developing countries is associated with an increased risk of diarrhoea due to poor sanitary conditions and lower quality of supplements. In Sudan the most supplementary food offered to children are cereal-based stuffs which are naturally deficient in protein constituents. A survey was done in a central rural area of Sudan to study the feeding habits of children under age of five and related information about breast feeding, drinking water and complementary foods during breast feeding for the infants. Moreover, the weaning parameters as well as the most common food consumed by the children under age of five have been detected. The type of diet consumed by children under question was determined by using the Recall method. The results discovered the importance of early and continuous breast feeding for infants of the studied area. 60.7% of the infants were breast-fed for two years and only 10% of them were using bottle-feeding. Moreover, it was recorded that a higher share of the children (97.3%) were taking complementary food during the period of breast feeding while 12% of the infants started such complementary feeding program earlier (< 4 month of age) and 57.3% involved in the range between four to six month old. The assessment of the weaning regime was found to be sudden in about 23.3% of the infant community. Imposing of such sudden weaning without gradual introduction of complementary food was reported as one of the terrible traditional practices affecting the child health in various parts of Sudan. Most of the children were found consuming cereal-based diet and due to the low socio-economic status large number of families consumes on average 0.25 kg of meat for preparing meals

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for the whole family. All the children examined were found consuming dried okra (*Abelmoschus esculentus* (L.) Moench) in their meals during three consecutive days.

Keywords: Breast feeding, cereal-based foods, children under 5, complementary foods, okra, Sudan

Introduction

Breastfeeding is the best way of providing the ideal food for the normal and healthy growth and development of the infants. Data from 86 countries revealed that there are very large differences in breastfeeding practice between countries, between population groups within countries and within different groups over a period of time (OMER MIA ET AL., 1987; HAROUN ET AL., 2008). The optimal way of feeding infants is exclusive breastfeeding for the first 6 months. After 6 months, complementary foods should be provided along with continued breastfeeding up to the age of 2 years and beyond. The patterns of complementary feeding during the first 2 years of life have attracted increasing interest as important determinants of malnutrition (UNDERWOOD AND HOFVANDER., 1982). In many developing countries the weaning patterns and the related introduction of complementary foods are not well known (BAGENHOLM ET AL., 1987). Malnutrition affects one out of every three preschool age children living in developing countries (SMITH ET AL., 2003). It is also very important to mention that there is a strong relationship between women status and children nutritional situation (SMITH ET AL., 2003). In addition, many socio-economic factors will have direct and in direct effect on the child health and nutrition status, these factors include parents education especially mother, income of the family and other cultural aspects which related to feeding patterns of the family (ABDALLA ET AL., 2009). Sudan continues to be a country characterized by diversity, where numerous tribes have been found in the northern Arabic and southern African along with eastern and western tribes. These different tribes are contributing in what we call a country with multi cultural and ethnic features. Numerous factors have contributed in the food types and differences from north to south and east to west, these factors include climate, soil type, water availability, rainfall, temperature and of course culture and ethnicity. Accordingly, regional variations in food consumption patterns are occurring. Sorghum is considered to be the main staple dish of the major part of the rural areas.

Where, the people used to ferment it and prepared as porridge (*Aceda*) or *Kisra*, they are the major traditional type of Sudanese food. While, in western Sudan millet, along with sorghum, are used as main dietary energy supply, they are taken mainly in the form of porridge. In addition, wheat mainly consumed as bread, is of increasing importance to the diet in urban areas and in the north. The main crops of the Southern of Sudan are Cassava, yams and sweet potatoes in addition to maize and milk. More over, milk and dairy products are consumed in some areas, as much as 40% of all food consumed. While in rural area milk (from cows, sheep, goats and camels) is consumed as the main source of energy, protein and other

nutrients (DIRAR, 1996). The main objectives of the present work is to study the feeding habits of children under age of five in El Fau rural area of Gadarif state in order to evaluate the nutritional situation.

Material and Methods

A descriptive cross-section survey was made up in 2003 in three villages of El Fau rural area of the children under age of five.

Data collection: The survey was covered by the distribution of 150 questionnaires designed to collect data about the feeding habits of children under the age of five. The form was composed of 44 questions aiming to collect data about age, sex, number of children under age of five, mother age at delivery, parents level of education, parents occupations, source of income of the family, breastfeeding, weaning practicing, complementary feeding, feeding patterns after weaning, types of food and number of meals consumed by children under age of five using recall method. Other questions include immunization, children illness like malaria, diarrhoea fever, vomiting and respiratory tract infection, number of death among the children.

Sample size: The population in the study area is heterogeneous in terms of ethnic and tribal composition thus a sample of 5% was chosen to represent the community. From the 18,000 inhabitants in the area who form 3,000 households, 150 families (50 families from each village) were selected as a representative sample and the eldest child from the children under five was chosen randomly from each family to indicate the nutritional status.

Anthropometric measurements: Measurements of 150 children were done and data were transformed into height-for-age, weight-for-age, and weight-for-height ratios.

Clinical assessments: The children were examined by a physician to check the clinical signs of malnutrition, nutritional anaemia and vitamin A deficiency.

Analysis of the main food: Approximate analysis of food was done according to the protocols of AACC (1980) and AOAC (1975, 1984).

Analysis of drinking water: Coliform bacterial test was carried out according to the presence-absence test for total coliform as described by WHO (1998).

Results and discussions

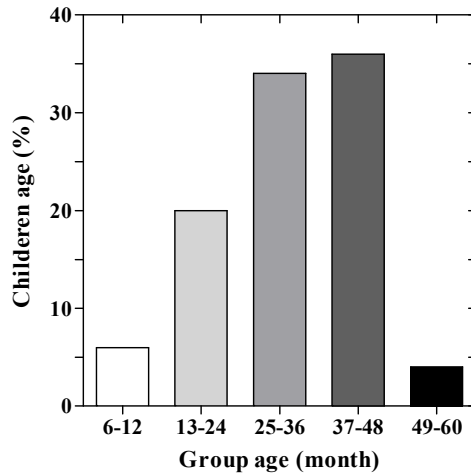


Figure 1: Age of the children in the study area

Most of the children are of the age 37-48 months (36%) while about 34% are of the age 25-36 months and only 4% are ranging between 49-60 months and finally 6% are infants (6-12 months) (Figure 1). Figure 2 shows the educational level of the mothers and fathers of the children in the study area, where 76.7% and 54% of the mothers and fathers were illiterate respectively. It is also found that 19.3% of the mothers received primary education and 18.6% of the fathers received or completed their elementary education. 2% of the mothers received intermediate education, while 4.7% of the fathers entered or completed intermediate school. 0.7% of the mothers and 0.7% of the fathers reached secondary education but only 0.7% of the fathers are university graduates. It is very clear that illiteracy is highly prevailing among El Fau community and particularly among women and this can be attributed to factors related to the cultural norms especially of the Arabic tribes in the study area, where girls are not allowed to go to school or complete their education (Figure 2).

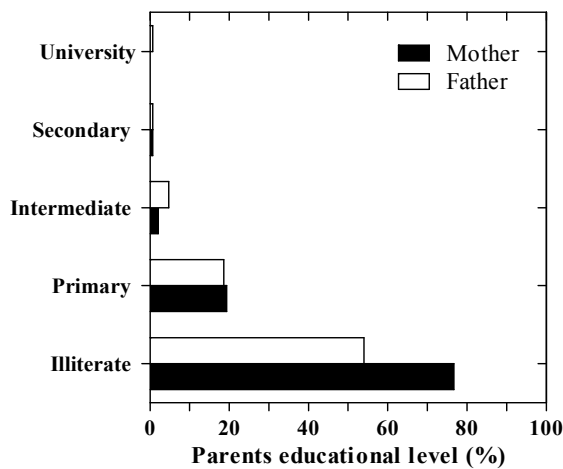


Figure 2: Educational level of parents in the study area

Concerning breastfeeding it was found that 100% of the children under age of five in the study area were breastfed immediately after birth and such feeding pattern continues till 2 years or more, which indicates that the importance and persistence of the breast feeding is well understood. In addition it was found that 68% of the children started to drink water before four months or even after few days from the day of birth if not in the first day, 31.3% started to drink water in the age of five to six months and only 0.7% of them started drink after six months (Figure 3). For the water source, it was revealed that 96% of the children were drinking water directly from the Rahad scheme canal and only 4% of the children have access to tap water. UNICEF (1995) reported that lacking of clean water, inadequate sanitation and poor hygiene practices are the direct causes of water-borne diseases and among the underlying causes of child deaths and illnesses from diarrheal diseases and malnutrition.

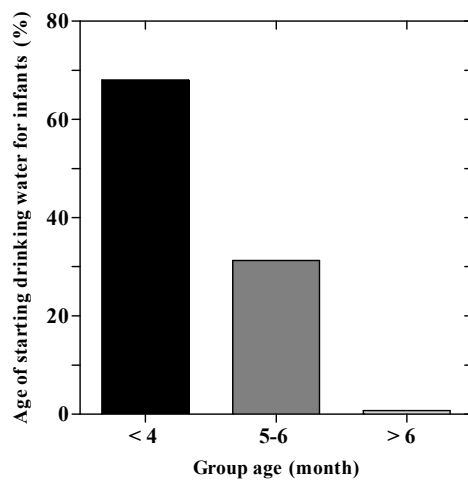


Figure 3: Age of starting drinking water of infants in the study area

Moreover, 97.3% of the children were reported taking complementary foods during the period of breast feeding, while the rest (2.7%) did not have such practice during this critical period. *Aceda*, *Kisra* and *Nasha* (prepared from fermented sorghum) are taken in large quantities during the day as the main source of energy and protein beside milk for the growing children in the three villages under study which found to be insufficient as balanced diet.

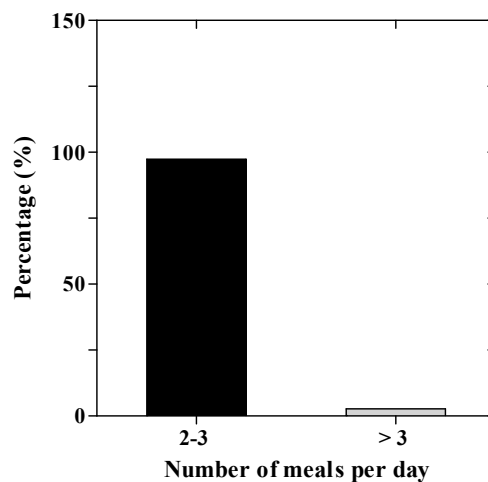


Figure 4: Number of meals consumed by children under age of five in the study area

Figure 4 and 5 show the number of meals per day and the child feeding habits in the study area. Obviously, it was found that 97.3% of the children take two to three meals per day and only 2.7% of the children take more than three meals per day. For the system of feeding, it was found that half of the children take the daily meals with their families, 18% of the children take meals alone while the rest (32%) take their meals some times with their families and some times alone. In fact, children taking meals with their own families might decrease their nutritional requirements balance. Due to the rapid growth nature and highly specific nutritional requirements, it is recommended to take more than three meals per day for the young growing children and the diets must be balanced and sufficient. This is in agreement with what was reported by WHO (1988) that child's diet should to be nutritious, suitable, energy dense and given frequently, perhaps four to six times per day, not just in two or three meals per day as may be the family practice.

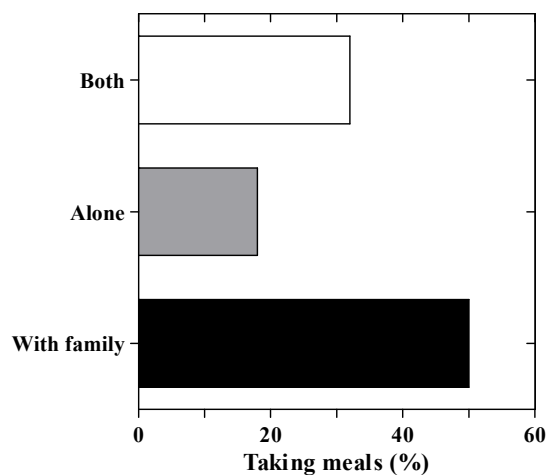


Figure 5: Feeding patterns of children under age of five in the study area

Concerning the food constituents, it was found that the major diets were prepared mainly from fermented sorghum (*Sorghum bicolor*; local cultivar wadaker) with about 100% of the children favor to consume it daily, while 82.0% of them consumed milk on daily basis (Figure 6). *Weika* (dried okra) which is available in each household in El Fau villages is one of the most important diets (100%). Only 7.3% of the children daily consumed meat with little quantities normally included in such meals. Recently the consumption of the local legume pigeon pea (*Cajanus cajan*) is increased for the children of El Fau rural area. The Nutrition Directorate of Gadarif tried to encourage people to consume legumes, especially pigeon pea which is available in lower prices as a source of dietary iron as a solution of chronic nutritional anemia among children and their mothers (EL MAHI, 2003).

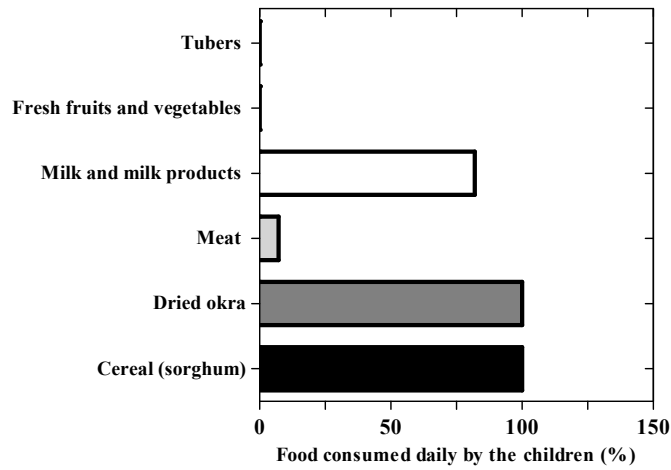


Figure 6: Food consumed by children under age of five in three consecutive days in the study area

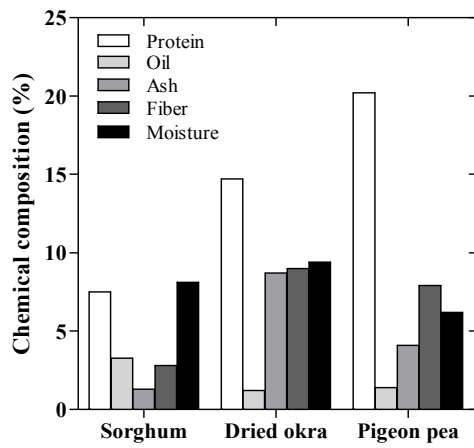


Figure 7: Chemical analysis of the main food consumed by children under age of five in the study area

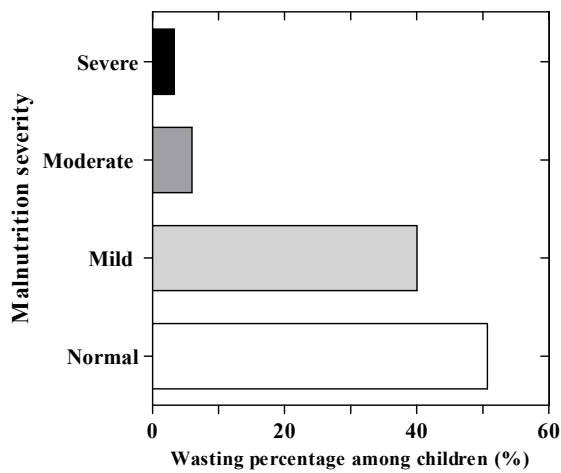


Figure 8: Wasting percentage among children under age of five in the study area

Regarding the prevalence of protein energy malnutrition among the children under five in the study area, the results showed complete absence of all symptoms of kwashiorkor and marasmus. The wasting percentage (according to Jelliffe classification) among the children in the study area indicated that around half of the children are normal, 40% are mildly malnourished, 6.0% are moderately malnourished and 3.3% are severely malnourished (Figure 8). This prevalence of mild, moderate and severe malnutrition might be attributed partially to the high rate of illiteracy among the mothers in the study area (Figure 2) as well as the insufficient food supplementations.

The haemoglobin concentration for 65.3% of the children was 50% or less ($\leq 7\text{g/dl}$), while Hb concentration for 34.0% of the children was 50-70% ($7 - 9.8\text{g/dl}$) and only 0.7% of the children has Hb concentration more than 70% ($> 9.8\text{g/dl}$) (Figure 9). According to WHO standard records, the above mentioned 65.3% of the children were severely anaemic (WHO, 1968). HOFFBRND AND PETTIT (1985) reported that the normal haemoglobin concentration for infants (3 to 12 month) and children (1 year-puberty) is ranging between 9.5-12.5g/dl and 11.0-13.5g/dl respectively.

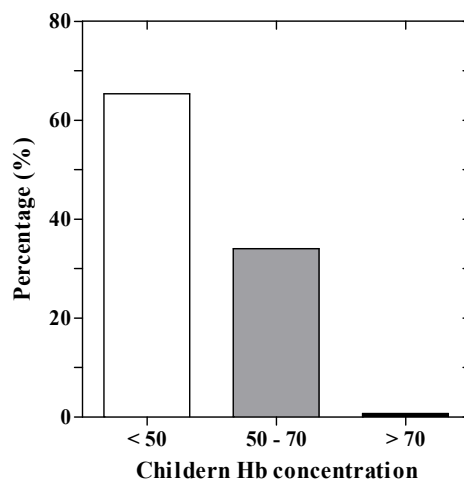


Figure 9: Haemoglobin concentration of children under age of five in the study area

The above data shows the high prevalence of anemia in spite of the absence of many of its clinical signs. It is well known that the nutritional anemia is mainly attributed to iron deficiency. Nutritional anaemia among the children in the study area is mainly due to absolute dependency on sorghum and vegetables (dried okra) based food which has low bioavailability of iron.

Conclusions and Outlook

The higher rate of illiteracy among mothers affects the feeding patterns of the target children. Moreover, the study area is poor and lacking for the basic needs, which reflected in the usage of canal water as

drinking water and unsanitary environment. Additionally, the area is also characterized by the low purchasing power, since most of the families depend on their food storage (sorghum and dried okra & milk). Poverty and insufficient income result in the lack of the food diversification is the main cause of nutritional anaemia among the children under age of five in the study area. The results of the present study clearly indicate the prevalence on nutritional anaemia. Most of the community member's practice subsistence farming and only few of them had surplus production.

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