



PREVALENCE OF MALNUTRITION'S AMONG CHILDREN UNDER-FIVE YEARS AT EL-OBEID SPECIALIZED PEDIATRIC HOSPITAL, NORTH KORDOFAN, SUDAN (2021 TO 2023).

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ABSTRACT

Background: Malnutrition is still an important problem among children under-five years in El Obeid city, and it is remain one of the commonest causes of morbidity and mortality among children. This study aimed to identify the prevalence of malnutrition's among children under 5 years at El-Obeid Specialized Pediatric Hospital, North Kordofan, Sudan, from April 2021 to October 2023. **Methodology:** An institutional cross-sectional descriptive analytical study, included 384 of under-five children aged 6-59 months who were selected using simple random sampling technique was implemented. Data collection was focused on anthropometric tests (MUAC) for children and using structured questionnaire for mothers of children. Data were entered and analyzed using the Statistical Package of Social Sciences (SPSS) version 23.0 and chi-square test. **Result:** The results indicated that (38.8%) of children had suffered from malnutrition, (22.1% of them were females). (19.3%) of mothers were illiterate. Majority of malnourished children 98 (25.5%) eat two meals per day. There is statistical significant correlation between the mother's educational levels, number of meals eaten by child per day, exclusive breastfeeding and malnutrition statuses (p-value= 0.000), (p-value = 0.000) and (p-value = 0.008), respectively. **Conclusion:** There is high prevalence rate of malnutrition among children under 5 years in El-Obeid City. The study recommended that: raising awareness of mothers about importance of breast feeding for infant to improve nutritional status of their children, encourage complementary feeding and begin it in right age according to WHO recommendations and better maternal education are needed.

KEYWORDS: Malnutrition, breast feeding, children under- five, MUAC, North Kordofan- Sudan.

1. INTRODUCTION

Adequate nutrition is essential in early childhood to ensure strong immune system and proper physical and mental development.^[1] WHO defines malnutrition as "the cellular imbalance between supply of nutrients and energy and the body's demand for them to ensure growth, maintenance, and specific functions. Malnutrition can also be defined as the insufficient, excessive or imbalanced consumption of nutrients. Several different nutrition disorders may develop, depending on which nutrients are lacking or consumed in excess."^[2]

Malnutrition refers to state of either under nutrition or over nutrition. Under nutrition occurs when the diet

person consumes does not meet their body requirement for growth and developments were as over nutrition occurs when person consumes too many calories.^[3] Malnutrition in under- five children continues to be a major health problem.^[4] It is the most important risk factor for the burden of disease causing about 300,000 deaths per year directly or indirectly responsible for more than half of the all deaths in children.^[5] Globally, approximately 60 million and 13 million of children are affected with moderate and severe acute malnutrition, respectively.^[6] The causes of malnutrition are directly related to inadequate dietary intake as well as disease, but indirectly to many factors, among others household food security, maternal and child care, health services

and the environment, while most nutrition interventions are delivered through the health sector, non-health interventions can also be critical. Actions should target the different causes to reach sustainable change, which requires multisectoral approach.^[7] Good nutrition sets children on the path to survive and thrive. Well-nourished children grow, develop, learn, play, participate and contribute – while malnutrition robs children of their full potential, with consequences for children, nations and the world.^[8]

Chronic food deficits affect about 792 million people in the world including 20% of the population in developing countries. Worldwide, malnutrition affects one in three people and each of its major forms dwarfs most other diseases globally.^[9] Malnutrition affects all age groups, but it is especially common among the poor and those with inadequate access to health education and to clean water and good sanitation. More than 70% of children with protein-energy malnutrition live in Asia, 26% live in Africa, and 4% in Latin America and the Caribbean.^[9] The problems of poverty and under nutrition are wide spread and growing. Almost 40,000 children under the age of five years die each day from under nutrition and infection.

The World Health Organization recommends exclusive breastfeeding until 6 months of age and continued breastfeeding for at least 2 years together with the introduction of adequate amounts of complementary foods of suitable nutritional and microbiological quality. In the population, infants exclusively breastfed up to 6 months are less affected by diarrhea and do not have growth deficits. Exclusive breastfeeding for 6 months is the optimal way of feeding infants. Thereafter infants should receive complementary foods with continued breastfeeding up to 2 years of age or beyond.^[10]

2. Aim

The objective of the present study was to identify the prevalence of malnutrition's among children under -5 years at El-Obeid Specialized Pediatric Hospital, North Kordofan- Sudan (2021 to 2023).

3. MATERIALS AND METHODS

3.1 Sample size

This study was done in El-Obeid Specialized Pediatric Hospital, North Kordofan, Sudan among children under 5 years and their mothers. The sample size was (384), it determined by using the following formula

$$n = \frac{z^2 pq}{d^2}$$

Where

Z = 95% = (1.96).

P= 50% = 0.50 (Prevalence of malnutrition as 50%),^[11]

q= (1- P) = (1- 0.50)

d= marginal error = 0.05

3.2. Sample techniques and processing

Simple random sampling technique was implemented. This technique gives each member of target population an equal and independent chance of being selected for the study.^[12] Where children in the age group between 6 to 59 months were considered for the study, the mother's child answered the questions during the study. Two methods were used to collect data; direct measurement of anthropometric parameters (MUAC), and indirect method; using a structured questionnaire for mothers of children). Data entered, processed and analyzed using SPSS version (23.0) software, Microsoft Excel (2010) and Chi-square (X²-test) and organized it in tables, graphs and figures.

4. RESULTS

The study shows that about 46.6% of children were males and 53.4% were female as shown in Figure (1). The above figure (2) shows that, 19.30% of the mothers were illiterate, 0.30% had non-formal education, 38.80% had primary, while only 1.00% had post graduate(n=384). Figure (3) shows that about 5.70% of the mothers fed their child one meals daily, 43.50% feed their child twice a day, while 35.90% fed their children three times per a day and 14.80% fed their child more than three times a day.

Table (1): Distribution of children according to Mid Upper Arm Circumference (MUAC), El-Obeid Specialized Pediatric Hospital; (n=384).

MUAC	Frequency	Percent
from 0 to 11.5 cm (Malnutrition)	149	38.80%
≥11.5 and <12.5 (at risk of malnutrition)	180	46.90%
Normal (>12.5)	055	14.30%
Total	384	100.00%

n=384

The above table shows that 14.3% of children were having MUAC more than 12.5 cm, 46.9% of them were having MUAC in range between ≥11.5 to <12.5 cm and 38.8% of them were having MUAC less than 11.50 and those suffering from malnutrition according to MUAC measurement.

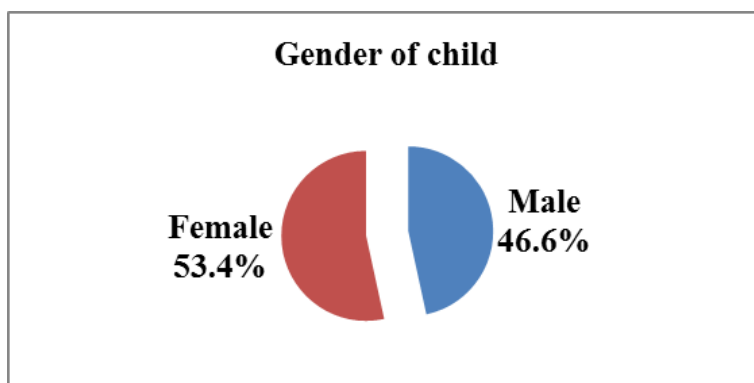


Figure (1): Distribution of children according to gender, El-Obeid Specialized Pediatric Hospital; (n=384).

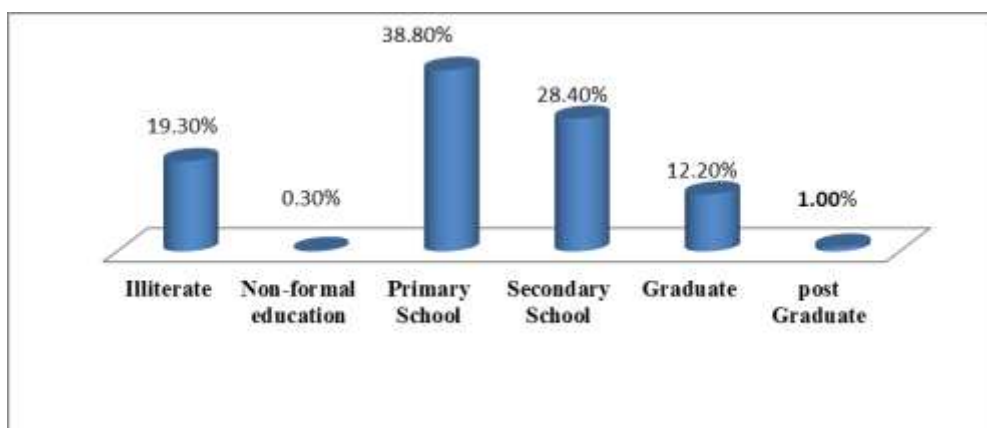


Figure (2): Distribution of mother's according to educational level, El-Obeid Specialized Pediatric Hospital; (n=384).

Table (2): Relationship between mother's educational levels and malnutrition statuses, El-Obeid Specialized Pediatric Hospital; (n=384).

Mother's educational level	MUAC			Total
	Malnutrition	At risk of malnutrition	Normal	
Illiterate	47 (12.2%)	23 (5.9%)	4 (1.1%)	74
Non-formal education	1 (0.3%)	0	0	1
Primary School	63 (16.4%)	63 (16.4%)	23 (5.9%)	149
Secondary School	29 (7.5%)	62 (16.2%)	18 (4.7%)	109
Graduate	8 (2.1%)	30 (7.8%)	9 (2.4%)	47
Post Graduate	1 (0.3%)	2 (0.5%)	1 (0.3%)	4
Total	149 (38.8%)	180 (46.8%)	55 (14.3%)	384
<i>P-value = 0.000 df= 10 $\chi^2 = 39.322$</i>				

The above table shows high significant relation between mother's educational level and malnutrition statuses (*p-value* = 0.000).

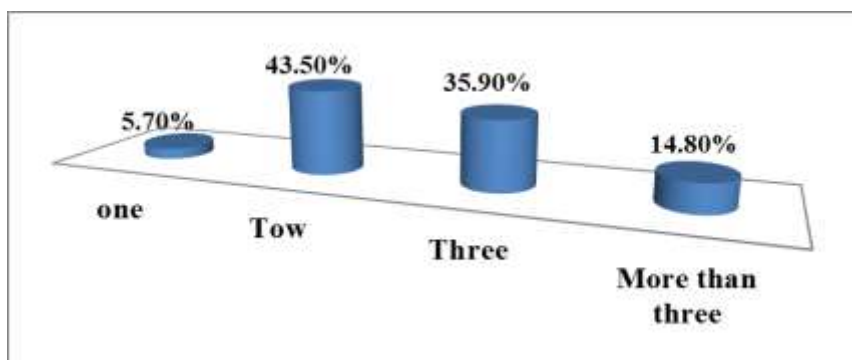


Figure (3): Number of meals your child eats per day, El-Obeid Specialized Pediatric Hospital; (n=384)

Table (3): Relationship between the number of meals eaten by child per day and malnutrition statuses, El-Obeid Specialized Pediatric Hospital; (n=384).

Number of meals your child eaten per day	MUAC			Total
	Malnutrition	At risk of malnutrition	Normal	
One	12 (3.12 %)	6 (1.6%)	4 (1.04%)	22
Tow	98 (25.5%)	59 (15.4%)	10 (2.6%)	167
Three	31 (8.1%)	82 (21.3%)	25 (6.5%)	138
More than three	8 (2.1%)	33 (8.6 %)	16 (4.2%)	57
Total	149 (38.8%)	180 (46.8 %)	55 (14.3%)	384

$p\text{-value} = 0.000$ $df = 6$ $\chi^2 = 66.819$

(P value = 0.000 < 0.05) significant.

Table (4): Relationship between monthly family incomes (SDG) and number of meal eaten per day, El-Obeid Specialized Pediatric Hospital; (n=384).

Family income	Number of meal eaten per day				Total
	One	Tow	Three	More than three	
Less than 10000	2(0.5%)	31 (8.1%)	29 (7.5%)	3(0.8%)	65
1000 -20000	14(3.6%)	106 (27.6%)	72 (18.7%)	35(9.1%)	227
More than 20.000	6 (1.6%)	30 (7.8%)	37(9.6%)	19(4.9%)	92
Total	22 (5.7%)	167(43.5%)	138(35.9%)	57(14.8%)	384

$P\text{-value} = 0.030$ $df = \chi^2 = 13.959$

Regard the above table, approximately 5.7% of families and their children were eating one meal per day, while 43.5% were eating two meals per day, 35.9% were eating three meals per day and 14.8% were eating more than

three meals per day. The correlation between number of meal eaten per day and families income are significant ($P\text{-value} = 0.030 < 0.05$).

Table (5): Practice of mothers child toward to children feeding during childhood period (under five year of age), El-Obeid Specialized Pediatric Hospital; (n=384).

Variable	Frequency	Percent
Type of feeding (n= 384):		
Breast feeding	368	95.80%
Artificial feeding	015	03.90%
Both feeding	1	00.30%
Total	384	100.00%
Starting complimentary feeding (n=368)		
Before six month	262	71.00%
6 months	022	06.00%
After six months	084	23.00%
Total	368	100.00%
Reasons of early introduced complementary food (Before6 months) (n=262)		
Early pregnancy	023	08.80%
Cultural	161	61.50%
Availability of other food	004	01.50%
Problem in mother milk	040	15.30%
More than one choices	034	13.00%
Total	262	100.00%

The above table shows that 95.80% of mothers are practiced breast feeding, while 71.00% of mothers were starting complimentary feeding for their children for less than 6 months. In the same table shows that 08.80% of the mothers were introduced complementary food early due to early pregnancy, 61.50% due to cultural, 1.5% due to availability of other food, 15.30% due to problem in mother milk.

Table (6): Relationship between the starting complimentary feeding and malnutrition statuses El-Obeid Specialized Pediatric Hospital; (n=384).

Starting complimentary feeding	MUAC			Total
	Malnutrition	At risk of malnutrition	Normal	
Before six month	116 (31.5%)	110 (29.89%)	36 (9.78%)	262
6 months	8 (2.17%)	11 (2.9%)	3 (0.8%)	22
After six months	19 (5.1%)	53 (14.4%)	12 (3.26%)	84
Total	143 (38.8%)	174(47.3%)	51(13.8%)	368
$p\text{-value} = 0.008$ $df = 4$ $\chi^2 = 13.793$				

The above table show that there is relationship between malnutrition statuses of children and exclusive breastfeeding (P value= 0.008 < 0.05).

5. DISCUSSION

The present study showed that 38.80 % of children were malnourished <11.5 cm according to MUAC; this finding is higher than a previous studies that conducted in various countries, a similar study conducted in India, maintained that “17.3% of children were having MUAC less than 11.5 cm”.^[13] Also a study conducted in Khartoum state, revealed that 20.90% of children badly nourished.^[14] In addition a similar conducted in Elgeneena City, West Darfur State, found that “8.9% of children were had their MUAC value <11.5”.^[11] On other hand the present is lower than study conducted in Rural Karnataka, South India obtained revealed that about 70% of the children were malnourish.^[15] Malnutrition in under- five children continues to be a major health problem.^[4]

The current study revealed that the prevalence of malnutrition was significantly high in female children 85 (22.1%) than males 64 (16.6%). These results were in accordance when compared with study conducted in Pakistan, found that 338 (66.1%) children were observed to suffer from malnutrition, out of these 338 malnourished children 164 (48.5%) were males and 174 (51.5%) were females.^[4] This result was discordance with studies carried out in different countries; Uganda by.^[16,17,18] have suggested that under-nutrition is more prevalent among boys than girls.

The results showed that 19.3% of mothers were illiterate. This result was in line with study conducted in Ethiopia which detected that 19.5% of mothers were illiterate.^[19] Also, the current result is lower than studies conducted in different countries; a study carried out in Pakistan found that 51.8% children's mothers were illiterate.^[20] Also study conducted in Khartoum State, revealed that 53% of mothers were illiterate.^[14] Other study conducted in Rukmini Nagar found that 27.5% of the mothers were illiterate.^[21]

The study observed that there's a relationship between the mother's educational levels and malnutrition statuses of child; ($p\text{-value} = 0.000$). This result is in the line with study conducted in Elgeneena City, West Darfur State, detected that “there are relationship between mother's educational levels and nutrition status ($p\text{-value} 0.03$).^[11] That means when increase education level of mother the

affected of malnutrition of their children under five age decreased.

In this study about 98 (25.5%) of malnourished children eat two meals per day, there are high significant relation between the number of meals that eaten per day and malnutrition statuses (P value = 0.000 < 0.05), this means the number of meals which eaten by child per day consider one of the factors that contribute to exacerbating malnutrition among under five children.

The study observed that there's a relationship between starting of complimentary feeding and malnutrition status ($P\text{-value} = 0.008$). 3.26% of the mothers with normal children were started complementary feeding after 6 months as per WHO recommendation and 9.78% of the mothers were started before completed the 6 months. While 31.5% of mothers with malnourished children were started complementary feeding before 6 months and only 5.1% of the mothers with malnourished children were started after completed 6 months. Recommendation of WHO infant should be introduced to complementary food at 6 months' (180 days) while continuing to breastfeed.^[22]

6. CONCLUSION

There is high prevalence rate of malnutrition among children under 5 years in El-Obeid City.

Economic factor, poor nutrition and mother's knowledge and feeding practices led to increase in the prevalence of malnutrition.

7. Ethical Considerations

Ethical approval was taken from the appropriate management authority; Sheikan Locality, the General Department of Health Affairs and Ministry of Health in North Kordofan State and Ministry of Education. Ethical permission to carry out study was obtained prior data collection from local authorities, and verbal consent was obtained from mothers of children.

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administrations of the El-Obeid Specialized Pediatric Hospital in El-Obeid City.

9. Abbreviations

MUAC	Mid Upper Arm Circumference
SPSS	Statistical Package for Social Sciences
UNICEF	United Nations Children's Fund
WHO	World Health Organization

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