Prevalence of malnutrition and associated factors among children 6-60 months in the Therapeutic Feeding Centre (tfc) in bo- government hospital, Sierra Leone.

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Abstract

Background: Malnutrition is regarded as a worldwide health issue that affects the growth and development of children under age five. This study aimed at determining the prevalence of under-nutrition and associated factors of malnourished children (6-60 months) admitted in TFC (Therapeutic Feeding Centre) in Bo Government Hospital, Bo city. Methods: Questionnaires, direct observation and key informant interviews were employed in collecting data. Salter scales and length mats were used to measure the weight and length/height of the children respectively. Results: The epidemiological analysis revealed the Odds Ratio (OR) of low birth weight as 2.71, 95%, confidence interval (CI=1.85-0.15); the odds ratio (OR) of child illness as 10.46, 95 %, CI=3.32-1.38; immunization status (OR=5.22, 95 %, CI=2.77-0.5); not breastfeeding in the first six months of birth (OR=5.92, 95%, CI=3.07-0.49); child's relationship with guardian (OR=3.8, 95%, CI=2.39-0.29) and small number of meals taken per day by the child (OR=3.83, 95%, CI=0. 46-2.22) were considerably predictable factors associated with malnutrition (underweight). Conclusion: It was reported that factors such as low birth weight, small number of meals taken per day, not breastfeeding and child illness represented in the graph were significantly the predictable factors associated with malnutrition.

Keywords: Malnutrition, Morbidity, Questionnaires, Breastfeeding, Epidemiological analysis.

Introduction

Malnutrition is the greatest threat to the world's public health leading to morbidity and mortality, particularly under nutrition for the marginalized and discriminated groups [1]. Malnutrition is a general term that is sometimes used as an alternative for under nutrition [2]. More than 1/3 of child mortality is caused by under-nutrition. Around 178 million children worldwide are affected by insufficient food vitamins, mineral deficits and diseases [3]. The low intake of nutrients typically results from under-nutrition. In young infants, the impacts of under-nutrition are overwhelming. Malnutrition leads to 1/2 of the world's mortality with Asia death rating of Africa-51 %, and the rest of the globe 8% of underage five children. One in four children (about 146 million) are underweight in poor nations, while 10.9 million below age 5 children die every year. Hunger related illnesses and under-nutrition account for 60% of deaths [4]. According to, 35% of children in Kenya less than age 5 are low height, while 7% of children are low weight and 16 percent are underweight. This study aimed at determining the prevalence of under-nutrition and associated factors of malnourished children (6-60 months) admitted in TFC (Therapeutic Feeding Centre) in Bo Government Hospital, Bo city. The findings of this study intend to further aid clinicians to improve the outcome of these children [5].

Methods

Population and sample selection

This study population include children under age 5 attending child welfare clinics at the Therapeutic Feeding Centre (TFC) in Bo Government Hospital, as well as their parents. The study was designed with case control. Cases and controls were picked from the monthly reports collected from the child welfare clinic records and nutrition surveillance logbook from Ward 8 TFC in Bo Government Hospital. This study involves a purposive sampling technique involving all participants. The data sources were nutrition surveillance logbook monthly reports which were available from Ward 8 TFC in Bo Government Hospital and the clinic inventory. The clinic provides all the children and face-to-face interviews with the guardians of the selected children were performed [6,7].

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***Received:** 18-Mar-2022, Manuscript No. AAPCCS-22-57706; **Editor assigned:** 24-Mar-2022, Pre QC No. AAPCCS-22-57706(PQ); **Reviewed:** 07-Apr-2022, QC No. AAPCCS-22-57706; **Revised:** 30-May-2022, Manuscript No. AAPCCS-22-57706(R); **Published:** 04-Jun-2022, DOI: 10.35841/aapccs-6.3.114*

***Citation:** Jalloh AA, Edo GI, Ozgor E, et al. Prevalence of malnutrition and associated factors among children 6-60 months in the Therapeutic Feeding Centre (tfc) in bo-government hospital, Sierra Leone. J Pub Health Nutri. 2022;6(3):114*

Survey

The data collection instrument was a self-developed standardized questionnaire including closed questions consisting of three sections. Two weeks before the fieldwork; the study methodology was piloted at Ward 8 therapeutic feeding centre TFC in Bo Government Hospital. The section pre-tested for the research paper comprises of the study variables, the presence of the participants, respondent's acceptance of the study, timescale, economic capacity, relevance of the issues, order of questions and the precise translation of questions by the participants. In the research project, no pilot data were used. The pilot study contributed to the evaluation of respondents' approval of the study, timing, financial adequacy and precise understanding of the questions by the participants [8,9].

Data-collection process

After the collection of cases and controls from the monthly updates on nutrition monitoring; the children names, parent names and home addresses were recovered from the child welfare clinic database. The researcher visited the parents for face-to-face interviews thereafter. The researcher introduced himself before the interview, described the aim of the study and requested the participants informed permission. The interview was only done with the parent's approval. To collect further information on the health state of the mothers and the children, the child clinic cards were examined during home visits for both cases and control for anthropometric measurements (the systematic measurements of the size, shape and composition of the human body) like height, length and weight were taken. To maximize the number of participants in the survey, a second home visit was planned for parents that were absent during the initial face-to-face interview in their homes. In the course of the interviews, the researcher used a fluent English-language interpreter and the native language spoken by residents in the hospital namely Krio, Temne Fula and Mende for 38 suitable cases and 79 suitable controls (controls that are not malnourished) identified to take part in the study. Although, 4 cases refused to be registered while another had moved out of the district at the time of collecting the data. One (1) control had also relocated at the time of data collection. Questionnaires were labeled by a coding technique; the name of the health center and children's healthcare card number. The data were organized and stored in a safe case under the observation of the researcher [10,11].

Data Analysis

We analyzed the data that was captured from the 33 cases and the 78 controls using the Microsoft Excel office (Version 07) computer software. The results are presented both in descriptive and analytical form in frequencies, percentages, graphs, figures, tables and basic statistics [12,13].

Results

The results are presented both in descriptive and analytical form, frequencies, percentages, graphs, figures, tables and basic statistics.

Demographic Characteristics of the Cases and the Controls

A total of 111 respondents (Table 1) were recruited in the study with a total of 33 (30%) cases that were malnourished and 78 (67%) controls that were not malnourished. There was a total of 64 (58%) females in the study consisting of 18 cases (55%) and 46 controls (59%).

Figure 1 Represents the information provided in Table 2 above and it explains the gender distribution of the study population.

Figure 2 Age distribution of the study population.

The participants had a normal age distribution with a mean of 38.17 (Standard Deviation 16.35). Figure 2 shows that over 55 participants were at the age between 1-10 months, 47 were at the age between 11-20 months, 39 were between 21-30 months, 48 were between 31-40 months, less than 10 participants were between 41-50 months, while 30 participants were between 51-60 months.

Table 1 Shows several child characteristics that were analyzed using epidemiological analysis by calculating the odds ratio of each characteristic and logistic confidence interval of the characteristics.

Table 2 Shows the characteristics of the cases and controls. From the Epidemiological analysis, the odds ratio (OR) of low birth weight was 2.71, 95% confidence interval (CI=1.85-0.15); the odds ratio (OR) of child illness (OR=10.46, 95 % CI=3.32-1.38), immunization status (OR=5.22, 95% CI=2.77-0.5); not breastfeeding in the first six months of birth (OR=5.92, 95 % CI=3.07 - 0.49); child's relationship with guardian (OR=3.8, 95 % CI =2.39-0.29) and small number of meal taken per day by the child (OR=3.83, 95% C=0.46-2.22) were considerably predictable factors associated with malnutrition (underweight).

These factors are further expressed in the tables and graphical figures with percentages below.

From **Table 3** the percentages for low birth weight, small/ adequate number of the daily meal, not breastfeeding in the first six months of birth and child illness were all calculated for both cases and controls of the study population.

Table 4 Represents the immunization status and the child's relationship with the guardian. The immunization status of 30% cases was not updated, 70% cases were updated, 8% controls were not updated, 92% controls were updated for child relationships with a guardian, 70% cases were taken care of by their mothers and 30% by a caretaker, 10% of the controls were taken care of by a caretaker and 90% by their mothers.

The table further revealed that 12 children were not breastfed in their first six months which indicated "YES" while 99 children were breastfed in the first six months. In an oral interview, the researcher asked why children were not breastfed in their first six months, and 12 respondents revealed that they were not the biological parents of the children.

Table 1. 2014 Bo district projected population by age group and sex.

Variable	All	Cases	Controls
Total Number	111	33 (30%)	78(70%)
Male	47 (42%)	15 (45%)	32 (41%)
Female	64 (58%)	18 (55%)	46 (59%)

Table 2. Child characteristics and risk factors for underweight.

Main Variable	Variable	Cases	Controls	Crude OR (95% CI)
Gender	Female	18	46	0.83 (0.6 - 1. 02)
	Male	15	32	1
Low Birth Weight	Low	16	20	2.71 (1.85 - 0.15)
	Normal	17	58	1
Not breastfed in the first six months	Yes	8	4	5.92 (3.07 - 0.49)
	No	25	74	1
No. of meal per day	Small	24	32	3.83 (0. 46 - 2.22)
	Adequate	9	46	1
Immunization status	Not up to date	10	6	5.22 (2.77 - 0.53)
	Up to date	23	72	1
Child illness	Yes	20	10	10.46 (3.32 - 1.38)
	No	13	68	1
Vitamin A supplement	Not up to date	21	72	0.14 (0.88 - 3.06)
	Up to date	12	6	1
Child's relationship with Guardian	Caretaker	10	8	3.8 (2.39 - 0.29)
	Mother	23	70	1

Table 3. *Comparison of child's characteristics expressed in percentages for significantly selected predictors of malnutrition.*

Low Birth Weight			Number of meals per day			Not breastfed in the first 6 months			child illness		
	Cases	Control		Cases	control		cases	control		cases	Controls
Yes	48%	26%	Small	73%	41%	yes	24%	5%	Yes	61%	13%
No	52%	74%	Adequate	27%	59%	no	76%	95%	No	59%	87%

Table 4. *Comparison of child's characteristics expressed in percentages for significantly selected predictors of malnutrition.*

Immunization status				Child's relationship with the guardian	
	Cases	Controls		Cases	Control
not up to date	30%	8%	caretaker	30%	10%
up to date	70%	92%	Mother	70%	90%

Table 5 Shows the parental characteristics of both the malnourished children (cases) and the non-malnourished children (controls). These characteristics were analyzed using epidemiological analysis by calculating the odds ratio of each characteristic and logistic confidence interval of the characteristics. It reported the characteristics of cases and controls of the participants and epidemiological analysis as thus; the odds ratio (OR) of a parent not attending antenatal clinic is OR=7.0, 95% Confidence Interval (CI=3.35-0.55, marital status (OR=2.4, 95% CI=1.72-0.80), parent employment status (OR=44.57, 95% CI=4.98-2.62) and parent not knowledgeable for preventing malnutrition (OR=2.49, 95% CI=1.99-0.17) were significantly associated with malnutrition in children. These characteristics are also represented in percentages for both cases and controls in the figures and tables below.

Table 6 Shows the household characteristics of both the malnourished children (cases) and the non-malnourished children (controls) and those characteristics were also analyzed using epidemiological analysis by calculating the odds ratio of each characteristic and logistic confidence interval. The odds ratio of the large number of under-five (5) with a minimum of three children per household (OR=1.15, 95, CI=4-0.62) was not significantly associated with malnutrition; while that of a large number of households above 5 years (OR= 38.08, 95%, CI=4.79-2.49) was significantly associated with malnutrition. This information is also analyzed in the form of percentages in the tables and figures below for better understanding.

The outcome of the analysis of the prevalence of malnutrition in the study area

The prevalence of malnutrition was analyzed in terms of age distribution and gender of the children of the study population in both the cases and the controls. According to the results, there were more females (number=18, 55%) among the cases and total number of females for both cases and controls is 64, 58% in the study population. The odds ratio of gender (OR=0.83, 95%, CI=0.6-1.02) from the epidemiological analyses reported that gender does not have any significant predictable factor association with malnutrition. According

Table 5. *Parental characteristics relating to the prevalence of malnutrition.*

Main Variable	Variable	Cases	Controls	Crude OR (95% CI)
Parent Age	<21	18	26	2.40 (1.73 - 0.03)
	>21	15	52	
Parent Level of Education	none + primary	20	36	1.79 (1.42 - 0.26)
	secondary and above	13	42	1
knowledge for the cause of malnutrition	not knowledgeable	27	56	1.77 (1.60 - 0. 46)
	knowledgeable	6	22	1
knowledge for prevention of malnutrition	not knowledgeable	28	54	2.49 (1.99 - 0.17)
	knowledgeable	5	24	1
parent employment status	unemployed	26	6	44.57 (4.98 - 2.62)
	employed	7	72	1
parent Marital status	single	21	30	2.4 (1.72 - 0.80)
	married	12	48	1
parent alcohol abuse	Yes	5	10	1.21 (1.36 - 0.98)
	No	28	68	1
parent ACA	No	3	1	7.0 (3.35 - 0.55)
	Yes	30	77	1
parent HIV status	Yes	5	7	1.81 (1.82 - 0.64)
	No	28	71	1

Table 6. *Household characteristics of both the malnourished children (cases) and the non- malnourished children (controls).*

Main Variable	Variable	Cases	Controls	Crude OR (95% CI)
Large No. of Under Five Children >3	Yes	7	12	1.51 (1.44 - 0.62)
	No	24	62	1
Large Household >5	Yes	28	10	38.08 (4.79 - 2.49)
	No	5	68	1

to the results, children between ages 1-10 months were more likely to be malnourished than children above 10 months old.

The outcome of the analysis of immediate determinants of malnutrition in the study area

Children who were not breastfeeding in the first six months of birth (OR=5.92, 95%, CI=3.07-0.49), child illnesses such as diarrhea, fever, vomiting and cough (OR=10.46, 95% CI=3.32-1.38), children who were having a small number of a daily meal (OR=3.83, 95%, CI=0.46-2.22), children whose parents were not knowledgeable for the prevention of malnutrition (OR=2.49, 95%, CI=1.99-0.17), and those with low birth weight (OR=2.71, 95%, CI=1.85-0.15) were more likely be malnourish.

The outcome of the analysis of underlying determinants related to malnutrition

According to the results from the research analysis, the significant predictive factors associated with malnutrition were mostly related to parental characteristics, fewer household characteristics and child characteristics. The results were represented as thus, parental characteristics: parent marital status (OR=2.4, 95 %, CI=1.72-0.80), the parent not attending antenatal clinic (OR=7.0, 95%, CI=3.35-0.55), unemployment status of the parent (OR=44.57, 95 %, CI=4.98-2.62) and child being taken care by caregiver (O =3.8,95%, CI=2.39-0.29). Household characteristics; a large number of household members (OR=38.08, 95%, CI=4.79-2.49); Child' characteristics: immunization status of the child (OR=5.22, 95%, CI=2.77-0.53) were significantly associated with malnutrition.

Discussion

The factors that were found to be significantly associated with malnutrition were small number of daily meals taken by the child, inadequate knowledge and prevention of malnutrition by the parent, parent's unemployment, low birth weight, child illness, child raised by a guardian, child's not breastfed in the first six months of birth, child's being taken care by the caregiver, immunization status not up to date, a large number of people living in a single household, parents not married and parents not attending antenatal clinic. A similar study conducted by to determine the factors influencing malnutrition among children under 5 years of age in the kweneng west district of Botswana reveals that vitamin. A supplement not up to date significantly leads to underweight (malnutrition). The current study revealed that vitamin A supplement was not significantly associated with malnutrition whiles child illness was a significantly predictable factor of malnutrition.

One difference in a study conducted by on the nutritional intake and under nutrition predictors of children under the age of 3 in Ngheam, This study did not disclose a major link between maternal HIV statuses in pregnancy, as opposed to the assumptions of the researchers and the number of under-five children per household.

This study revealed a significant association between child illness and size of the household is consistent with the findings of a study by who investigated the incidence of under nutrition in the Kabarole District of western Uganda and the factors impacting dietary intake for children under five years of age.

In summary, the study found out that malnutrition is one of the major challenges affecting under age five children in the

therapeutic feeding center in Bo Government Hospital, Bo City. Therefore, the purpose of this study was to identify and determine the factors that are responsible for the prevalence of malnutrition among under age five children in Bo government hospital. After the data are placed in excel worksheet office, the relevant predictors significantly related to malnutrition. The recommended daily intake the child receives was limited, parent's lack of understanding of under nutrition prevention strategies, parent unemployment, low birth weight, child's immunization welfare card is not up to date, child disease and children raised by parents. In Bo Government Hospital, the variables affecting nutrition among children under the age of five can be characterized as follows; immediate determinants including child illness, child not breastfed in the first six months of birth, small amount of daily meal taken by the child and parents not knowledgeable of the prevention of malnutrition. Underlying determinants; includes parent not married or living as a single parent, large size of household, parents' unemployment status, poor immunization status of the child and parent not attending an antenatal clinic. The prevalence of malnutrition among under age five according to the results showed that children between ages 1-10 months were more likely to be malnourished than children above 10 months old.

Child illness

Malnourished children were found to be with illnesses such as diarrhea, fever, vomiting or coughing (OR = 10.46, 95%, CI=3.32-1.38). Research conducted by indicated that children's diseases (diarrhea, vomiting, pneumonia, ear disease, handicap and febrile sickness) were positively correlated to child under-nutrition. They described that there are double links between under-nutrition and childhood disease. Malnutrition makes an infant susceptible to disease and in turn causes an inadequate dietary intake and loss of appetite.

Low birth weight

Malnourished children were found to be (OR=2.71, 95%, CI=1.85-0.15) more likely to have a low birth weight below 2,500 g as opposed to well-nourished children. This might occur because children with low birth weight may have no nutrients necessary for their future proper growth and development from the moment of delivery. But it can also imply that infants who are born with low birth weight may require a longer time to achieve their usual weight.

A small number of daily meals

Malnourished children were found to consume a small amount of daily meal per day (OR=3.83, 95 %, CI=0.46-2.22) in comparison with well-nourished children who are more likely to consume a daily meal. A research carried out by reports that the number of meals a child consumes influences his or her nutritional condition. The more frequently the feeding, the more likely the required daily nutrients are to be consumed. Due to logistic challenges such as the absence of laboratory equipment to quantitatively undertone and qualitatively evaluate the dietary intake of present participating children, the daily intake could no longer be assessed. To find out the sufficiency of nutrient intakes, the researcher relied upon figures for the variety of foods the child ingested daily.

Limitations of the Study

As the study was cross-sectional in design, it neither represents a seasonal variation of nutritional outcomes nor establishes a causal relationship. As the study was questionnaire-based, questions that required a good memory were vulnerable to recall bias. The study was done in an urban setting but excluded some other clinics because Bo Government Hospital is the only hospital in the City having a special ward for treating acute malnutrition cases and thus, making the results difficult to generalize. In this study some variables have wide confidence intervals; this may be due to the low prevalence of the cases.

Conclusion

Determinants of acute malnutrition in children under five years of age in Bo Government Hospital in 2016 are mainly from the immediate and underlying determinant of this study. Breastfeeding less than eight times a day and being fed less than three times a day are underlying causes directly related to the caring practices of the mother or guardians, the child raised by caregivers and parents not knowing the method of preventing malnutrition. Feeding solid or semi-solid foods to children less than three times a day could be improved by increasing the knowledge of mothers and caregivers with regards to infant and young child feeding. The level of education of the mother was not a significant determinant of acute malnutrition. The level of education of the mother does not translate to increased knowledge of the mother with regards to infant and young child feeding.

Low birth weight was the only significant immediate determinant of acute malnutrition found during the analysis. Children born below 2500 g were significantly more likely to have acute malnutrition. Maternal nutrition is an area that requires more attention and not just during pregnancy, but also in the pre-pregnancy years. The lifecycle approach to nutrition becomes important as a malnourished child is more likely to become a malnourished mother.

The findings of the study emphasized that investing in prevention is critical. Preventive interventions need to include: improving access to high-quality foods and health care; improving nutrition and health knowledge and practices; effectively promoting exclusive breastfeeding for the first six months of a child's life and promoting improved complementary feeding practices for all children aged six months to 24 months with a focus on ensuring access to age-appropriate complementary foods using locally available foods.

Abbreviation

TFC: Therapeutic Feeding Centre

Declaration

Conflicts of Interest

The authors have no competing interests.

Citation: *Jalloh AA, Edo GI, Ozgor E, et al. Prevalence of malnutrition and associated factors among children 6-60 months in the Therapeutic Feeding Centre (tfc) in bo-government hospital, Sierra Leone. J Pub Health Nutri. 2022;6(3):114*

Funding

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

Availability of Data and Material

All data will be made available upon reasonable request.

Ethics Approval and Consent to Participate

Not required due to administrative, secondary health data being used.

Consent for Publication

Not Applicable

Author's Contributions

AJ, GE, EO, LN, PN, EA were responsible for the conception and design of the study; AJ, GE, EO, performed data collection. AJ, GE performed data analysis and drafted the article. GE, EO supervised the study, contributed to data analysis, interpretation, and critical revisions. All authors approved the final manuscript

Acknowledgement

The authors wish to thank the entire Therapeutic Feeding Centre in Bo Government Hospital staff and management team and also the caregivers in the TFC ward for their cooperation and support during the data collection exercise.

References

1. Keeley B, Little C, Zuehlke E. The State of the World's Children 2019: Children, Food and Nutrition--Growing Well in a Changing World. UNICEF. 2019.
2. Qaim M. Food Consumption Patterns in Developing Countries. Encycl Food Secur Sustain. 2019;556-60.
3. Ahmed T, Hossain M, Sanin KI. Global burden of maternal and child undernutrition and micronutrient deficiencies. Ann Nutz Metab. 2012;61(1):8-17.
4. Martins VJ, Toledo Florencio TM, Grillo LP, et al. Long-lasting effects of undernutrition. Int J Environ Res 2011;8(6):1817-46.
5. Ijarotimi OS. Determinants of childhood malnutrition and consequences in developing countries. Curr Nutr Rep. 2013;2(3):129-33.
6. Provo A, Atwood S, Sullivan EB. et al. Malnutrition in Timor-Leste: A review of the burden, drivers, and potential response. DC: World Bank. 2017.
7. Khan S, Zaheer S, Safdar NF. Determinants of stunting, underweight and wasting among children <5 years of age: evidence from 2012-2013 Pakistan demographic and health survey. BMC public health. 2019;19(1):1-5.
8. Hien NN, Kam S. Nutritional status and the characteristics related to malnutrition in children under five years of age in Nghean, Vietnam. BMC Pediatr. 2008;41(4):232-40.
9. Habaasa G. An investigation on factors associated with malnutrition among underfive children in Nakaseke and Nakasongola districts, Uganda. BMC Pediatr. 2015;15(1):1-7.
10. Hodges M. Diarrhoeal disease in early childhood: experiences from Sierra Leone. Vet Parasitol. 1993;107(S1):S37-51.
11. Irena AH, Mwambazi M, Mulenga V. Diarrhea is a major killer of children with severe acute malnutrition admitted to inpatient set-up in Lusaka, Zambia. Nutr. 2011;10(1):1-6.
12. Scaglioni S, De Cosmi V, Ciappolino V. Factors influencing children's eating behaviours. Nutr. 2018;10(6): 706.
13. Scaglioni S, De Cosmi V, Ciappolino V, et al. Factors influencing children's eating behaviours. Nutr. 2018;10(6):706.