

Assessment of Nutritional Status of Children in Birnin Kebbi Orphanage Home, Kebbi State, Nigeria

Yusuf, A. B¹., Turaki, A. A¹., Abubakar, J¹. and Yau, S. L.²

¹Department of Biochemistry and Molecular Biology, Federal University, Birnin Kebbi, Kebbi State, Nigeria.

²Department of Nursing Science, Federal University, Birnin Kebbi, Kebbi State, Nigeria.

ABSTRACT

Nutritional assessment is the process used to evaluate nutritional status, identify disorders of nutrition, and determine which individuals need nutrition instruction and or nutrition support. The current study was conducted in Birnin Kebbi Orphanage Home to assess dietary pattern and nutritional status of the children. A questionnaire was used to collect data on socio-economic status, hygiene practices; 3-day and 24-hour foods re-call. Body parts were measured and examined for signs of malnutrition. Blood samples were collected to evaluate some biochemical and haematological parameters. Data were subjected to descriptive statistics and Student's t-test using SPSS version 20 and ENA SMART software. The prevalence of stunting, wasting, and underweight was 60%, 25%, 37.5% respectively. A few of the children (7.5%) had a MUAC less than 11.5cm while 7.5% had between 11.5- 12.5cm (Acute malnutrition). Physical signs of protein energy malnutrition were observed in 60% of the children, while conjunctiva pallor was noticed in 30% and angular stomatitis in 2.5% of the children. Biochemical analysis revealed that 58.82% have low serum total protein, while 52.9% have low serum albumin and 29.41% were anaemic. All the children have low levels of total cholesterol, while (52.94%) have low levels of HDL and 17.64% have low levels of triglyceride. Dietary pattern reveals that starchy cereals account for a greatest percentage of the foods consumed by the children. The current study has established sub optimal nutritional status among the children in the orphanage, which may be attributed to poor infant and young child feeding practices.

Keywords: Children, Nutritional assessment, Nutritional Status and Dietary pattern.

INTRODUCTION

Malnutrition is a condition that results from eating a diet in which nutrients are either not enough or are too much such that they cause health related problems (Young, 2012). Most often, malnutrition is used to refer to under nutrition when there is inadequate supply of calories, proteins, or micronutrients. The World Health Organization, defined malnutrition as the cellular imbalance between the supply of nutrients and energy and the body's demand for them to ensure growth, maintenance and specific functions (WHO, 2006). This implies a disparity between the amount of nutrients that the body needs and the amount that it is receiving.

Children happen to be the most affected by acute malnutrition worldwide especially in developing countries. The World Health Organization estimated that globally about 54 percent of child mortality is caused by malnutrition (WHO, 2004). Childhood underweight accounts for about 35 percent death in children under the age of five years (WHO, 2006). According to United Nations Children Fund (UNICEF), at any time, approximately 100 million children suffer from moderate to severe forms of PEM (UNICEF, 2013). While Save the Children posits that in every hour of the day, 300 children die as a result of malnutrition and one in four children is chronically malnourished (Save the Child, 2012). An orphan is a child that is below the age of 18 years who has lost one or both parents irrespective of the cause of death. Children at orphanages are more susceptible to malnutrition than children staying at home with their parents. Orphans often lack parental care,

adequate nutrition, basic amenities like portable drinking water, clothing and decent accommodation (Haleemath *et al.*, 2017). In addition, caregivers in orphanages often lack knowledge on optimal infant and young child feeding practices.

Several studies have been conducted on the nutritional status of children in Kebbi State by different Non-governmental organization. However, to date, the nutritional status of children in orphanages particularly in Birnin Kebbi metropolis has received little or no attention. Therefore, the objective of this study was to assess the dietary pattern and nutritional status of children in Birnin Kebbi Orphanage Home so as to identify disorders of nutrition, and determine which individuals need nutrition instruction and or nutrition support.

MATERIALS AND METHODS

Chemicals and reagents

All the chemicals and reagents used in this study were of analytical grade. Sample analyses were conducted using high performance commercial kits (All from Randox Laboratories Northern Ireland, Sigma-Aldrich Chemie GmbH, Germany, and Cayman chemicals, USA).

Study Area

The study was conducted at Birnin Kebbi Orphanage Home located in the Kebbi State Ministry for Women Affairs and Social Development, Gesse Phase 1, Birnin Kebbi. Kebbi State is located in the North-western part of Nigeria. It lies on latitude 10° N to 13° N, and Longitude

30 E to 60 E. The state enjoys a tropical type climate, which is generally characterized by two extreme seasons: the hot and cold temperatures. The state is famous for the traditional fishing festival which attracts people from far and near.

Study Design

The study was a cross-sectional descriptive study.

Study subjects

40 children under the age of five in the orphanage participated in this study. 27 were males and 13 were females.

Inclusion Criteria

All apparently healthy children under the age of five in the orphanage

Exclusion Criteria

Children > 5years of age or under any form of medical treatment during the period of study

Ethical clearance and Informed consent

Ethical approval was obtained from Kebbi State Ministry of Health. The Health research committee assigned number: 106:1/2018; and registration number KSHREC 106/2018. Informed consent was sought from the Management of the Orphanage. Participation was strictly voluntary.

Data Collection Instruments and Methods

A well-structured questionnaire was used to collect information on the gender, age, and number of children, staff strength, and the educational background of the Caregivers.

Dietary Pattern Assessment

Food consumption pattern was assessed by 24 hour and Three-day estimated food record as described by Schroder *et al.*,(2001).

Anthropometric Measurements and Physical Examination

Data on the children's anthropometric parameters were obtained by measuring their weights, heights; mid upper arm circumference and skin fold thickness according to WHO standards (WHO, 2006). Physical examination for signs of protein energy malnutrition was done as described by Sandstead and Anderson (1947) and Jelliffe (1966).

Biochemical and Haematological Analyses

Blood was drawn with aseptic precaution and serum total protein was determined as described by Lowry *et*

al.,(1951), serum albumin was determined by method of Doumas *et al.*,(1971), and globulin was estimated by the method of Turnwald and Barta (1989). Estimation of Total-cholesterol was by the method of Roeschlau *et al.*,(1974), HDL-cholesterol was determined by method of Lopez-Virella *et al.*,(1977), triglyceride was determined as described Jacobs and VanDermark (1960), LDL-cholesterol was estimated by method of Friedwald *et al.*,(1972), and hematological parameters were determined as described by Cheesbrough (2005).

Data Analysis

Data were subjected to descriptive statistics and Student's t-test using Statistical Package for Social Sciences (SPSS), version 20, 2012 SPSS, Inc, Chicago, IL, USA; and ENA SMART software was used for anthropometric parameters. The significance level was established at $p < 0.05$.

RESULTS

Figure 1 shows the food consumption pattern of the participants. The cereals food group contributed the highest proportion (39.51%) to the total diet for the orphanage children, Vitamin A rich Fruits and vegetables 9.96%, other fruits and vegetables were 3.99% while juices were 4.12%. Milk and dairy products were 14.64%, animals/flesh foods 15.80% and legumes and nut were 11.93%. Table 1 presents nutritional status of children in the orphanage based on mid upper arm circumference (MUAC) measurements. Fifteen percent show sign of moderate or severe acute malnutrition (MUAC< 12.5cm). A total of 85% were well nourished (MUAC>12.5).

Table 2 presents results of physical examination of body parts to identify signs of nutritional deficiency. Overall, the result indicates that 60% of the exhibit some physical signs of malnutrition. Table 3 presents result of percentile distribution of the participants based on skin fold thickness. Nine children corresponding to 22.5% had triceps skin less than the 10th percentile, an indication of inadequate nutrition. Figure 2 and 3 presents result of biochemical analysis of participants. Serum albumin, total protein, and haemoglobin levels were low in some of the children, an indication of inadequate nutrition. Biochemical analysis reveal that slightly above 50% had normal albumin levels. Figure 6 shows the prevalence of malnutrition among the children in the orphanage. More than half (60%) of the children were stunted, 37.50% were underweight while 25% were wasted.

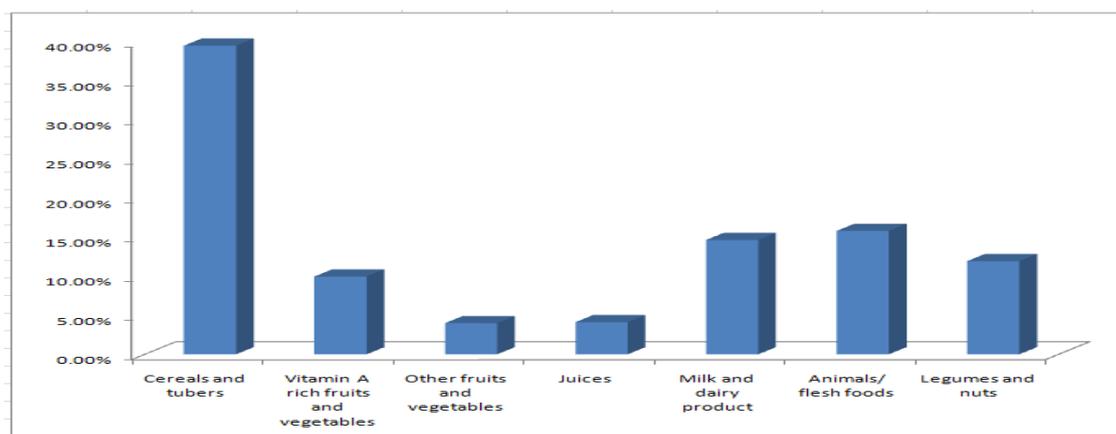


Figure 1: Dietary Pattern of the Participants in the study

Table 1: Nutritional Status of the Participants Based on MUAC Measurements

MUAC (cm)	frequency	Percentage
<11.5	3	7.5
11.5-12.5	3	7.5
>12.5	34	85
Total	40	100

MUAC <11.5cm indicates severe acute malnutrition, MUAC of 11.5cm-12.5cm indicates moderate acute malnutrition, MUAC > 12.5 indicates adequate nutrition.

Table 2: Percentage of Children Showing Physical Signs of Malnutrition

Body part Examined	Percentage
Hair (n=8)	20
Eye (n=12)	30
Mouth and gum (n=1)	2.5
Finger nails (n=3)	7.5

(n= number of children with sign of nutritional deficiency)

Table 3: Percentile distributions of the children based on skin folds thickness

	<10 th Percentile	10 to 90 th Percentile	>90 th Percentile
Triceps skinfold	9 (22.5)	31(77.5)	0(0)
Subscapular	0(0)	40(100)	0(0)
Supraliac	0(0)	40(100)	0(0)

<10th percentile indicates inadequate nutrition, 10th to 90th percentile indicates adequate nutrition, and >90th percentile represent over nutrition.

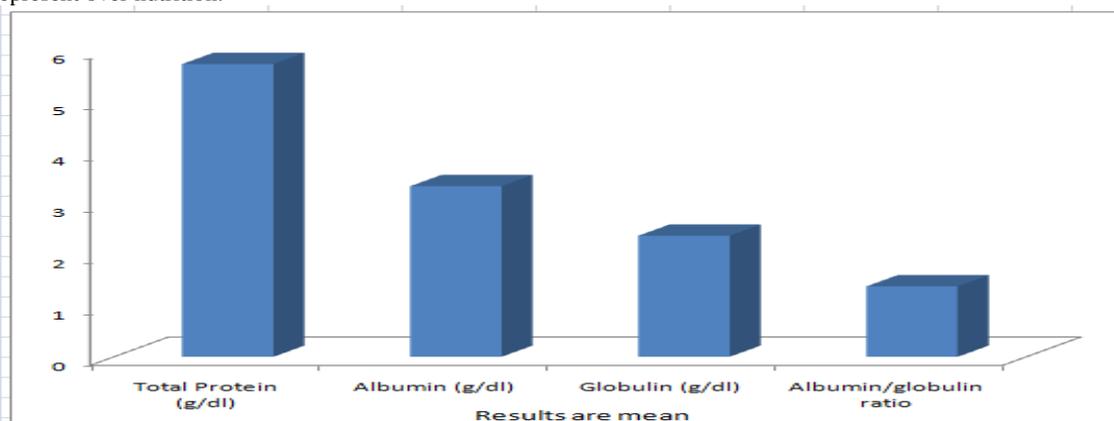


Figure 2: Mean protein profile of the children in the study

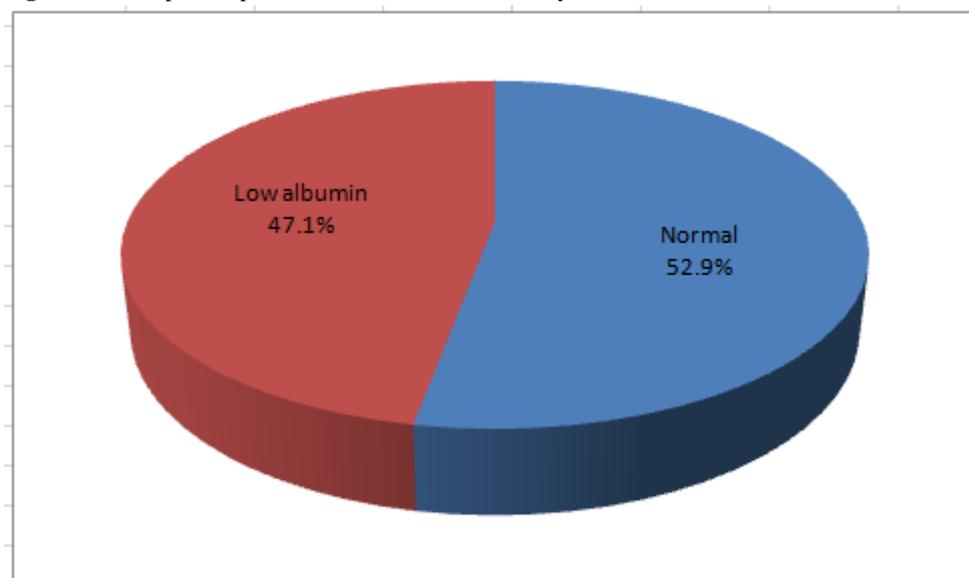


Figure 3: Percentage prevalence of hypoalbuminemia among the children

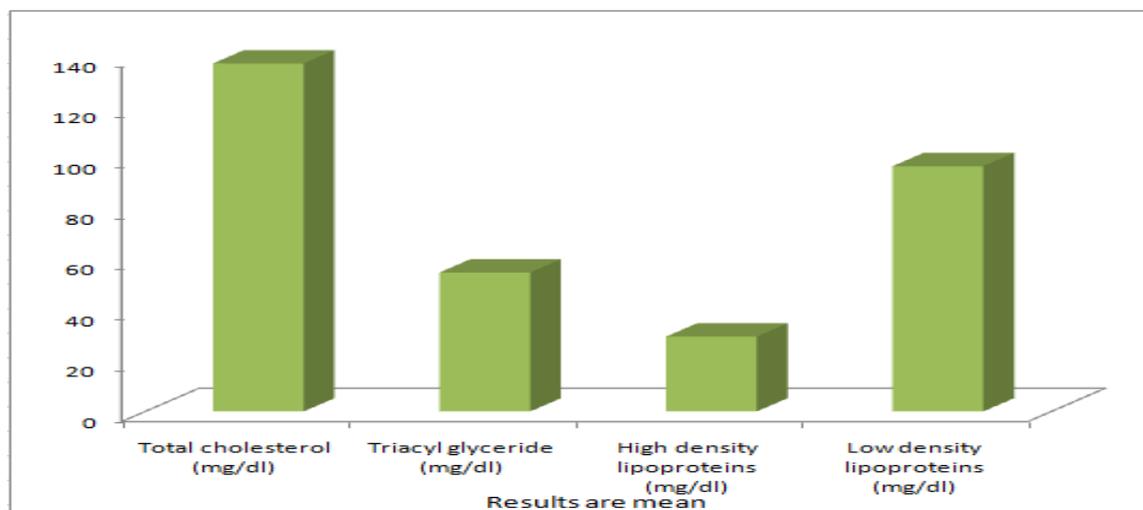


Figure 4: Mean lipid profile of the children in the orphanage

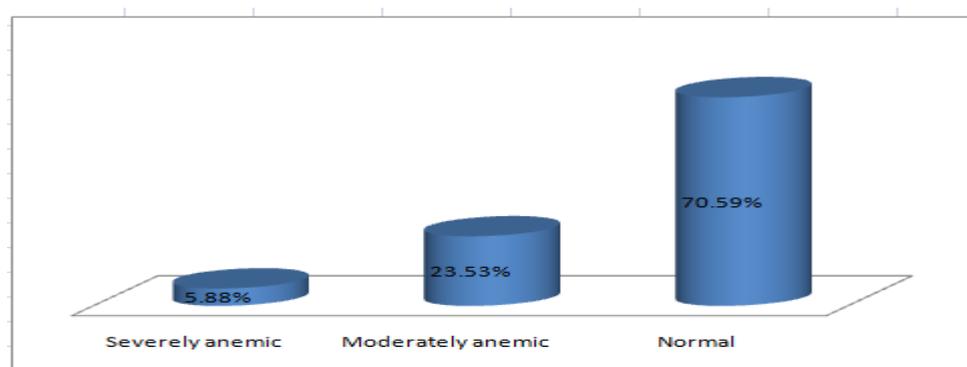


Figure 5: Percentage prevalence of anaemia among the children

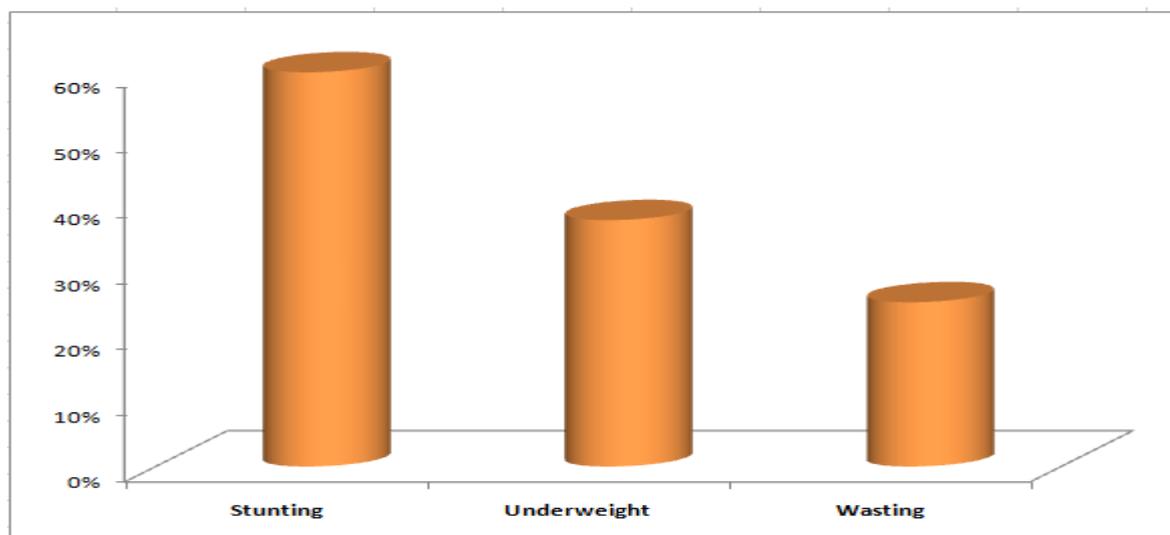


Figure 6: Prevalence of stunting, underweight, and wasting among the children in the orphanage

DISCUSSION

From the result obtained shows the food consumption pattern of the participants and cereal-based foods constitute a highest proportion of the total diet of the children in the orphanage. The high rate of cereal-based foods recorded may be attributed to their availability and affordability. Background information revealed that rice, Indomie, and millet are among the foodstuffs donated regularly to the orphanage. These findings are similar to a study in Kenya by Elizabeth and Makokha (2013) which reported low dietary diversity in orphanages. Low dietary diversity often leads to suboptimal nutritional status that manifest as nutritional deficiencies (Elizabeth and Makokha, 2013). This study assessed the nutritional status of the participants by measuring MUAC. Measurement of MUAC is a simple, invasive, and cheap technique that is used to determine nutritional status or screen children for acute malnutrition.

The dietary pattern of the participants corroborates the results of nutritional status based on MUAC. The results of MUAC indicate that 15% of the children suffer from moderate or severe form of malnutrition. It is imperative to note that while the moderately malnourished children would require nutritional instruction, the children with SAM need to be admitted into malnutrition rehabilitation program. The results for skin fold thicknesses showed that majority of the children have all the three skin folds evaluated within the normal range. This finding is in agreement with Clerke *et al.*, (2006). However, 22.5% had triceps skin fold less than the 10th percentile. Lidia *et al.*, (2013) also reported low levels of triceps skin fold (TSF) in a similar study. This low levels of TSF in an indication of inadequate nutrition and depletion of fat stores in adipose tissue. Physical examination also revealed that 60% of the participants exhibited one or sign of nutritional deficiency. These findings are similar to that reported by Haleemath *et al.*, (2017). Some of signs the children presented include pale coloration of sclera of eye, sore around the mouth and gums, brown sparsely dense hair, and patches on fingernails. This suggests that the children may be taking diet that is deficient in some macro and micronutrients. Results of haematological and some biochemical parameters (serum protein, albumin) are similar to the findings of a study in children under the age of five in Kussada Local Government Area of Katsina State by Adegbusi and Sule (2011). The lipid profile of the children showed low levels of serum total-cholesterol, triacylglycerols, and HDL. This is in line with the previous research on assessment of anthropometric and biochemical parameters of the under five children with nutritional deficiencies where level of lipid profile parameter were significantly low. These low levels of lipid profile may be associated with biochemical changes that characterize protein energy malnutrition (Torun and Chew, 1994). Children with malnutrition show low levels of serum triacylglycerides and cholesterol as reported by Wammanda and Adeleke (2002).

Based on dietary pattern, anthropometric, and biochemical parameters, some of the children in the current study showed varying degree of sub-optimal nutritional status. These findings are comparable with a previous study on orphans and vulnerable children by Haleemath *et al.*, (2017). The prevalence of malnutrition

according gender showed that male participants were more stunted than their female counterpart. This is in agreement with the findings of Alabi *et al.*, (2016).

The current study has established the dietary pattern of the children in the orphanage. The food consumption pattern does not meet minimum dietary diversity. Anthropometric measurement, physical examination and some biochemical parameters revealed the presence of nutritional disorders among the children. This may be attributed to suboptimal nutrition precipitated by poor dietary diversity as revealed by food consumption pattern of the children. The study also revealed the percentage of children that need nutritional instruction and support. Therefore, it is imperative to initiate and sustain optimal feeding practices in the orphanage.

Conflict of Interest: There is no conflict of interest among the authors.

Acknowledgement: The authors want to specially thank and acknowledge the support of Kebbi State Ministry of Women Affairs and Social Development for their support and permission to conduct this study.

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