Prevalence of Malnutrition among Children Aged 6-59 Months in Kaduna State, Nigeria

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ABSTRACT

Background: The World Health Organization quotes malnutrition as a major single threat to the world's public health.

Objective: The study assessed the anthropometric indices of the under five children from the three senatorial districts in Kaduna State.

Materials and Methods: A cross sectional descriptive survey was adopted for the study Proportionate sampling technique was used to select 420 children from a population of 1, 172,43, aged 6- 59 months. The nutritional status was assessed using a structured questionnaire, anthropometric parameters based on World Health Organization (WHO) classification of malnutrition, mild (weight for height ratio between -1SD to -2SD) moderate (-2SD TO-3SD) and severe (less than -3SD), while 24-hour food recall was obtained on the children looking at the breakfast, lunch and dinner. The data obtained was analyzed using SPSS version 16.0. Frequency distribution and percentages were used to present anthropometric status of the children.

Results: Female were 53.8% and 46.2 % male. Anthropometric assessment showed the prevalence of different categories of malnutrition among the children as severe stunting38.6% moderate stunting 31.4% while 30% of the children were normal. Severe underweight was 41.24%, moderate underweight 35.2% and normal was 23.6% while severe wasting was 21.26%, moderate wasting 26.4% while 51% were normal. Twenty-four (24) hour dietary recall showed the diet of the children is monotonous in nature.

Conclusion: Severe malnutrition exists among children in Kaduna State therefore, there's need for improvement in the diet and nutritional status of children in the State.

Keywords: Malnutrition, Anthropometry, Children, Kaduna State.

INTRODUCTION

Malnutrition signifies inadequate, excessive, or imbalanced consumption of nutrients. In Nigeria, 37 per cent of children, or 6 million children, are stunted (chronically malnourished or low height for age), more than half of them severely. In addition, 18 per cent of children suffer from wasting (acutely malnourished or low weight for height), half of them severely. Twenty-nine per cent of children are underweight (both acutely and chronically malnourished or low weight for age), almost half of them severely (1). The World Development Report (2) ranks Nigeria as the largest territorial unit in West Africa that has over one hundred and forty-seven million people (147,000.000). Approximately, 75% of the population are women and children. Over 70% are residing and securing their livelihoods in the rural areas. Within this huge rural population, particularly among the urban poor, Nigeria infant and child mortality rates are alarming. The rate is 100 per 1,000 births and mortality of 1,100 per 100,000 live births. Most of these deaths are due to lack of adequate intake of food or inappropriate combinations of food (3). Akinyele (4) reported a high level of malnutrition among children in rural Nigeria. The figures differed with

geopolitical zones, 56 percent was reported in a rural area of South West and 84.3 percent in three rural communities in the northern part of Nigeria.

High-level Task Force on Global Food Crisis (5) reported that inadequate diet and malnutrition are the major causes of death of over 3.5 million children, every year at a rate of more than 10,000 children per day. Inadequate dietary pattern is a threat to health and under-nutrition, mainly in young children. Inappropriate and inadequate dietary patterns have emerged as a major development crisis facing Nigeria. Inadequate dietary patterns have serious implication on the growth and health of individuals and have a huge effect on the country's productivity. The United Nations Development Programme Report (6) states that adequate diet and health of the people are indicators of the country's socio-economic situation. Apart from shelter and clothing as the basic needs of life, food remains the core in the hierarchy of human needs. This is because of its importance not just to children but to the entire human existence. Over two thirds of child's deaths are associated with inappropriate feeding practices that occur within the first year of life. Malnourished children who survive are more frequently sick and suffer the lifelong consequences of impaired development (7).

Inadequate intake of food will continue to affect the nutritional status of households leading to malnutrition and consequently to poor health, poor livelihoods and poor productivity. This is very important and critical to life; adequate and appropriate dietary pattern should be the right of every individual. However, monotonous diet, inadequate food and poor feeding behavior have persisted. These constitute a major threat to the health and wellbeing of children. Again, for any country to thrive and be productive, it must have a healthy population as a malnourished population leads to reduced productivity, hampering economic growth and the full realization of potential of citizens. Adequate nutrition is very crucial to the growth and the economic development of any country. Dietary pattern or habits become established in children from infancy and to a greater extent persist throughout life. Nutrition affects health throughout the life cycle and it is best to prevent malnutrition early in life. So, it is very important to monitor the nutritional status of any country to determine the productive rate of that nation (8).

The Food and Agriculture Organization (8,9,10,11), reports that about 854 million people were under-nourished worldwide in 2001-2003 Nigeria inclusive and by 2008, the number had increased from 854 million to 925 million. The FAO report also shows clearly that a large percentage of this under-nourished number is located in Africa where one in three people are deprived of sufficient food.

Adequate dietary pattern is the fundamental challenge to children's health status and welfare in Nigeria and Kaduna State in particular (12). Nutrition is not just eating and drinking but eating adequate food to get a good supply of all the key nutrients. Individual nutritional status is dependent on the interaction between food that is eaten, the state of health and the physical environment. This study was undertaken to assess the anthropometric indices and diet of the children in Kaduna State.

MATERIALS AND METHODS

The study was conducted in Kaduna State, North-Western Nigeria. Kaduna State has twenty-three local government areas (LGAs) and three senatorial districts. Kaduna is one of the seven states that make-up the North West geopolitical zone of Nigeria.

The study design for the research was a cross sectional descriptive survey. The population of the study was all under five children in the three senatorial districts. The population of male under-five children in Kaduna state was 593,555 and females was 578,882, giving a total of 1,172,437 (13). A sample size of 420 respondents from the study population was arrived at using a formula according to Yamane et al., (14) was used.

$$n = \frac{N}{1 + N * e^2}$$

n = Sample size
N = Total Population
e = error or level of precision = 5% or 0.05

A multi stage sampling technique was used to select the subjects for the study. In the first stage, using the senatorial districts housing the Local Government Areas; two Local Government Areas were selected from each of the three senatorial districts using simple random sampling procedure. This gave a total of 6 (six) Local Government Areas. The second stage involved compilation of all the names of the communities

within the selected Local Government Areas. This was done with the assistance of the workers at each Local Government Areas Headquarters. Purposive sampling was used in selecting two communities from each of the local government areas (a total of 12 communities) because they have similar characteristics. At the third stage, number of children aged 6-59 months was selected using proportionate sampling technique, 420 children were used and they were selected randomly (Based on the 2013 immunization data in Kaduna State) followed by selecting mother - child pair randomly from the 12 communities, respectively to give a total of 420 children.

The Houses were listed to ensure systematic sampling and adequate coverage of the community. Where a scheduled household has no suitable subject (mother-child pair), the next household after it, was used to replace it. Mothers with children aged 6 - 59 months were eligible in a mother/child pair. In the absence of the biological mother, the person considered as the child's primary caregiver was eligible.

The age of the children was determined through their birth certificate. The nutritional status was assessed using a structured questionnaire, anthropometric parameters of sex, age, weight, height based on World Health Organization (WHO) classification of malnutrition, mild (weight for height ratio between -1SD to -2SD) moderate (-2SD TO-3SD) and severe (less than -3SD) while 24-hour food recall were obtained on the children looking at the breakfast, lunch and dinner.

The collected data was analyzed using a Statistical Program for Social Sciences   informed (SPSS) version 16.0 Frequencies and percentages were computed to present all categorical variables including age and 24-hour recall. Informed consents were obtained from respondents after explaining the importance of the study and confidentially assured.

Results:
Table1. 1 shows the Gender, Anthropometric indices and Age distribution of the children, A higher proportion (55.8%) of children were female compared to male (46.2%, Prevelance of malnutrition amoung under five children in the six local government   areas and in the twelve (12) communities of Kaduna State revealed more than half 76.4% of the children were underweight, 70% were stunted while 47,6% were wasted while age group of the children shows; in the age range of 25 – 36 months were131 in number and in the age range of 49 – 59 are 33. Another 50 were between 37 – 48 months, 109 were 6 – 12 rang and 97 were in the age range of 13 – 24 months.

Table 2. Shows 24- hour dietary recall of under – five children in Kaduna State showed   that 47.7%   took *Tuwo masara da mia kuka* (*Maize paste with soup*),*fura / nono* 19% (*Fermented cow milk and millet paste)* and tea and bread (*Shai*)14%   as breakfast,   for lunch 42.4% took *Tuwo massara da mia tuase,(Maize paste with tomato soup)*, 16.4 %   took *wake* (beans)   as lunch, For dinner 52.8% took *tuwo masara da mia kuka* (Maize paste with baobao vegetable soup), 20.5% *tuwo* rice and 15% rice and stew, 46.2% took *awara (tofu or soybeans cheese)* as a snack.

Table 1: Gender, Anthrompometric indices and Age Group of Children

Gender		Anthropometric indices			Age group (Months)	No	%
Male (%)	Female (%)	Wasted (%)	Underweight (%)	Stunted (%)	6-12	109	100.0
53.8	46.2	47.6	76.4	70	13-24	97	100.0
					25-36	131	100.0
					37-48	50	100.0
					49-59	33	100.0
					Total	420	100.0

Table 2. 24- Hour Dietary Recall of Under Five Children in Kaduna State

Variables	Frequency	%
Breakfast		
Tuwo rice da mia	20	4.8
Ale-ale and koko (Moi-moi / Akamu (Pap)	8	1.9
Koisai and koko (Akara / Akamu (Pap)	53	12.6
Tuwo masara da mia kuka (Maize paste with soup)	200	47.7
Tea and bread (*Shai*)	59	14.0
Fura / Nono	80	19.0
Total	**420**	**100.00**
(b) Lunch		
Tuwo rice da mia tuase (Rice paste swallow / soup	94	22.4
Tuwo Acha da mia geda (Hungry rice)	20	4.8
Talia (Spaghetti)	27	6.4
Wake (beans)	69	16.4
Doya/ mai geda (yam /groundnut oil)	32	7.6
Tuwo Massara da mia tuase (corn paste swallow / tomato soup	178	42.4
Total	**420**	**100.00**
(c) Supper		
Tuwo rice da mia tuase (Rice paste swallow /tomato soup)	86	20.5
Tuwo Masara da mia kuka (Maize paste with soup)	222	52.8
Dambu soya/nama/ (Soybeans/beef meat)	49	11.7
Rice and stew	63	15
Total	**420**	**100.00**
(**d) Snacks**		
Doya(yam)	69	16.5
Awara (Soy-bean cheese)	194	46.2
Oranges/Mangos/Pear/Banana	17	4.0
Boiled corn (*Masara*)	61	14.5
Beans (*Ale-ale/Kosi*)	79	18.8
Total	**420**	**100.00**

Source: Field Survey

Anthropometric indices Classification according to the ages of Children

Table 3. Shows weight- for – age classification according to the ages of the children. The age range of 25 – 36 months had the highest percentage of severely under – weight children (65.6%). The moderately underweight were highest in the age range 37 – 48 months. The least percentage of underweight children (6.1% severely and 21 .2 % moderately underweight) was within the age range 49 – 59 months.

Table 4. Shows height – for – age (stunting) classification of the children according to age groups. The children aged 25 - 36 months had the highest percentage of severe stunting (45.8%); 39.7% of them were moderately stunted. Those aged 49 -59 months has the least percentage of stunted children as only 3.0% were severely stunted while 21.2% were moderately stunted

Table 5. Shows the wasting classification of the children according to ages. The children aged 25-36 months were the most wasted as 31.3% were severely wasted while another 31.3% were moderately wasted. Those in aged 49 -59 months were the least wasted as only 6.1% were severely wasted while 27.3% were moderately wasted.

Table 3. Weight – For – Age (Underweight) Age Classification According to the Ages of the Children

Distribution of weight - for – age	Normal (-1 to + 1 SD)		Moderately Underweight (-2SD)		Severely Underweight (-3SD)		Mild (- 1SD)		Total	
Age Group	N	%	N	%	N	%	N	%	N	%
6-12 months	55	50.5	38	34.9	16	14.7	-	-	109	100.0
13-24 months	10	10.3	39	40.2	48	49.5	-	-	97	100.0
25-36 months	3	2.3	42	32.1	86	65.6	-	-	131	100.0
37-48 months	7	14.0	22	44.0	21	42.0	-	-	50	100.0
49-59 months	24	72.7	7	21.2	2	6.1	-	-	33	100.0
Total	99	23.6	148	35.2	173	41.2	-	-	420	100.0

Source: Field Survey

Table 4: Age Distribution of Height – For – Age. (Stunting)

Age groups	Normal (-1 to +1SD)		Moderately Stunted (-2SD)		Severe Stunted (-3SD)		Mild (- 1SD)		Total	
	N	%	N	%	N	%	N	%	N	%
6-12 months	42	38.5	29	26.6	38	34.9	-		109	100.0
13-24 months	22	22.7	34	5.1	41	42.3	-		97	100.0
25- 36 months	19	14.5	52	39.7	60	45.8	-		131	100.0
37- 48months	18	36.0	10	20.0	22	44.0	-		50	100.0
49 -59 months	25	75.8	7	21.2	1	3.0	-		33	100.0
Total	126	30	132	31.4	162	38.6	-		420	100.0

Source: Field Survey

Table 5: Wasting Classification According to the Ages of the Children

Age groups	Normal (-1 to +1SD)		Above normal (+2SD and over)		Moderately Wasted (-2SD)		Severely Wasted (-3SD)		Mild (-1SD)		Total	
	N	%	N	%	N	%	N	%	N	%	N	%
6-12 months	79	72.5	3	2.8	14	12.8	13	11.9	-	-	109	100.0
13-24 months	45	46.4	0	0.0	32	33.0	20	20.6	-	-	97	100.0
25-36 months	49	37.4	0	0.0	41	1.3	41	31.3	-	-	131	100.0
37-48months	22	44.0	0	0.0	15	30.0	13	26.0	-	-	50	100.0
49-59 months	22	66.7	0	0.0	9	27.3	2	6.1	-	-	33	100.0
Total	217	51.7	3	0.7	111	26.4	89	21.2	-	-	420	100.0

Source: Field Survey

Discussion.

Table 1: Anthropometric indices of children showed the prevalence of different categories of malnutrition among the children. The study recorded more stunting (70%), underweight (76.4%) and wasting (47.6%) in relation to (1,12). which reported 41% stunting, 23% underweight and 14% wasting among under five children. The current study indicates that 70%. of the study population was stunted and this falls within the WHO estimate for developing countries (20). The prevalence of underweight, stunting, and wasting from this study is higher than what was reported by Manjunath, et al. (21). It is also consistent with the estimate from the 2013 national demographic health survey on geopolitical zones (11). Stunting in this population is higher than the national estimate. Stunting and underweight in the current study is also higher than the prevalence in the study among pastoral Fulani in Northwest Nigeria. Kaduna State should sustain and scale up existing interventions that will reduce malnutrition (21,22). The high prevalence of stunting observed in these children could signify that these children are not being fed adequately with diverse diets both in quantity and quality. The difference may be attributed to regional and sociocultural factors. Ondo State being in the southern part of Nigeria has prevalence lower than national average as compared to the northern part of the country.

Table 2: Twenty-four (24hr) hour dietary recall on breakfast, lunch, dinner and snacks of under – five children in Kaduna State indicated that greater percentage of the children ate much more of *Tuwo masara da mia kuka* (Maize paste and baobao vegetable soup)at breakfast, *Tuwo Massara da mia tuase* at lunch, supper ,*tuwo sinkafa da mia tuase*, (maize/rice ball with soup made from baobab leaves, fresh or dried / tomato soup; and *awara* (soy bean ball or tofu as snacks).This factor is important in the nutrition of the children as it shows what food is available and the type of food eaten in the area of study. The diet is also monotonous in nature as it dwells more on maize and maize products. Prevalence of child malnutrition in Kaduna State by child's age (Table 3, 4 and 5) showed children aged 25 – 36 months as the age most affected and the least affected age group were in ages 54 – 59 months. Children aged 25 –36 months appeared to be severely underweight while those aged 37 -48 months of age were moderately underweight. Children aged 25-36 months were severely stunted while few aged 54 – 59 months were moderately stunted. Those aged 25 – 36 months tended to be more affected in terms of wasting as they are found to be affected in all the three parameters measured (wasted, moderate and severely wasted), the children aged 54 – 59 months were the least affected. This was similar to the findings in the study among the Fulani children in the southwestern zone of the country for age and all the parameters evaluated (21, 22) Malnutrition is a cumulative phenomenon, and

hence malnutrition rates, as measured by the three indicators (stunting, wasting, and underweight), ought to increase with children's ages. The prevalence of stunting, the most popular anthropometric indicator increases up to the age of 26 months. Malnutrition is therefore, higher when it is most harmful to the child. This is because children's brains grow most rapidly in early childhood and also because they are more vulnerable since their immune systems are not yet fully developed. The largest increase in malnutrition occurred around 6, 24 and 34 months during the period of complimentary feeding (16,17, 18, 19). The period of complementary feeding when infants receives other food in addition to breast milk is a critical period for children's' nutritional status.

Generally, all the parameters of under nutrition were more common among the younger ages (2 – 3 years) compared to the older ages (4 – 5years). This can be explained by the fact that the younger children are growing faster and needed more nourishing food than what they were getting (19). The children's immune mechanism must have been weakened by the poor diet taken; they tend to fall ill more frequently than the older children. The older children spent more time outside the house; they can follow the adults out and so may eat better and more frequently than the younger ones.

CONCLUSION

The children in the study areas are food in secure as their diet is monotonous in nature, the family have little variety in their diet, the same few foods are eaten daily and maize is the major feature.

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Severe malnutrition exists among children in Kaduna State as quite a number of the children are stunted (70%), underweight (76.4%) and wasting (47.6%) therefore, there's need for improvement in the diet and nutritional status of children in the State and the nation at large, knowing the out- come of malnutrition as it affects survival and health, education, productivity and the economy of the nation

References

1. NDHS (2008). *Nigeria Demographic and Health Survey*. National Population Commission Federal Republic of Nigeria Abuja. Nigeria p.62 – 74

2. World Development Report (2008). Agriculture for Development. Washington, D C . © W o r l d B a n k . https://openknowledge.worldbank.org/handle/10986/5990 .

3. NDHS (2007). *Nigeria Demographic and Health Survey*. National Population Commission Federal Republic of Nigeria.

4. Akinyele, I. O. (2009). Ensuring food and nutrition security in rural Nigeria. International Food Policy Research Institute (IFPRI). p.37

5. High-Level Task Force on global Food crises (2008). Comprehensive Framework for A c t i o n . http://www.reliefweb.int/rw/RWFiles2008

6. UNDP (2007). Measuring human development: A Primer: New-York: United Nations NPC (National Planning Commission) and UNICEF (United Nations Children's Fund). (1998).Child survival, protection and development in Nigeria: Key social statistics. Abuja and Lagos, Nigeria.p28

7. Hatloy, A. Hallund, J. Diarra, M. & Oshaug, M. (2000). A Food variety, socioeconomic status and nutritional status in urban and rural areas in Koutiala (Mali). *Public Health Nutrition, 3(1), 57-65.*

8. FAO (2000a). Agriculture: Towards 2015/30 Technical Interim Report Rome: FAO.p.1

9. FAO (2000b). Agriculture: Towards 2015/30 Technical Interim Report Rome: FAO.p.3

10. FAO (2000c). The State of Food insecurity in the world. Rome: Food and Agricultural Organization of the United Nations.p.8

11. NDHS (2013). *Nigeria Demographic and Health Survey*. National Population Commission Federal Republic of Nigeria

12. UNICEF Statistics (*2008)* Progress for children: a child survival report card. 2006. A v a i l a b l e at:http://www.cdc.gov/malaria/impact/index.htm. Accessed 31June 2011 NPC (2006). United States Agency for International Development. (2017). *Multi-sectoral*

13. *Population Census of the Federal Republic of Nigeria*. Analytical report at the National Level Lagos, Nigeria. P. 8 – 9

14. Yamane, T (1967). Statistics - An introductory analysis, Harper and Row 2nd

Ed, New –

15. Bryce, J. Coltinho, D. Darnton-Hill, I. Pelletier, D. & Pinsrup-Anderson, P. (2008). Maternal and child under nutrition: effective action at National level. *Lancet, 360,1347 - 1360.*

16. Caulfield, L. E., De Onis, M., Blossner, M. & Robert, E. B. (2004a*).* WHO estimates of the causes of death in children. *Lancet, 365,1147-1152.*

17. Caulfield, L. E., De Onis, M., Blossner, M. & Robert, E. B. (2004b). Undernutrition as an underlying cause of child deaths associated with diarrhea, pneumonia, malaria, and measles. *American Journal of Clinical Nutrition,80, 193 – 198*

18. *Nutrition Strategy 2014-2025, Technical Guidance Brief: Gender Considerations for Achieving Nutrition Outcomes through Agriculture*. Washington, DC: USAID. https://www.usaid.gov/sites/default/files/do cuments/1864/gender-sensitive-ag-tech-guidance-brief-edit-508.pdf

19. WHO (1997). *WHO Global Database on Child Growth and Malnutrition,* Program of Nutrition, WHO Document No. WHO/NUT/97. Geneva, Switzerland: World Health Organization.p.4

20. WHO (2016) World Health Organization, Global database on child growth and malnutrition. WHO, CTD/WHO PES/IC/96.1 Geneva: WHO.

21. Manjunnath, R., Kumar J. K., Kulkarm, P., Begum, K and Gangadha M. R. ,(2008). "Malnutrition among under-five children of kadukuruba tribe: Need to reach the unreach," Journal of Clinical and Diagnostic Research, vol. 8, pp. 1-4.

22. Ekpo UF, Omotayo AM, Dipeolu MA. (2008). Changing lifestyle and prevalence of malnutrition among settled pastoral Fulani children in Southwest Nigeria. Ann Agric Environ Med.;15(2):187–191.

23. Majekodunmi AO, Fajinmi A, Dongkum C, Shaw APM, Welburn SC. (2014). Pastoral livelihoods of the Fulani on the Jos Plateau of Nigeria. Pastor Res Policy Pract. ;4 (1):20.