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INCIDENCE, CO-MORBIDITIES AND ASSOCIATED FACTORS OF MAL NUTRITION AMONG CHILDREN 0-5 YEARS IN DALA INTERNALLY DI SPLACED PERSONS (IDPs) CAMP IN JERE LOCAL GOVERNMENT AR EA OF BORNO STATE.

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Abstract: Introduction: Malnutrition is a scourge on children in the states of Yobe, Adamawa and Borno in northeastern Nigeria whi ch have been under siege of Boko Haram insurgency since 2009. The insurgency has displaced many families who only find abode in internally displaced persons camps scattered in the affected states. Children 0-5 years are especially vulnerable to malnutrition, and su ccumb easily to many diseases following reduced immunity from poor nutrition. **Aims:** To determine the incidence of malnutrition, co -morbidities and associated factors among children 0-5 years of age in Dala internally displaced persons camp in Jere, LGA, Borno sta te.**Methods:** The design of the study is a cross-sectional descriptive survey. Census sample of 10,743 children 0-5 years who reported at the camp clinic from 1st January to 30th December 2017 was used. Binary logistic regression was used to identify causes of malnutrit ion, and variables significant at P<0.05 will be entered into the final multivariate model to identify significant factors independently pr edicting under-five malnutrition. **Results:** The incidence of malnutrition among children 0-5 years of age in Dala IDP camp is 10.7 pe r 1000 children. Moderate acute malnutrition (MAM) was higher than severe acute malnutrition (SAM) of which one can infer that the level of malnutrition in the camp was moderate. Those children whose fathers with illiterate were 5 times more likely to have malnutr ition as compared to those with literate fathers [AOR=5.02, 95%CI (2.06, 13.14)] (p-value 0.001). Fever, diarrhea, anemia, cough, wor m infestation, cough and ear infection were the common morbidities associated with malnutrition in the camp. **Conclusion:** Malnutriti on easily occurs in displaced persons camps due to shortages of food and nutrients, and children are more prone. Efforts should be ma de to end hostilities causing displacement of citizens.

Keywords: Boko Haram, Co-morbidities, Internally displaced persons, Malnutrition**.**

Introduction

The Boko Haram insurgency in northeastern Nigeria since 2009 has led to the displacement of many citizens from their homes i nto temporary shelters – in internally displaced persons (IDP) c amps - maintained by the government and humanitarian agenci es. The IDP camps are home to both young and old, men and w omen, and all who, for the safety and security concerns, have fl ed their homes and forced to live in the camps. Due to the large

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number of displaced people, the living conditions in the camps are poor and inhabitants are exposed to squalid environments with great health risks. There is a lack of access to highly nutritious foods in the camps. Children and the elderly are usually most vulnerable to unhealthy environment and are vulnerable to diseases and infections. A major consequence of poor living condition and poor nutrition among children in displaced setting is protein energy malnutrition (PEM). Malnutrition can be defined as all deviation from adequate nutrition. According to the WHO (2018), malnutrition refers to deficiencies, excesses or imbalances in person's intake of energy and/or nutrients. Malnutrition, in all its forms, includes under-nutrition (wasting, stunting, underweight), inadequate vitamins or minerals, overweight, obesity, and resulting diet-related non-communicable diseases. The consequences of malnutrition can be serious in childhood. Under nutrition is responsible for 35% of disease burden of under-five year children (Black et al 2008). Contributing factor in child malnutrition are extra uterine growth retardation, low birth weight, inadequate exclusive breast feeding, inappropriate complementary feeding, maternal education, poor nutritional knowledge, insufficient energy and micronutrient intake, birth spacing, parity, socio economic background, food availability, housing, poor sanitation, health services, vaccination, and infectious diseases (Pusricha & Makoka, 2000) .

The associated health conditions associated with PEM occur due to the devastation caused in the body from reduced immunity. The child becomes vulnerable to diseases that would otherwise be resisted with adequate immune response in a well nourished child. Malnourished children have lowered resistance to infection; therefore, they are more likely to die from common childhood ailments such as diarrhoea diseases and respiratory infections. Present research findings, include follow up of interventions trials, and indicate that chronic malnutrition can have long-term negative consequences on various aspects of child development (World Bank, 2008). Globally, in 2014 an estimated 159 million children under five years were stunted, 95 million were under weight and 50 million were wasted (UNICEF /WHO 2014). Malnutrition accounts for at least half of all children deaths worldwide (Demisse & Early, 2013).

In developing countries, malnutrition is a major health problem (Mengistu, Alemu, & Destaw, 2013). Africa is regarded as the continent with the highest number of malnourished children in the world (Food and Agriculture Organization (FAO), 2015). Under nutrition is responsible for 35% of disease burden of under-five year children (Black et al 2008). It is estimated that about 5.9 million deaths among children under the age of 5 years are linked with under malnutrition (Mamidi, 2011). UNICEF (2018) states that more than 2.5 million children in Nigeria are currently suffering from severe acute malnutrition (SAM) with only one (I) out of five (5) affected are reached. The UNICEF report also claims Nigeria has the second highest burden of stunted children in the world with a national prevalence of 45 percent of children under five. It contributes to about 3.5 million deaths in children within the age group (Black et al 2008). It is important to detect malnutrition early in individual children and in the population so as to institute intervention activities aimed at controlling childhood malnutrition and hence reduce childhood mortality. Nutritional assessment in under five years old children can be carried out using anthropometric indicators which include stunting, wasting and underweight. In nutritional anthropometry, a child index will be compared with an internationally accepted reference population, and children who fall below the recommended cut-off are classified as malnourished. Nutritional assessment in under-five year old children can be carried out using anthropometric indicators which include stunting, wasting and underweight. In nutritional anthropometry, a child index will be compared with an internationally accepted reference population, and children who fall below the recommended cut-off are classified as malnourished. A malnourished child is one who has failed to attain the expected value for any of the nutritional indicator (height-for-age, weight-for-age, weight-for-height) as compare with the healthy child of the same sex and age in the reference population (WHO multi-growth reference Study Group, 2006). Weight-for-height is used to assess acute malnutrition (wasting), height-for-age is used for chronic malnutrition (stunting) while weight-for-age is for any protein-energy malnutrition (underweight). Depending on the reference and descriptors used, malnutrition is defined as an anthropometric index below the 2 standard deviation from median value of the reference population or the fifth (5th) percentile for a given anthropometric index. Malnutrition in children can take the form of stunting, wasting and underweight (Mahgub, Nnyepi & Badeke, 2016). Children whose

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weight for age indicator is more than two or three standard deviation below median for the international reference population (age is 0-59 months) are considered moderately or severally underweight (WHO, 2011). Children whose height /length for age indicator is more than two or three standard deviation below the median for the international reference population (0-59 months) are considered moderately or severely stunted (World Bank, 2011). Children whose weight for height/length indicator is more than two or three standard deviation below the median for the international reference population (age is 0-59 months) are considered moderately or severally wasted (UNICEF, 2008). Children who are malnourished are at far greater risk of contracting pneumonia, measles diarrhea, malaria, HIV, and of dying from this condition. It also impact on human performance, cognitive development, and physical work capacity and survival (Maghub, 2016). Malnourished children that survive are likely to suffer from frequent illness, which adversely affects their nutritional status and locks them into a vicious cycle of recurring sickness, faltering growth and diminished learning ability. This study sets out to determine the incidence of malnutrition and associated health conditions among children 0-5 years in Dala IDP camp, Jere local government, Borno state.

Materials and Methods

Design: The design of the study is a cross-sectional descriptive survey.

Setting: Dala IDPs camp situated in Dala ward of Jere Local Government area of Borno State. Dala ward is one of the largest wards in Jere with largest population of about 8,683 people. Jere local Government area is a local government under the Borno emirate, It has a land mass of 86km^2 making it one of the smallest local government in Borno state. Jere L.G.A. is located very close to Maiduguri at the center of Borno state. The dominant ethnic group is Kanuri, and most of them are Muslims with few Christians in the camp.

Study population: The target population of this study is made up of all the children 0-5 years of age that reported with malnutrition at the camp clinic.

Sampling technique: Census sampling technique was used to get 10,743 children from 0-5 years of age who reported to the clinic in Dala IDPs camp from 1st January to 31th December 2017.

Instrument for data collection: The instrument for data collection is anthropometric measurement, and it is a standardized tool. Weight, height or length in infants and children are found to be reliable and valid for the measurement of severity of malnutrition for community surveys (Jamaiya et al, 2010).

Method of data collection: Anthropometric measurement was used for the collection of data. To assess the physical growth and nutritional status of the children, measurements of weight was taken by weighing scale using an adopted check list. The Salter hanging spring scale with graduations of 100g and a capacity for 25 kg was utilized for measuring the weight of the children with minimum clothing and no shoes to the nearest 0.1 kg. Weighting scales was calibrated with known weight object regularly. The scales indicators were checked against zero reading after weighing every child, and are measured twice. Recumbent length measurement was taken for children under two years of age while for children above two years were measured in a standing position in centimeters to the nearest of 0.1 cm.

For assessing the nutritional status of children, two anthropometric indices will be adopted: weight-for-age and weight-for-height, expressed as percentage or Z-score of individual weight to the median or 50th percentile of the WHO growth references. Absence of acute protein-energy malnutrition, or normal nutritional status, is defined as having a weight-for-height z-score of -2.0 or greater (-2 to +2 Z-scores). Moderate acute protein-energy malnutrition is defined as having a weight-for-height z-score of -3.0 to less than -2.0 (-2 to -3 Z-scores). Severe acute protein-energy malnutrition is defined as having a weight-for-height z-score less than -3.0 (< -3 Z-scores).

Absence of acute protein-energy malnutrition or normal nutritional status is defined as having a percent of median weight-for-height of 80% or greater. Moderate acute protein-energy malnutrition is defined as having a percent of median weight-for-height of 70-79%. Severe acute protein-energy malnutrition is defined as having a weight percent of median less than 70%. All children with bilateral oedema are automatically defined as having severe acute protein-energy malnutrition regardless of their weight-for-height percent of median.

Method of data analysis: Data obtained from anthropometric measurement was checked, sorted, categorized and coded. After coding data, it was fed to the computer to make them ready fo

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r processing and analysis. Data was entered to EPI data and ana lyzed, using IBM SPSS 22.0 statistical program. ENA for SMA RT software was used to convert nutritional data into Z-scores of the indices; Mid-upper arm circumference (MUAC) taking a ge and sex into consideration using WHO standards. Binary log istic regression was used to identify causes of malnutrition, and variables significant at P<0.05 was entered into the final multiv ariate model to identify significant factors independently predic ting under-five malnutrition. Tables and charts were used to pre sent results.

Ethical consideration: Permission to carry out this study was o btained from the Dala IDP camp authority. A brief proposal of t he study was presented to the camp manager for consideration a nd approval to conduct the study. Informed consent was obtaine d from the participants' parents, and they were assured of anon ymity and confidentiality. Their wishes and rights were respect ed throughout the period of data collection including the right t o withdraw from the study at any time they wish. Respondents were treated with respect, dignity and their rights and welfare w ere protected.

Data Presentation and Analysis

Table 1.Demographic Information of the Respondents (n =1 0,743)

Variable	Frequency	Percentage (%)
Age		
0-2 years	8,043	74.9
3 -5 year s	2700	25.1
Gender		
Male	4611	42.9
Female	6,132	57.1
Religion		
Islam	10,080	93.8
Christian ity	663	6.2
Total	**10,743**	**100**

As shown in **Table 1** above, majority 8,043(74.9%) of the child ren are aged 0-2 years while 2,700 (25.1%) falls within the age range of 3-5 years. Majority are females 6,132 (57.1%) while 4, 611 (42.9%) are males having Islam as their major religion 10,0 80 (93.8%) while 663 (6.2%) are Christians.

Table 2: Monthly incidence of Malnutrition in Dala IDPs C amp (n=10,743)

S/N	Month	Malnutrition	Percentage (%)
1.	January	173	1.6
2.	February	142	1.3
3.	March	326	3.0
4.	April	1,797	16.7
5.	May	1,964	18.3
6.	June	2,311	21.5
7.	July	1,689	15.7
8.	August	408	3.8
9.	September	492	4.6
10.	October	851	7.9
11.	November	370	3.4
12.	December	220	2.0
Total		**10,743**	**100.0**

As shown in **Table 2** above, the total number of new cases of m alnutrition in Dala IDP camp from first January 2017 to Decem ber 2017 is ten thousand seven hundred and forty three (10,743) . The highest number of malnourished children between the age s of 0-5 years 2,311 (21.5%) were found in June, followed by 1, 964 (18.3%) found in May while the least incidence was found in February which is 142 representing 1.3%.

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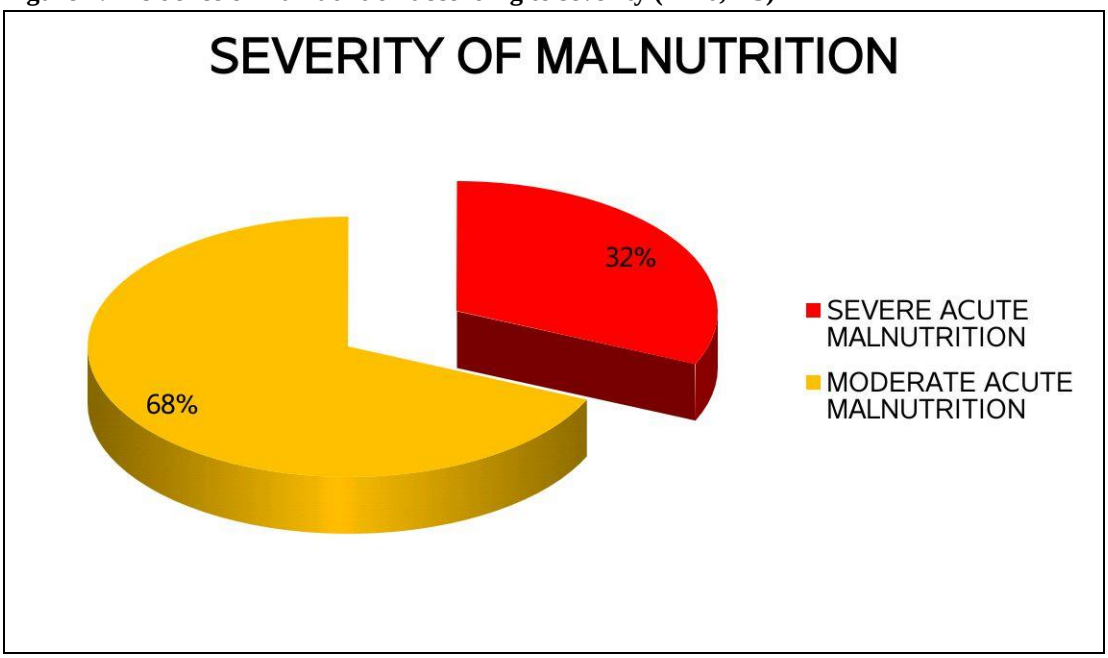
Figure 1: Incidence of malnutrition according to severity (n=10,743)



As shown in **figure 1**. Majority of the cases of malnutrition 7,344 (68.4%) are moderate acute malnutrition (MAM), while the least is Severe acute malnutrition (SAM) 3,399 (31.6%)

Figure 2: monthly incidence of malnutrition severity

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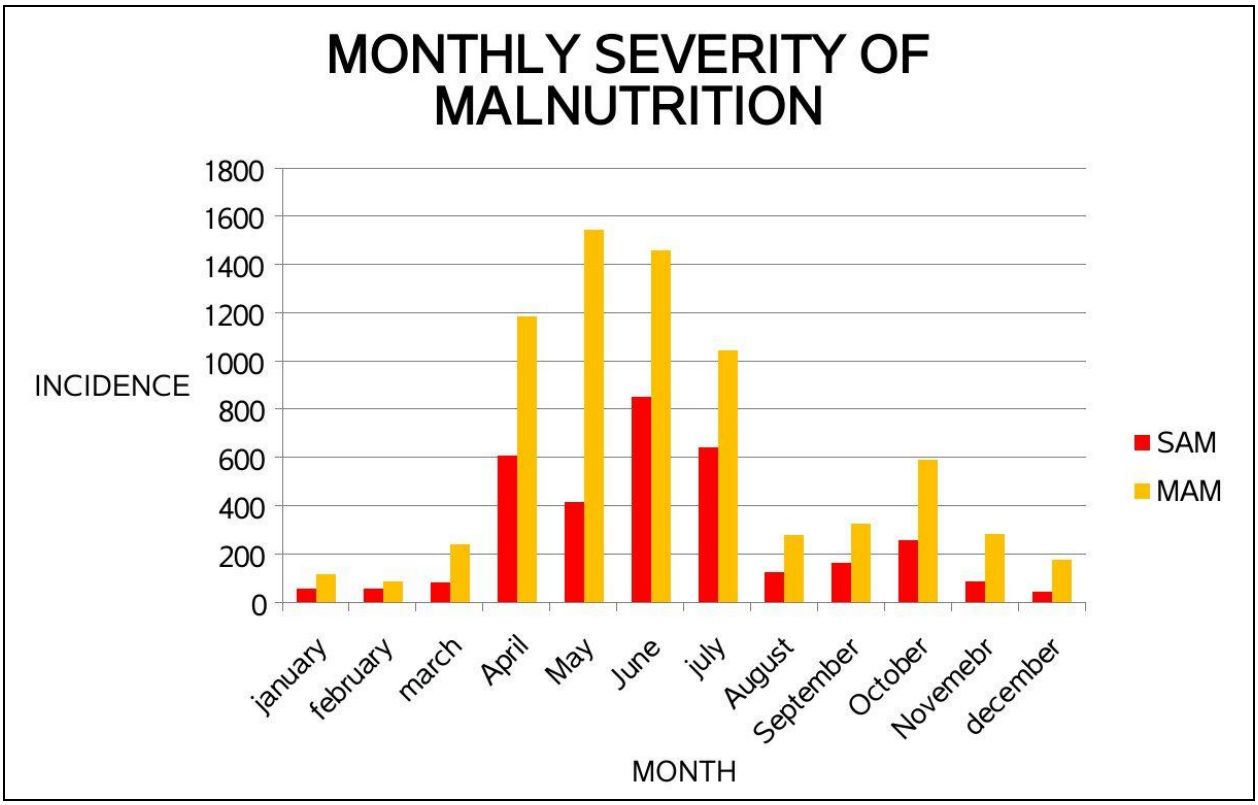

Figure 2 above shows the monthly incidence of the severity of malnutrition classified as either severe acute malnutrition (SAM) of m oderate acute malnutrition (MAM). It revealed that the incidence of severe acute malnutrition was highest in June (851), followed by J uly (644) and the least was in December. On the other hand the incidence of MAM was highest in May (1,546), followed by June (1,4 60) and the least was in February (86).

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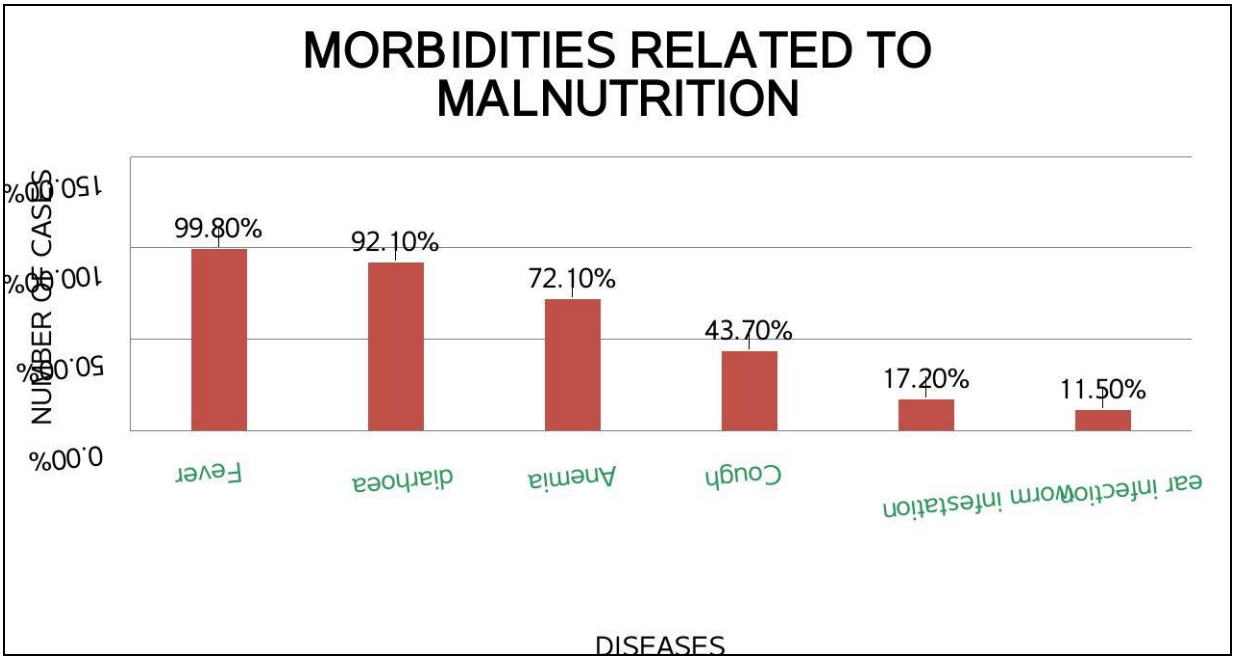
Figure 3: Morbidities associated with malnutrition



As shown in **figure 3**. Almost all of the malnourished children 10,722 (99.8%) presented with fever, followed by diarrhea 9,8 94 (92.1%), anemia 7,746 (72.1%), cough 4,695 (43.7%), worm infestation 1,848 (17.2%) and the least is ear infection 1,235 represent ing 11.5%.

Table3: **Adjusted regression analysis of significantly associated causes of malnutrition among under five year children in Dala IDP Camp.**

EXPLANATORY VARIABLES	COR(95%CI)	AOR (95% CI)	p-value
Low socio-economic status	1.834((1.132-2.973)	3.04(1.01-9.17)	0.047*
Educational status of parents			
Cannot read &write	5.45(3.25-9.133)	5.02(2.06-13.14)	0.001*
Literate	1.00	1.00	
Hand washing practice (hygiene)			
after use latrine	2.919(1.597-5.335)	6.04(1.97-18.29)	0.002*
before food preparation	1.71(0.92,3.17)	1.34(0.44,4.10)	0.64
after cleaning child	23.93(2.83,202)	*	0.99
mostly after lunch	10.25(1.03,102.4)	0.79(0.032,19.99)	0.88
All	1.00	1.00	
Child vaccination status			
Yes	1.00	1.00	
No	3.2(1.76-5.88)	35(1.75-71.82)	0.02*
Squeezing out of first breast milk			

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Yes	3.6(2.208,6.009)	2.02(1.07-6.69)	0.035*
No	1.00	1.00	
Decision maker to use money			
mostly mother	0.74(0.23,2.35)	*	0.99
mostly father	3.126(1.880-5.199)	5.68(2.09-15.43)	0.001*
both jointly	1.00	1.00	

In order to investigate the association of independent variables with malnutrition both univariate and multivariate analysis were used. Those variables that showed association with outcome variables at p-value of less than or equal to 0.05 in the univariate were selected as candidate variables for multivariable logistic regression analysis. The multivariable logistic regression analysis was used by taking all associated factors into account simultaneously and only the following six of the factors remained to be significantly and independently associated with malnutrition.

RESULTS

The findings of this study revealed that the incidence of malnutrition among children 0-5 years of age in Dala IDP camp is 10.7 per 1000 children. This means that in every 1000 children, about 11 of them was malnourished. The study revealed that the incidence of malnutrition was highest in May and June and was lowest in February; moderate acute malnutrition (MAM) was highest in May while severe acute malnutrition (SAM) was highest in June. On the severity of malnutrition among children 0-5 years in the camp, moderate acute malnutrition (MAM) was higher than severe acute malnutrition (SAM) of which one can infer that the level of malnutrition in the camp was moderate. This is in agreement to a study conducted by Kelati et al (2014) in an Eritrean Refugee camp in Ethiopia which revealed that the incidence of malnutrition in the camp were 33.4% underweight while 24.6% were wasted.

The findings of this study revealed that fever, diarrhea, anemia, worm infestation, cough and ear infection were the common morbidities associated with malnutrition among children 0-5 years in Dala IDP camp, Maiduguri. Almost all the children were admitted with fever, diarrhea, anemia and cough and this could be attributed to the lifestyle of the parents and the overcrowding in the camp which predispose the children to infection coupled with the poor nutritional status (low immunity) of the children as a result of poor feeding practices among parents and in the camp. This finding agrees with a study conducted by Prinow et al (2017) in Nicaragua which revealed that a total of 92.2% of the children examined the study had morbidities during the first 90 days of malnutrition.

The findings of the factors associated with malnutrition in Dala IDP camp were low socio-economic status, Educational status of parents, hand washing practice (hygiene), child vaccination status, squeezing out of first breast milk and decision maker to use money. It shows that low socioeconomic status is a predisposing factor to malnutrition as parents with low socioeconomic status tend to be less educated (leading to poor knowledge on nutrition and malnutrition) also leading to poor breast feeding practices such as squeezing out colostrums which is very nutritional to the baby. More so, the decision maker to use money in the house is also a great factor that indirectly contributes to malnutrition. This finding is in line with a study conducted by Ndemwa, Wanyua, Kaneko, Karama, & Anselimo (2017) in Kenya which revealed that level of education, mothers' breast feeding practices and occupation are factors that are significant predictors of child under nutrition.

Conclusion

The total incidence of malnutrition from 1st January to 30th December 2017 was ten thousand seven hundred and forty three (10,743). The highest number of malnourished children was found in June, followed by May while the least incidence was found in February. Majority of the cases of malnutrition were moderate acute malnutrition (MAM), which was highest in May followed by June and the least was in February. The diseases associated with malnutrition in the IDP camp were fever, diarrhea, anemia, cough, worm infestation and ear infection. The factors associated with malnutrition were Low socio-economic status, Educational status of parents, hand washing practice (hygiene), Ch

ild vaccination status, Squeezing out of first breast milk and dec ision-maker to use money. Efforts should be made to end hostili ties causing displacement of citizens.

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