



**EPIDEMIOLOGY OF PROTEIN ENERGY MALNUTRITION AMONG CHILDREN
UNDER FIVE YEARS OF AGE AT (MANDELA) DISPLACED CAMP, KHARTOUM**

¹*Ibtehad Mahgoub Mubarak, ²Mohamed Osman Elamin, ³Fowzi Omer Elamin and Walid Adam Eltahir⁴

^{1,4}Ministry of Health (Sudan).

^{2,3}Faculty of Public Health and Informatics, Umm Al-Qura University, Saudi Arabia.

*Corresponding Author: Dr. Ibtehad Mahgoub Mubarak

Ministry of Health (Sudan).

Article Received on 29/01/2018

Article Revised on 19/02/2017

Article Accepted on 11/03/2018

Abstract

This study was conducted at Mandela camp for displaced people in Khartoum state. 403 children were randomly selected from 315 families during the period from 5-1-2004 to 15-2-2004. The study provides many essential results from which PEM was found to be very high in the area among children below five years of age and it was attributed to the low level of education of parents in the area and also to the large family sizes which dominant in the study area. The study also revealed many other factors that were having a role in such high prevalence of PEM either directly or indirectly, these included: in sanitary environmental conditions, poor family income, inadequate water supply, poor personal hygiene of the mothers; insufficient health services, poor nutritional education. As a result, there were many unhealthy practices as using of bottle-feeding, delay in starting breast-feeding; early or too late introduction of complementary foods, some sorts of food taboos and wrong food habits and beliefs.

Key Words: Malnutrition, Mandela camp, children

1. INTRODUCTION

Malnutrition is a complex condition that can involve multiple, overlapping deficiencies of protein, energy and micronutrients – so called because they are nutrients needed by the body in only tiny amounts. A child becomes malnourished because of illness in combination with inadequate food intake. Insufficient access to food, poor health services, lack of safe water and sanitation, and inadequate child and maternal care underlying causes (UNICEF, 1998).

Malnutrition contributed substantially to childhood deaths and diseases but often went unrecognized. In 1990, many of the world's children below 5 years were underweight. The proportion ranged from 11% of children in Latin America, 4% in Asia, and 27% in Africa. Collectively, 31.6 million children in this age group were underweight (WHO, 1995).

According to UNICEF, (1998), malnutrition contributes to over 6 million child deaths each year. Fifty five percent of the nearly 12 million deaths among children under five were in developing countries. Half of all children under five years of age in South Asia and one third of those in Sub-saharan Africa are malnourished.

In 1999 and according to the Sub-Committee on Nutrition (SCN), approximately 841 million people in

developing countries, mostly women and children do not have enough food to meet their basic nutritional needs. Some 50 million other people suffer from acute hunger because of natural disasters, war, civil unrest and economic crisis. Half of more than 10 million deaths every year among children under five is associated with malnutrition. 170 million children are underweight, 208 million are stunted, and 49 million are wasted.

Protein Energy Malnutrition (PEM) is a spectrum of condition ranging from growth failure to overt marasmus or kwashiorkor (Park, 2000), PEM is characterized by high level of mortality in children between 12 – 24 months and estimated to be an underlying cause in 30% of deaths among children below 5 years. As many (43%) of children had low weight for age (stunting) and 9% (50 million children) had low weight for their height (WHO, 1995).

Records of Federal Ministry of Health, Sudan, (1995-1996) pointed to malnutrition as a common public health problem that endangers the life of children. The situation of malnutrition in different states was: 17.4% in White Nile State, 14.6% in El-Gadarif State, 28.4% in River Nile State, 25.2% in the Red Sea State, 8.5% in Southern Darfur State, 20.4% in El-Gaziar State, 16.4% in Kassala State, (16.4%) in Northern Kordufan State, and 16.6% in Khartoum State.

Famines, wars and other catastrophes are responsible for only a tiny part of the world wide malnutrition crises, but such emergencies often result in the severest forms of malnutrition (UNICEF, 1998).

OBJECTIVES OF THE STUDY

General Objective

To study the epidemiology of protein energy malnutrition (PEM) among children under five years.

Specific Objectives

To determine the prevalence rate of PEM among children under five years.

To identify the factors associated with PEM among children under five years.

To obtain on the knowledge, attitudes, practices of the mothers towards malnutrition among children.

MATERIALS AND METHODS

Study area

The study was conducted in Mandella camp for displaced people. The camp is located in Gebel Awlia municipality 85 km far from the center of Khartoum. The camp is composed of 7 strata. They comprised the Northern, Eastern, Southern, Western, Yarmouk, Gaboush and Elwadi.

Sampling procedure

The study included children less than 5 years of age. The sample size was determined by simple randomization method according to the equation:

$$n = \frac{Z^2 \cdot S^2}{d^2}$$

Where z is the standard normal variable corresponding to a level of significance of 95%, S is the standard deviation ($S \sim 3.45$), d is a marginal error estimated as ($d \sim 0.1536$).

Accordingly a sample of 315 household was obtained, this sample was distributed evenly upon the seven strata composing the camp.

Methods of data collection

The main variables that have been studied were

Sex of the child, weight of the child, height of the child, educational level of the parents, family-size, breast-feeding, duration of breast-feeding, types of complementary-food, weaning and weaning-practices, Sanitation and home environment, and pattern of infectious-diseases. All studied variables were included in the designed questionnaire for the data collection. The following methods were used for the collection of the required data.

A. Anthropometrics-measures

Using weight-for-height/length, by using a horizontal measuring board for measuring the child's height and small hanging scale (Slater scale for measuring the child's weight).

B. Questionnaire

This was designed for obtaining knowledge form mothers (their attitudes, various practices, knowledge regarding PEM and other information pertaining to the subject of study.

C. Focus Group Discussion

This was done with 120 of the mothers and through which information was collected concerning nutrition of the pregnant women and the reasons for not practicing natural breast feeding immediately after birth and the period for natural breast feeding and also information was collected regarding their visits to the maternal and childhood health center for regular follow up of the child growth and also for vaccination. The questionnaire also included information about infection with different diseases such as: malaria, diarrhoea, acute respiratory tract infections (ARI) during the last two months.

D. Interview with the health professional and nutritionist

This was for discussing the reasons for the spread of malnutrition in the camp. Also discussing the adopted nutritional programs and their objectives, and what national and international centers provide and also obtaining information regarding nutrition education and problems (obstacles) facing such Programs.

E. Focus group discussion with health professional and nutritionist

This is conducted with 15 individuals in the camp to collect information about the future plans to combat malnutrition in the camp.

F. Observation check list

This was done for collecting information about houses and environmental health and other required information.

Data analysis and interpretation

Information collected was analyzed by the computer using statistical package for social sciences (SPSS) program and then using statistical tests-the chi-square test (X^2 test).

RESULTS

The study showed that (43.4%) of children were normal. Malnutrition among children varied. Those with mild malnutrition constituted (26.3%), those with moderate malnutrition (11.7%) and (18.6%) with severe malnutrition. Table (1).

According to the data obtained, it has been shown that there is no relation between gender and those children affected with malnutrition (PEM). Table (2).

The study showed that there is no relation between the educational level of mothers and PEM (table 3). Form (table 4) it has been revealed that there is strong relation between education level of fathers and the spread of PEM among children less than 5 years of age. Data in

(table 5) showed that there is a strong relation between education level of mothers and awareness of malnutrition.

Table (6) indicates that there is strong relation between the size of the family and PEM with respect to children less than 5 years of age.

From table (7) it has been shown that there is a strong relation between the educational level of mothers and the selection of better types of food for children less than 2 years of age.

Table (8) showed that there is no relation between the awareness of mothers and the existence of PEM among children less than 5 years of age.

In table (9) fig (1) it was clear that (18%) of mothers are knowledgeable about PEM and (82%) of mothers lack the knowledge about the disease. The knowledge of mothers about PEM varied: some said that it is dehydration (17.5%), others described it as weakness (14%) and another group (43.9%) said that it is less of weight. Some (10.5%) said that it is the imbalanced nutrition and the rest (14%) said that it is diarrhoea and contamination of food stuff.

From fig (2), it has been revealed that (33%) of mothers believe that mother's milk by itself sufficient for the first 6 months of child birth and (67%) think that it is not sufficient for the first 6 months of the newborn.

In fig (3), (44.1%) of mothers mentioned that the mother's milk is the best feeding for children less than 2 years of age and (29.5%) said that the local food stuff is the best and (26.4%) think that cow's milk is much better. Those mothers who stressed on the importance of mother's milk (37.5%) believe that it is a full diet for the child in this period, the child can not be given additional food (62.5%).

From questionnaire it was obvious that (68.9%) of mothers do not avoid taking certain types of food during lactation period and the rest (31.1%) avoid taking certain types of food during lactation period such as khodra and weika Mulahs, Shatta and white meats (fishes and chickens) because they believe that those food spoil the milk (39.8%) or decreased amount of milk (7%) or for religious reasons (1%) has no nutritive value (19.4%), (others) (32.7%). Table (11).

From fig (4), it is clear that the majority of mothers (80%) do not breast feed their children when they got pregnant for the second time. And some of them (80%) attribute this to the harmful effect of milk during this period as they believe to the child and others (20%) believe that breast feeding during pregnancy may affect the health of the mother. Table (12).

The results showed that (5%) of mothers stop breast feeding 6 months after birth, (8.3%) in one year after birth and (18.1%) in 1 ½ years after birth, and (60.3%) in the 2 years of age (8.3%) in the 2 ½ years of age after birth. Table (13).

The investigation showed that the ways of weaning are all followed according to beliefs, customs and traditions, (22.9%) for sudden weaning and (16.5%) wean their children gradually and (3.2%) send their children to the sheik or Faki and (11%) put irritant substance (shata) on the nipple of the breast and (4.8%) by putting liquors on the nipple and (3.5%) put the mud on the nipple and (9.2%) put the dough on the nipple (5.1%) put ash on the nipple. It appeared that (56.2%) of mothers administer special meals to their children during the complete weaning while the others (43.8%) do not provide their children with special meals after weaning of breast feeding. Fig (5).

Fig (6) shows that (87%) of mothers is not aware of artificial feeding and (13%) are aware of it. Out of those mothers who practice artificial feeding, (32.7%) use the feeding bottles, (63.2%) use the ordinary cup and (4.1%) prefer to use the spoon. Table (14), fig (7).

Table (15) fig (8) showed the starting period for providing the complementary food, where (8.6%) of mothers commence this type of food immediately after delivery, (73%) 4-6 months after delivery, (5.4%) one year after delivery and (13%) more than one year after delivery.

The study showed that (62.2%) of mothers stop breast feeding suddenly. Some of the mothers (56.6%) attribute this to a limited age the child has reached and (37.8%) of mothers say it is due to harboring new baby (another pregnancy) or for insufficient milk (3.6%) or any problems involving the breast (2%) or working mother (2%). Table (16), fig (9).

Table (17), fig (10) reveals the attitude of mothers towards natural breast feeding for babies suffering from diarrhoea where (8.3%) of mothers lessens the number of breast feeding and (10.8%) complete stop breast feeding and (79.7%) of mothers continue breast feeding as usual. And others (1.3%).

The results showed that (75.9%) of mothers regularly visit the health center for maternal and childhood care MCH center fig (11). The study revealed the reason that encouraged women to visit the center as (54.4%) mentioned that the reason is the periodical examination and follow up existing pregnancy and (45.6%) related that to nutrient provided by the center, when they were asked about the reasons for visiting the health center.

Table (1): Percentage of different types of PEM among children under 5 years of age.

PEM	Frequency	Percentage %
Normal	175	43.4
Mild malnutrition	106	26.3
Moderate malnutrition	47	11.7
Severe malnutrition	75	18.6
Total	403	100

Mild malnutrition	52	54	106
Moderate malnutrition	25	22	47
Severe malnutrition	30	45	75
Total	189	214	403

Table (2): Association between sex of the child and different grades of PEM.

PEM	Sex		Total
	Males	Females	
Normal	82	93	175

Chi-Square Tests

	Value	Asymp. Sig. (2-sided)
Person Chi-Square	2.379	0.498

Table (3): Association between PEM and education level of mothers.

PEM	Education level					Total
	Illiterate	Khalwa	Primary	Intermediate	Secondary	
Normal	119	4	24	8	4	159
Mild malnutrition	82	5	23	3	2	115
Moderate malnutrition	34	2	12	1	2	51
Severe malnutrition	52	2	19	5	-	78
Total	287	13	78	17	8	403

Chi-Square Tests

	Value	Asymp. G-Sig. (2-sided)
Person Chi-Square	9.765	0.637

Table (4): Association between education level of fathers and PEM.

PEM	Education level						Total
	Illiterate	Khalwa	Primary	Intermediate	Secondary	University	
Normal	102	12	13	11	15	6	159
Mild malnutrition	70	8	22	4	9	2	115
Moderate malnutrition	24	11	8	5	3	0	51
Severe malnutrition	42	11	13	9	3	0	78
Total	238	42	56	29	30	8	403

Chi-Square Tests

	Value	Asymp. G-Sig. (2-sided)
Person Chi-Square	30.906	0.009

Table (5): Association between education level of mothers and the awareness of malnutrition.

PEM	Mothers education level					Total
	Illiterate	Khalwa	Primary	Intermediate	Secondary	
Yes	23	2	20	6	6	57
No	193	8	49	4	4	258
Total	216	10	69	10	10	315

Chi-Square Tests

	Value	Asymp. G-Sig. (2-sided)
Person Chi-Square	37.325	0.000

Table (6): Association between PEM and family size.

PEM	Family Size				Total
	3-5	6-8	9-11	>11	
Normal	89	45	19	12	165
Mild malnutrition	59	35	9	3	106
Moderate malnutrition	22	18	7	3	50
Severe malnutrition	58	18	2	4	82
Total	228	116	37	22	403

Chi-Square Tests

	Value	Asymp. G-Sig. (2-sided)
Person Chi-Square	16.319	0.061

Table (7): Association between the education level of mothers and food provided for children under 2 years of age.

Type of food	Education level						Total
	Illiterate	Khalwa	Primary	Intermediate	Secondary	University	
Local food	62	4	17	5	4	0	92
Mother milk	69	12	38	8	7	3	137
Cow's milk	53	8	7	3	1	0	72
Others	10	1	2	1	0	0	14
Total	194	25	64	17	12	3	315

Chi-Square Tests

	Value	Asymp. Sig. (2-sided)
Person Chi-Square	22.392	0.098

Table (8): Association between awareness of mothers about malnutrition and the existence of PEM.

Awareness of mothers	PEM				Total
	Normal	mild	Moderate	Severe	
Yes	31	24	11	20	86
No	136	86	36	57	317
Total	167	110	47	79	403

Chi-Square Tests

	Value	Asymp. Sig. (2-sided)
Person Chi-Square	1.646	0.649

Table (9): Awareness of mothers about malnutrition at Mandella displaced camp.

Awareness	Frequency	Percentage %
Yes	57	18
No	258	82
Total	315	100

Table (10): Distribution of the mothers according to the reasons behind preferring process of certain foods during pregnancy at Mandella displaced camp.

Reasons	Frequency	Percentage
Not harmful to the mother	40	36
Not harmful to the child	16	14.4
For economical reasons	11	9.9

For religious reasons	2	1.8
Has high nutritive value	20	18
Just habit	22	19.8
Total	111	100

Table (11): Distribution of the mothers according to the reasons behind avoid taking certain types of food during lactation period at Mandella displaced camp.

Reasons	Frequency	Percentage
Milk gets sore	39	39.8
Reduces milk quantity	7	7
Religious reasons	1	1
Has no nutritive value	19	19.4
Others (specify)	32	32.7
Total	98	100

Table (12): Distribution of the reasons that prevent mothers from practicing breast-feeding when they get pregnant at Mandella displaced camp.

Reasons	Frequency	Percentage
Milk get sore	201	80
Affect mothers health	51	20
Total	252	100

Table (13): Distribution of age for weaning children under 5 years at Mandella displaced camp.

Half year	Year	1 ½ years	2 years	2 ½ years	Total
16	26	57	190	26	315
5%	8.3%	18.1%	60.3%	8.3%	100%

Table (14): Methods of artificial feeding used with newly born child at Mandela displaced camp.

Methods of artificial feeding	Frequency	Percentage %
Bottles	103	32.7
Cups	199	63.2
Spoons	13	4.1
Total	315	100

Table (15): Distribution of mothers according to the starting of complementary feeding at Mandela displaced camp.

Starting complementary feeding	Frequency	Percentage %
Directly after delivery	27	8.6
4 – 6 months	230	73
After one year	17	5.4
Others	41	13
Total	315	100

Table (16): Distribution of the mothers according to the reasons behind sudden weaning of their children at Mandela displaced camp.

Reasons	Frequency	Percentage %
Child is old enough	107	56.6
New pregnancy	74	37.8
Milk is not enough or no milk	7	3.6
Breast problems	4	2
Mother working outside	4	2
Total	196	100

Table (17): The mothers and the breast-feeding process during diarrhoeal episodes at Mandela displaced camp.

Breast feeding	Frequency	Percentage %
Reduced	26	8.3
Stopped	34	10.8

Continued	251	79.7
Others	4	1.3
Total	315	100

DISCUSSION

The study revealed that there is no correlation between malnutrition and gender of children. This indicates that mothers put emphasis on both male and female children when they feed them. This attitude is not agreement with what had been mentioned by WHO (1986) who stated that "male babies are more valued than female babies in many cultures for social and economical reasons".

On the other hand in certain countries, men eat first and women last, and these practices poorly affect their health adversely (Park, 1997).

In this study, it has been shown that there is no relation between the educational level of mothers and PEM. This in my opinion is probably attributed to wrong believes in feeding habits of their children and this is applied for both illiterate and educated mothers in the study community.

One of the feeding habits that influence nutrition is that some people chose poor diets when good ones are available because of cultural influences, which vary from country to another. These may be stated as food habits, customs, believes, traditions and attitudes with regard to this aspect, Park (2000) stated that "food habits are among the oldest and most deeply entrenched aspects of any culture".

From the investigation, it was obvious that mothers were not knowledgable and were not aware of the cause of PEM in children and those who pretend to know, gave reasons for beyond the a etiology of the disease.

Form the study, it appeared that there is a statistically significant relation between PEM and size of the family which implies future increase in the prevalence of PEM. This relation is strengthened by Park (1995) who stated that "Malnutrition is largely the byproduct of poverty, ignorance, insufficient education, lack of knowledge regarding the nutritive value of food, inadequate sanitary environment and large family size. This relation was also in line with W.H.O (1986) who observed that in large families, less food is provided for each person and small children may be neglected because mothers have much work to do. Another statistically significant relation was found between the educational level of fathers and suffering of children from PEM. This finding was consistent with that of William (1982) who observed that lack of education is considered a personal factor of malnutrition and also the UN (1993) who stated that "family education seems to have strong effect of reducing the prevalence of underweight".

The investigation showed that there is a statistically significant relation between the education level of mothers and their awareness of PEM. This may be true as the study revealed that the majority of mothers are illiterate and this proves the unawareness of 80% of mothers of PEM.

Ignorance and insufficient education were among the factors listed by Park (1997) that contribute to malnutrition. This factor was also suggested by lechting (1996).

From the study, it appeared that 65% of women eat indiscriminately any type of food during pregnancy and 35% of them prefer to eat certain types of food believing that they are not harmful to the health of mothers and their carried babies. Some of the mothers prefer certain types of food for economical reason, and some for religious reasons and some for their high nutritive value. Those mothers who are not selective in taking food attribute this to economical reasons as they eat any food they found regarding of its nutritive value which may affect the health of both the mother and the baby.

35% of women care about their feeding during pregnancy which in my opinion is considered a good practice for improvement of the health of both the mother and the baby and consequently not affected with malnutrition (children). Our observation is in agreement with Dickman (1990) who observed that the diet of the mother during pregnancy affects the condition of the infant at birth and during the first two weeks of life. Low birth weight, premature and congenitally defective infants are more frequently born by mothers who have had inadequate diet before and during pregnancy.

From the study, it is obvious that the majority of mothers (68.9%) do not avoid certain types of food during the lactation period. This in my opinion is a good concept for it is essential for mothers so as to improve the quality of mother's milk provided to the child. On the other hand, it has been shown that 31.1% of mothers avoid eating certain types of food during the lactation period such as Kudra and Waika Mulahs, fishes and chickens as they believe that these food either, they spoil milk, they decrease the amount of milk, for religious reasons, they have low nutritive value or they cause diarrhoea. These wrong believes affect the health of mothers and decreases the amount of milk and by turn affects the health of child during the lactation period. These believes were also observed by Park (2000) as he noticed that people choose poor diets when good ones are available and attributed this to cultural influences.

The study showed that 80% of mothers stop breast-feeding of their children when they get pregnant for the second time. They believe that the milk in this period has a harmful effect on the child or it may affect the health of the mothers herself. This concept was ascertained by WHO (1986) who stated that "when mother get pregnant when her baby is only 6 months, the baby will be neglected and her milk become less. Her attention and time is devoted to the new baby". Also Cameron et al, (1991) stated that "in some cultures, people tend to stop breast-feeding suddenly when the mother becomes or thinks she as become pregnant". Sudden weaning implies

that the infant is not accustomed yet to complementary foods, so his nutritional-needs will not be met.

The study showed that weaning is practiced suddenly by some mothers and gradually by the others. With some mothers, the weaning is achieved by taking the child to the Fakki or Shiekh or placing repellents on the breast like mud, ash, liquors, dough and shatta. The sudden stopping of breast feeding is practiced in most of the cases when the mother becomes or thinks she has become pregnant. This fact was also mentioned by Cameron *et. al.*, (1991). The use of repellents or irritants when weaning the children was also in line with what has been observed by W.H.O (1995). They stated that “the commonest weaning methods are painting the breasts with bitter substance such as saber (aloes), quinine or occasionally hot pepper or captor oil, or with black, red and blue substances to frighten the child and make the breast looks repellent. Sometimes, the child is turned over to it’s grand-mother or to a familiar relative for two to seven days in order to make him forget the breast. Also the slit in the mother’s dress, through which the child reaches the breast, is closed. Weaning methods are rather severe and may cause emotional upset and psychological trauma to the child”.

The study revealed the more than 50% of mothers provide their children with special diets during the complete weaning and this in our opinion is a good attitude from mother with regard to feeding in complete weaning as it improves the health of the children and prevent them from acquiring malnutrition. This is practice is in agreement with what had been recommended by UNICEF (1987) who stated that “multi-mixes should be given after the first six months which have four basic ingredients: carbohydrates, proteins, vitamins, mineral, calorie supplements as fat oil”. Also Righard, (1996) stated that “the current approach is to recommend weaning multi-mixes of food based on the stable foods, but with other foods added to supply nutrients that are not present in the staple food, so that more complete food mixture results. It is therefore important to add animal products to the staple-food at an early stage”. Also WHO (1996) stated that “the weaning diet usually commences the soft (semi-solid) and not very concentrated staple-food, i.e. the main food of the community.

The rest of mothers (less than 50%) do not provide their children with special meal and this might probably be due to economic reasons. In this case, the food given to children do not meet their nutritive requirements during this period and predispose them to malnutrition.

From the study, it is obvious that 80% of mothers provide their children with unbalanced diet after weaning i.e. not rich in proteins that are required for the growth of children which make them more prone to malnutrition. The weaning period is most probably the most critical period in the child development as improper weaning is

often followed by diarrhoea and growth failure as mentioned by Park (1997), Cameron (1991) said than “Malnutrition is more common during weaning period than that first six month of age”.

The study showed that the majority of mothers uses different objects for artificial feeding (cups, spoons and bottles). One their of mothers use the bottle for feeding their children. In my opinion, the use of bottle in feeding is risky and unhealthy especially with unhygienic mothers and therefore render children more subject to microbial infections and diarrhoea which leads to malnutrition. This explanation is consistent with King (1980) who found bottle feeding dangerous as it causes starvation and infection resulting in diarrhoea.

From the study, it appeared that complementary food is introduced when the child is 4-6 month of age which in our opinion is a good concept and also a good and healthy practice and this agrees with what stated by WHO (1999) “Age of introducing of complementary foods should be between 4 and 6 months of life”.

The bad practice observed is that some mothers starts complementary feeding immediately after birth. This will neg-atively affect the health of children and produce malnutrition.

Introducing complementary food at the age of 6 months was also confirmed by UNICEF (1998).

Some mothers provide complementary food in a late stage (following the first year of life) which is considered a bad attitude. However, economical reasons, traditions and wrong concepts might probably play a greater role in this bad attitude. This was ascertained by WHO (1999) and UNICEF (1987).

From the study, it appeared that abrupt weaning is undoubtedly a predisposing factor to malnutrition as it deprives the child from many nutrients that were available in mothers milk. Those mothers who attend educational health lectures in health centers or lectures given by health visitors wean their children gradually. These lectures in my opinion improves the health awareness of these mothers. Those mothers who wean their children abruptly believe that the child reached a suitable age for being weaned. This in turn will affect the health of the child as he will be provided with complementary food deficient in certain items.

In this study, few mothers mentioned that the reason for abrupt weaning is the insufficient amount of milk in the breast. This might be true as it is related to economical reasons where mothers are not supplied with balanced diets during the period of breast feeding. The drying up or inadequate breast milk as a major reason for abrupt weaning was also mention in the report of WHO (1995). Another reason for the abrupt weaning is mothers being working to earn money for subsistence. This reasons was ascertained by Schafer (1991) who observed that

economic pressure encourages mothers to work outside the house.

The study showed that 75% of mothers or more continue breast feeding when their children are affected with diarrhoea. This, in my opinion is a good attitude and is probably attributed to their awareness due to the educational lectures presented to them by different organizations as previously mentioned. This awareness leads to the improvement of the child health and compensate the loss of fluid and prevent dehydration and consequently prevent PEM. This was in agreement with what observed by WHO (1990) that the child is given plenty of food to prevent under nutrition, when breast feeding is continued during diarrhoeas. The wrong, unhealthy attitude is practiced by some mothers who decrease or cease completely breast feeding during diarrhoeal manifestations. This attitude will make children prone to be affected with dehydration and PEM. Besides, the excellent mixture of human milk, it also has a unique anti infective properties and seems to protect children of all ages against diarrhoea even when given in small amount (David and Dered, 1987; Hoyle, et.al 1980; WHO, 1993). The WHO (1990) recommended the continuation of breast feeding during diarrhoea episodes and this confirms that cessation of breast feeding during diarrhoea is a practice not recommended.

The study revealed that 66% of mothers do not practice natural feeding immediately after birth for complete lack of mother's milk. This may be attributed to the insufficient feeding of lactating mothers due to the prevailing poverty in the area in addition to their (mothers) unawareness of the importance of proper feeding during the lactation period. The insufficient feeding during the lactation period affects both the health of the mother and the child. It was obvious that some mothers do not breast feed their children as they are isolated from the child immediately after birth. And some for insufficient mother's milk. This, in my opinion is attributed to family habits and traditions and also to improper feeding habits and unawareness. The importance of proper feeding of mothers during pregnancy was also reported by Dickman (1990) who showed its effect on the condition of the infant during the first two weeks of life.

Some mothers feed their children with nutrients other than mother's milk (boiled water and cow's milk) immediately after birth. We would like to confirm that mother's milk is very essential as a full diet to the child as was mentioned by Christian and Greger (1988) that it contains Colostrums which is the watery liquid produced by breasts during the first few days after a mother gives birth. They showed that it is higher in protein and some minerals than mature breast milk. They reported that it also contains antibodies and special cells that increase the baby's immunity to several diseases.

Most of the children are affected with diarrhoea once or several times during the two months before the commencement of the study. This in my opinion is considered a great risk leading to occurrence of malnutrition. This in agreement with WHO (1992) who reported that diarrhoea is an important cause of malnutrition, Diarrhoea is said to be product of deteriorating hygienic standards and inadequate supply of drinking water (WHO, 2000).

CONCLUSIONS

1. The high prevalence rate of PEM in the area is attributed to inadequate health and nutritional education, large family size and wrong believes and traditions.
2. The deteriorating economic condition of the family was a common factor for the spread of PEM among children less than 5 years of age in the area.
3. The inadequate supply of drinking water (most of the families cannot afford to buy water) will help in the spread of diseases and consequently the spread of PEM in children less than 5 years of age.
4. A good sanitation system for disposing garbage and human waste is lacking in the area. This predisposes children to different infectious diseases and PEM as result.
5. The educational standard of parents is low.
6. The number of nutritional centers in the area does not meet the demands of the population.

RECOMMENDATIONS

According to the study performed, the following recommendations for combating malnutrition in the area are raised:

1. Putting great emphasis on the health education of mothers. Health education must include: Personal hygiene of the mother and the child, environmental and household reforms, MCH aspects, food habits and food taboos, health education concerning pregnancy, lactation (breast feeding) and weaning periods.
2. Affording equipment's and appliances that facilitates the achievement of educational health programs and guarantee the continuous electric supply to the camp.
3. Continuous water supply for drinking and for other household uses should be attained to improve personal hygiene and prevent the spread of diseases.
4. Provision of adequate preventive and curative health services which can be easily reached.
5. Introducing a healthy and sound system for the disposal of solid wastes and human waste in the area.
6. Revealing the activities of the governmental and non-governmental organizations.
7. Improving the economic status of the population by creating job opportunities to the capable family members and the erection of social development centers for mothers to help them find jobs and to

ultimately improves their income and by turn improves their standard living and consequently prevent the occurrence of PEM in the area.

REFERENCES

1. Barker, M.H. Nutrition and dietetic for nurses, 8th ed. Oxford University Press: New York, 1991.
2. Beaton, G.H. and Bengoa, J.M. Nutrition in preventive medicine. The major deficiency syndromes, epidemiology and approaches to control, Geneva. WHO, 1976; 32-54.
3. Brown. K.H and Black. R.E. The national Cost of Infections. *Prog-clin-Bil-Res*, 1981; 77: 467-77.
4. Brozek, D. et al. Malnutrition and behaviour. Critical assessment of key issues. Lausanne, Nestle Foundation, 1984; 15-105.
5. Cameron, M. Hofvander, Y. A Manual of feeding infants and young children, 3rd ed. Oxford University Press: Nairobi, 1991.
6. Chandra. R.K. Nutrition, immunity and infection : present knowledge and future directions *lancet*, 1983; 1(68): 8-91.
7. Christian, J.L. and Greger, J.L. Nutrition for living. 2nd ed. The Benjamin Cummings Publishing Company INC, 1988; 420.
8. Christian, J.L. and Greger, J.L. Nutrition for living. 4th ed. The Benjamin Cummings Publishing Company INC, 1994; 227.
9. Cogil, B. Anthropometric Indicators. Measurement Gide. Washington: Food and Nutrition Technical Assistance, 2001.
10. Dickman, R. Food supplementation during pregnancy. *Indian journal of Nutrition and Dietetics*, 1990; 33(9): 163-165.
11. Dunn, P.M. Low birth weight incidence, etiology and Prevention. In: Philpott R.M. ed. *Maternal Services in developing world: What the community needs*, Royal collage of obs and Gynecol, 1979; 233-240. (Abst).
12. Festo, K. Malnutrition in children. *Child health Dialogue*, Issue 94th quarter, 1997; 4.
13. Freeman, H. et al. Nutrition and cognitive development among rural Guatemalan children. *American journal of public Health*, 1980; 1277-1285.
14. Gavin, C.A and Metcoff, J. *Pediatric nutrition*. 1st ed, Butter Worth and Co, London, 1985.