



FACTORS RELATED TO MALNUTRITION DISEASES AMONG CHILDREN UNDER-FIVE YEARS AT EL-OBEID SPECIALIZED PEDIATRIC HOSPITAL, NORTH KORDOFAN, SUDAN (2021 - 2023)

Hiba A. A. Abdallah^{1*}, Ekram Adam Eldoom², Mirghani Elnager Ahmed¹,
Musa A. O. Mohammed³, Halima B.G. Tigaidi⁴.

¹Department of Food Hygiene and Safety, Faculty of Public and Environmental Health, University of Kordofan, Sudan

²Department of Food Hygiene and Safety, Faculty of Public and Environmental Health, Al-Zaiem Al-Azhari University, Sudan

³Department of Epidemiology, Faculty of public and Environmental Health, University of Kordofan, Sudan

⁴Department of Environmental Health, Faculty of public and Environmental Health, University of Kordofan, Sudan

*Corresponding Author

ABSTRACT

Abstract Background: Malnutrition is a global issue with patterns and prevalence that vary significantly not only among different nations of the world but also in different region of a country. This study aimed to determine the factors related to malnutrition diseases among children under-five years at El-Obeid Specialized Pediatric Hospital, North Kordofan- Sudan from April 2021 to October 2023. **Methodology:** This is an institutional cross-sectional descriptive analytical study. 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 (X^2 -test). **Result:** The results indicated that (38.8%) of children had suffered from malnutrition, more than quarter (27.1%) of the families their monthly income affected by the COVID 19 pandemic. Third of mothers (30.5%) held cultural beliefs related to child feeding. 13.5% of the children were not vaccinated. (2.9%) of families use drinking water from uncovered storage containers. There is statistical significant correlation between the monthly incomes, diarrhea in last two weeks, vaccination status and malnutrition statuses (p -value = 0.000). **Conclusion:** Based on our findings, the study indicated that family income, COVID 19 pandemic, family size; immunization, cultural beliefs and diarrhea are important factors that associated with malnutrition among children. The study recommended that doing further studies and continuous health education program among mothers for preventing malnutrition.

KEYWORDS: Children under-five, Malnutrition, MUAC, COVID 19, Immunization, Sudan.

1. INTRODUCTION

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^[1]. Malnutrition in under- five children continues to be a major health problem^[2].

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^[3]. Globally, approximately 60 million and 13 million of children are affected with moderate and severe acute malnutrition, respectively^[4]. 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^[5]. 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^[6].

2. OBJECTIVE

The objective of the present study was to determine the factors related to malnutrition diseases among children under-five years at El-Obeid Specialized Pediatric Hospital, North Kordofan- Sudan (2021 to 2023).



3. MATERIALS AND METHOD

3.1. Sample size

This study was done in El-Obied Specialized Pediatric Hospital in El-Obied City – 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%), [7].

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 [8]. 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. Data were collected by direct measurement of anthropometric parameters (MUAC), and using indirect method (by using a structured questionnaire for mothers of children). Data entered and analyzed using SPSS version (23.0), Microsoft Excel (2010) and Chi-square (X²-test) and data were displayed in tables and figures showing the percentage.

4. RESULT

Table 1: Demographic and socioeconomic characteristics of respondents, El-Obeid Specialized Pediatric Hospital; (n= 384).

Characteristics	Categories	Frequency (n)	Percent (%)
Mother's age (in years)	15-19	28	7.3
	20-24	72	18.8
	25- 29	102	31.2
	30-34	99	25.8
	35-39	35	9.1
	More than 40	30	7.8
Number of under-five children at house	One child	101	26.3
	Two children	156	40.6
	Three children	96	25.0
	Four children	26	6.8
	five children	5	1.3
Family monthly income (SDG)	Less than 10000	56	16.9
	10000 – 20000	227	59.1
	More than 20000	92	24.0
Impactof COVID 19 pandemic on family monthly income.	Affected	104	27.1
	Not affected	280	72.9

Table 2: Availability of covers for water storage containers, El-Obeid Specialized Pediatric Hospital; (n=384).

Covers for water storage containers	Frequency	Percent %
Available	373	97.1
No available	11	2.9
Total	384	100

Table (3): Cultural beliefs with regards to children feeding, El-Obeid Specialized Pediatric Hospital; (n=384).

Question and answer	Frequency	Percent %
Do you have any cultural beliefs related to child feeding? (n=384):		
Yes	117	30.5
No	267	69.5
Total	384	100
If yes what types if foods are subject to those beliefs? (n=117):		
No eating eggs before 5 years of age.	62	53.0
Watermelon	24	20.5
Dried okra	10	8.5
Beef	6	5.1
More than one	15	12.8
Total	117	100

The above table show that 30.5% held cultural beliefs while 53.0% of them not permitted to eat eggs before 3 years of age, 20.5%, watermelon 8.5%, dried okra, 5.1%, beef and 12.8% more

than one choice. However, 69.5% did not hold any cultural beliefs.

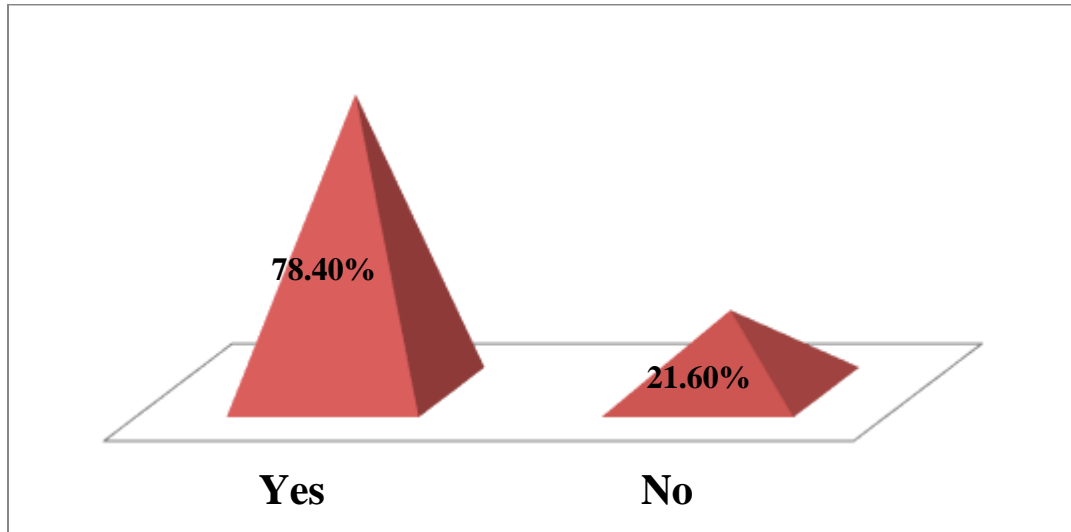


Figure (1): percentage of frequency of diarrhea episode in last two week, El-Obeid Specialized Pediatric Hospital; (n=384).

Regard the above figure 78.4% of the children were faced health problem with-in two week, like diarrhea and 21.6% of them didn't suffer from diarrhea at the time.

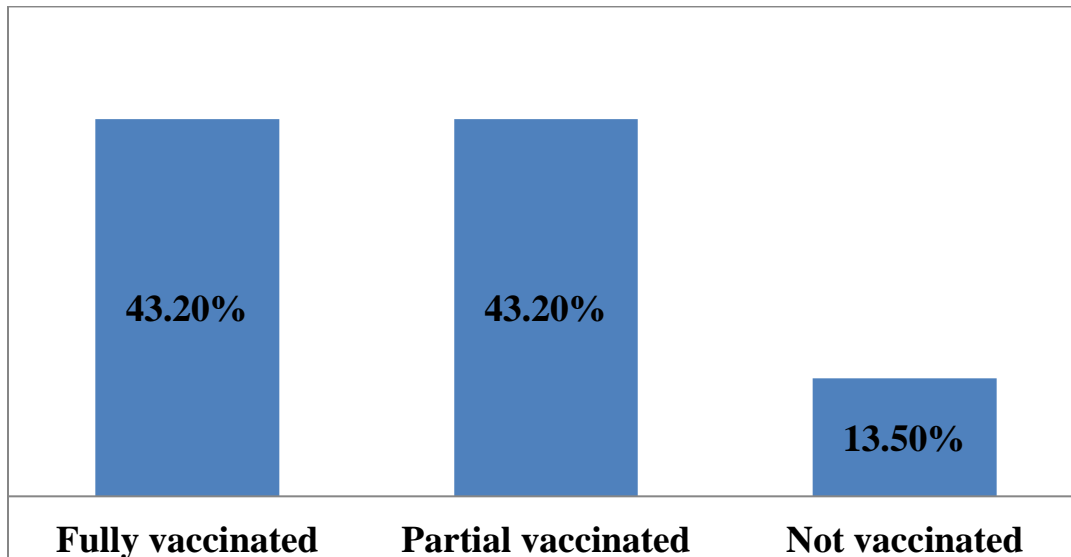


Figure (2): Percentage of study group according to the immunization status of the under-five children, El-Obeid Specialized Pediatric Hospital; (n=384).

Table (4): 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	38.8
≥11.5 and <12.5 (at risk of malnutrition)	180	46.9
Normal (>12.5)	55	14.3
Total	384	100



The above table shows that 14.3% of children were having MUAC more than 12.5 cm, 46.9 of children were having MUAC in range between ≥ 11.5 to < 12.5 cm and 38.8% of children were

having MUAC less than 11.5 and those suffering from malnutrition according to MUAC measurement.

Table (5): Relationship between diarrhea in last two weeks and nutritional status El-Obeid Specialized Pediatric Hospital; (n=384).

Diarrhea in last two weeks	MUAC			Total
	Malnutrition	At risk of malnutrition	Normal	
Yes	137 (45.5%)	135 (44.8%)	29 (9.6%)	301
No	12 (14.4%)	45 (54.2%)	26 (31.3%)	83
Total	149 (38.8%)	180 (46.9%)	55 (14.3%)	384
<i>P-value = 0.000 df= 2 $\chi^2 = 38.762$</i>				

Table (6): Relationship between vaccination status and nutritional status El-Obeid Specialized Pediatric Hospital; (n=384).

Vaccination Status	MUAC			Total
	Malnutrition	At risk of malnutrition	Normal	
Fully vaccinated	38 (22.9%)	96 (57.8%)	32 (19.3%)	166
Partial vaccinated	69 (41.6%)	76 (45.8%)	21 (12.6%)	166
Not vaccinated	42 (80.7%)	8 (15.4%)	2 (3.8%)	52
Total	149 (38.8%)	180 (46.8%)	55 (14.3%)	384
<i>P-value = 0.000 df= 4 $\chi^2 = 57.205$</i>				

The above table shows there are high significant relation between the vaccination status and nutritional status (p -value = 0.000).

Table (8): Relationship between number of under-five children at house and nutritional status, El-Obeid Specialized Pediatric Hospital; (n=384).

Number of under five children at house	MUAC			Total
	Malnutrition	At risk of malnutrition	Normal	
One child	26 (25.7%)	54(53.46%)	21(20.79%)	101
Two children	62(38.9 %)	77 (48.4 %)	17 (10.69 %)	159
Three children	44 (45.8%)	37 (38.5%)	15 (15.5%)	96
Four children	15 (57.7 %)	10 (38.5%)	1 (3.8%)	26
Five children	2(40%)	2(20%)	1(20%)	5
Total	149 (38.8%)	180 (46.8%)	55 (14.3%)	384
<i>P-value = 0.025. df= 8 $\chi^2 = 17.545$</i>				

5. DISCUSSION

The present study showed that 38.8 % of children were malnourished < 11.5 cm according to MUAC; this finding is higher than that found in various countries; a previous study conducted in India, maintained that 17.3% of children were having MUAC less than 11.5 cm^[9]. In addition to a similar study conducted in Khartoum state revealed that 20.9% of children were badly nourished^[10]. Malnutrition in under- five children continues to be a major health problem^[2].

The current study illustrated that the prevalence of malnutrition was found high in children aged between 12- 23 month and decreased when increased the child age, this finding was in contradiction with studies conducted in various countries, study conducted in Pakistan showed that the prevalence of malnutrition was found higher in younger children aged 6-11 months, and overall malnutrition decreased with age^[2]. Also a similar study conducted in the Princess Marie Louis Children’s Hospital (PML), Accra, Ghana detected that more than half of the

malnourished children were in the age 6 months to 12 months age group^[11]. “The low risk to malnutrition may be due to the protective effect of breastfeeding since almost all children are breastfed throughout the first year of life. Higher rates of malnutrition after the 12 months are linked to inappropriate food supplementation during the weaning period”.

The study demonstrated that 96 (25%) of families had three children, 44 (45.8%) of them were malnourished, this finding were confirmed in this study there are significant relation between number of under-five children at house and nutritional status; (p -value= 0.025) That mean families with high number of children under-five more likely to be affected with malnutrition, this finding confirming by^[12]which maintained that “ Children nutritional status can be affected by increase in family size, that means that increase in the numbers of children in a household decreases the food allocated to each child which consequently affects children nutritional status. Also these



results were agreed when compared with result obtained from study conducted in Lagos state, Nigeria maintained that “the increased number of children in families placed a heavy burden on the scarce household resources, particularly on financial and food; it also reduced the time and quality of care received by the children”^[13]. A similar study conducted in Pakistan indicated that “to having more children was a significant predictor for childhood malnutrition”^[14].

The present study showed that about 104 (27.1%) of the families, their monthly income affected by the COVID19 pandemic in Sudan, this findings agree with^[15] who mentioned that” COVID 19 pandemic created is the increased risk of malnutrition due to the economic impact of social distancing, full or partial lockdowns, and quarantining, many households have suffered loss of income and/or sources of supplemental food such as school meals for children. Although the causes of malnutrition are multifactorial, government-imposed shutdowns and quarantines have caused further shifts in the food industry and dietary practices increased health needs driven by the COVID19 pandemic has created an additional burden on the already exhausted health system in Sudan over the last two years”.

This study about 2.9% of families use drinking water from uncovered storage containers, this finding agree each other study conducted in Northwest Ethiopia, which mentioned that “families use drinking water from unprotected source were 3 times more likely to have malnutrition as compared to those children whose family use drinking water from protected source “^[16].

The present study showed that about 117 (30.5%) of mothers had cultural beliefs related to child feeding and out of these mothers 62 (52.9%) of them reported that they do not give eggs to children under five years of age since eggs disrupts them to start speaking. Eggs are an important source of protein, micronutrients, and fats. However, traditionally they are acknowledged cholesterol content hence having adverse effects to health^[17]. These findings in line with study conducted in Referral Hospital, Uganda revealed that “the concerning cultural beliefs with regards to children feeding, 68% held cultural beliefs and mentioned that children below the age of five are not permitted to eat eggs because of the perception that egg consumption among children below 59 months delays speech”^[18]. According to cultural beliefs related to child feeding, the study showed that 57 (48.7%) of mother’s whose children suffer from malnutrition, It indicated that cultural beliefs related to child feeding influence the nutritional status for children under five years of age there are high significant relations between cultural beliefs related to child feeding and nutritional status (p -value= 0.031). A similar study conducted in Uganda found out that socio-cultural aspect such as feeding practices and traditions related to nutrition of children under five years old are among the most important factors that will contribute to the development of cases of children malnutrition^[19].

The present study illustrated that 301 (78.38%) of children were suffering from the frequency of diarrhea episode in last two week

of data collection and 137 (45.5%) of them suffering from malnutrition. The current study proved that diarrhoeal disease was significantly associated with increasing prevalence of malnutrition; these results reflect that there are high significant correlation between a diarrhea in last two weeks and nutritional status (p -value 0.000). This result was in line with other studies conducted in Pastoral Communities of Afar Regional State - Northeast Ethiopia, mentioned that “children who had diarrhoeal disease in the past two weeks prior to the study were 4.6 times more likely to be malnutrition than those children without diarrhoeal disease”. This might be due to the fact that diarrhoeal may result in lower appetite, poor digestion, and mal-absorption which lead to malnutrition. The other possible reason also might be that malnourished children would have more diarrhoeal episodes and a child with diarrhea losses weight and can quickly become malnourished.”^[20]. In addition to a similar study reported that “infection with diarrhoeal diseases contributes to chronic malnutrition by inhibiting intestinal absorption of nutrients and is strongly correlated with stunting”^[20]. Also study conducted among maternal and child undernutrition, mentioned that” Diarrheal diseases are generally more frequent and tend to be more severe in malnourished children because of the association between malnutrition and infection”^[21]. On other hand, this finding disagree with what was reported that ” diarrhoeal diseases, subsequent malnutrition and their consequences may cause 2.4 million deaths per undernutrition in turn increases susceptibility to infectious diseases, such as diarrhea, thus perpetuating somewhat of a vicious circle^[22].

The present study illustrated that about 52 (13.5%) of the children were not vaccinated. 42 (80.7%) of them suffered from malnutrition. Not vaccinated children were more likely to be malnutrition than vaccinated children, vaccine is very important of the children under five to prevent of disease and completion of immunization schedule are very important. This finding was confirmed by Gebre which mentioned that “Non-immunized children were 2 times more likely to be underweight than vaccinated children^[20]. Immunization is one of the most successful public health interventions^[23]. Childhood immunization is a key intervention to promote the health, well-being and survival of children^[24].

6. CONCLUSION

Based on our findings, the study indicated that the factors that related to malnutrition include family income; COVID 19 pandemic, family sizes; non-completed immunization, cultural beliefs and diarrhea episode in last two week of data collection it is important factors lead to malnutrition among under -five children. The study recommends by doing further studies and continuous health education program of the mothers to prevent the malnutrition of children.

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.

Acknowledgement

The authors are would like to thank and grateful to all those who have helped and contributed in making this study a success, and many thanks for the administrations of the Ministry of Health for giving permission to conduct the study and for their support throughout and administrations of the El-Obied Specialized Pediatric Hospital in El-Obied City.

Abbreviations

COVID 19	Coronavirus Disease 2019
MUAC	Mid Upper Arm Circumference
PML	Princess Marie Louis Children’s Hospital
SPSS	Statistical Package for Social Sciences
UNICEF	United Nations Children’s Fund
WHO	World Health Organization

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