

Malnutrition in acutely ill children at the paediatric emergency unit in a tertiary hospital in Nigeria

Isaac E. Ocheke^{1,2}, Puoane Thandi²

¹Department of Paediatrics, University of Jos, Jos, Plateau, Nigeria, ²Faculty of Community and Health Sciences, School of Public Health University of the Western Cape, Cape Town, South Africa

ABSTRACT

Background: In many developing countries, malnutrition remains an important cause of morbidity and mortality particularly in under-five children. The factors responsible for malnutrition could be immediate, underlying or basic, acting either alone or together. It has been shown that children who are malnourished have poorer outcomes from other illnesses than well-nourished children. It is important therefore to periodically describe the extent and pattern of childhood malnutrition so that effective preventive measures can be put in place. The objective of this study was to describe the prevalence and pattern of malnutrition in children presenting with acute illnesses at the Jos University Teaching Hospital. **Patients and Methods:** A cross-sectional descriptive study in children aged 6 to 59 months seen at the paediatric emergency unit from April to October 2012. The subjects were recruited consecutively. Each child had both clinical assessment and appropriate laboratory evaluations done alongside anthropometric measurements. The nutritional/dietary and socio-demographic histories were also obtained. **Results:** Of the 379 children, 224 (59.1%) were males and 155 (40.9%) females. The median age was 17 months, range (6-57). Wasting (WFH z-scores ≤ -3 to < -1 SD) was evident in one hundred children, giving an overall prevalence of 26.9%. Severe wasting (WFH z-score < -3), was present in 22 (5.9%) children indicating the prevalence of marasmus, whereas only two children (0.53%) had oedematous malnutrition (kwashiorkor). Stunting or chronic malnutrition, (HFA z-scores ≤ -3 to < -1 SD) was present in 67 children (18.0%). Seventeen (4.6%) were severely stunted (HFA z-score < -3). **Conclusions:** Wasting was the most common form of malnutrition in the study.

Key words: Acute illness, emergency, malnutrition, paediatric

Address for correspondence:

Dr. Isaac E. Ocheke
Department of Paediatrics,
Jos University Teaching Hospital,
P. M. B-2076, Jos, Nigeria.
E-mail: ieocheke@yahoo.com

INTRODUCTION

The World health organisation (WHO) defines malnutrition as an imbalance between nutrient and energy supply and the body's demand for them to ensure growth, maintenance and specific functions.¹ Childhood malnutrition is a recognised public health problem worldwide but the severity vary from one region to another.² Globally, it is an important cause of morbidity and mortality in children under five years of age particularly in developing countries. The severe forms carry a high case fatality rate of between 20 and 60% in some settings and this probably underscores the reason for the

various initiatives and strategies that have been adopted to reduce the high prevalence of malnutrition in children.³

Childhood malnutrition is of particular concern however in the developing countries because the highest contribution to the global burden in under five is from this region.⁴ In the 1990s, it was estimated that 50% of all deaths globally in children younger than 5 years had malnutrition as an underlying condition, majority of this deaths occurred in the developing countries. This figure, even though has fallen in the most recent estimate to nearly 33%, is still unacceptably high.^{5,6} It is estimated that, malnutrition contributes to about one-fifth of all disability-adjusted life- years (DALY) lost world wide for children younger than 5 years of age.⁷ It is both an immediate and underlying cause of high under-five mortality.^{8,9} In sub-Saharan Africa, malnutrition accounts for about 2% of deaths and 3% of disability adjusted life years in under five children.^{5,10,11}

Nigeria is one among the first 10 countries in the world with the highest prevalence of underweight,

Access this article online	
Quick Response Code:	Website: www.nigeriamedj.com
	DOI: 10.4103/0300-1652.150695

stunting and wasting in children less than 5 years.¹² In this population, the prevalence rates of these forms of malnutrition according to the Nigerian demographic and health survey (NDHS) of 2003 was 35, 25 and 9%, respectively, for stunting, underweight and wasting.¹³ Only very minimal and insignificant improvements have occurred between this report and the figures released for the 2008 NDHS.¹⁴

A lot of efforts have been made in the past to improve childhood nutrition globally and particularly in Nigeria. Such activity as the child survival strategy that particularly focused on baby friendly hospital initiative to shore up exclusive breast feeding practice among lactating mothers, food fortification and supplementation, childhood immunisation and female education were outstanding initiatives. Furthermore, in the year 2000, the United Nations enunciated set of goals and activities geared toward improving the health and well-being of people in all nations of the world that is encapsulated in the Millennium Development Goals (MDGs). The first MDGs target is to halve, between 1990 and 2015 the proportion of people in extreme poverty, whose income is less than US\$1 a day and of those who suffer from hunger (as measured by the percentage of children under five who are underweight).^{15,16} If these goals are to be achieved, then both national governments and institutional periodic reviews are imperative to shed light on progress made and also identify areas of challenge. This study was undertaken to highlight the prevalence and pattern of malnutrition among acutely ill children seen in the emergency unit of Jos University Teaching Hospital.

PATIENTS AND METHODS

This was a descriptive and cross-sectional study, conducted in the paediatric emergency unit of the Jos University Teaching Hospital, Nigeria. Participants aged 6-59 months with acute onset ill-health that lasted less than 2 weeks were recruited consecutively following parental/caregivers consent. Children with any congenital abnormality or existing chronic illnesses were excluded.

Weight was measured in children 2 years or more with Seca® while barefooted and wearing only light clothing. Bassinet scale was used for children less than 2 years and in lying position. Scales were checked for accuracy with standard weights after every 10th measurement, or whenever it was moved from one place to another. Each child's weight was recorded to the nearest 0.1 kg.

Length measurement in children less than 2 years of age was with stadiometer. The child laid prone with the lower limbs fully extended. The head was held to a fixed vertical board at the zero point; the reading was taken at the soles using the sliding board. Standing height was measured

for children who are older than 2 years and all readings recorded to the nearest 0.1 cm.

The mid upper arm circumference (MUAC), was measured with an inelastic tape and recorded to the nearest 0.1 cm.

Height-for-age, weight-for-height, and weight-for-age were determined using WHO charts.

Laboratory investigations carried out when indicated included urinalysis, urine microscopy, culture and sensitivity. Others included thick and thin blood films as well as parasite counts for *Plasmodium falciparum*. Where indicated, chest radiograph, blood culture or lumbar puncture were done as well.

All data were entered into EPI Info version 3.4.3. Analysis of data was by EPI Info, Stata Corp, Texas 77845 USA, 800-STATA-PC and the WHO Antrop version 3.2.2. The Student 't' test was used to compare means while Chi-square (χ^2) test was applied to compare proportions and multivariate analysis for associations, accepting level of significance as ($P < 0.05$).

RESULTS

A total of 379 children were recruited for the study. Two-hundred and twenty-four (59.1%) were males and 155 (40.9%) females. The mean age was 21.67 ± 13.94 months, height of 82.66 ± 12.91 cm, weight of 10.59 ± 3.04 kg and mid upper arm circumference of 14.89 ± 1.53 cm.

The commonest acute illness identified in the children during the study and constituting nearly 36% was acute respiratory infections (tonsillitis, acute otitis media, pneumonia and bronchiolitis). This was followed by malaria (simple and severe) at 27.1%. Table 1 shows the six most common acute illnesses in the children and responsible for 75% of the total, (first 6 on the list in the Table 1).

There were 76 distinct ethnic groups in the study. The ethnic groups with the highest populations amounting to

Table 1: Acute illnesses that brought the children to hospital and their frequencies

Illness	Frequency	Percentage
Acute respiratory infection	135	35.8
Malaria	102	27.1
Acute watery diarrhoea	16	4.2
Urinary tract infection	13	3.4
Malaria and Tonsillitis	13	3.4
Septicaemia	11	2.9
Meningitis	9	2.4
Febrile convulsion	8	2.1
Others	72	19.0
Total	379	100

more than half the entire population (58.4%) were Berom, consisting 15.9% (60), followed by Hausa 15.4% (58), Igbo 9.3% (35), Yoruba 6.9% (26), Afizere 5.6% (21) and Magavwul 5.3% (20).

The overall prevalence rate of wasting among the study population, WFH z-scores $\leq -3SD$ to $< -1SD$ was (26.9%) $n = 102$. Severe wasting, however, WFH z-scores $< -3SD$ without oedema (marasmus) was (5.9%) $n = 22$ and moderate wasting, WFH z-scores $< -2SD$ was (18.6%) $n = 68$. Only two children, (0.53%) had oedematous malnutrition (kwashiorkor). Figure 1 shows the prevalence of severe wasting according to age groups.

Chronic malnutrition

Overall, the prevalence of chronic malnutrition was (18.0%) $n = 67$. Severe stunting HFA z-scores $< -3SD$ was present in (4.6%) $n = 17$ while moderate stunting, HFA z-score < -2 was (13.4%) $n = 50$. Of all the severely stunted children, the highest prevalence of 6.3% was noted in age group 12-23 months as shown in Figure 2.

The distribution of the various categories of nutritional status of the study population was compared with the

WHO standard as shown in Figure 3. The prevalence of severe stunting was much higher in the study population. However, there were slightly more obese children (z scores $\geq + 3SD$) in the study population compared with the WHO distribution.

The percentage distribution of stunting in the study compared with WHO standard, of children lying within different categories of HFA z-scores are shown in Figure 4.

DISCUSSION

This study has further shown that malnutrition is still an important and common problem among young children in Nigeria. The form of malnutrition in the present study with the highest prevalence was wasting, followed by stunting and underweight, respectively. This finding differs from the reports of NDHS for both 2003 and 2008, respectively. In the NDHS reports, stunting was the commonest form of malnutrition followed by underweight and wasting, respectively. Possible reasons for this difference could have arisen from the fact that whereas, the children in the national survey were randomly selected from general

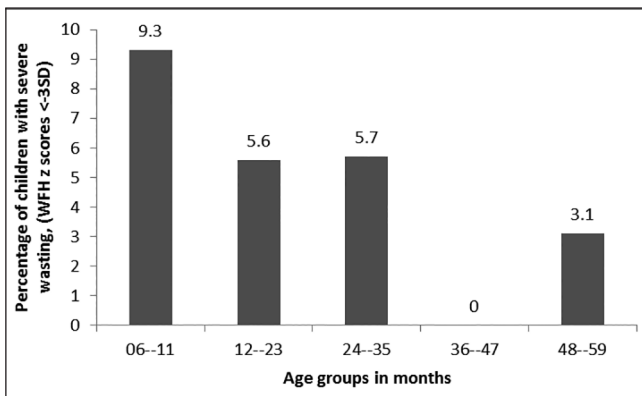


Figure 1: Prevalence of severe wasting, WFH z scores $< -3SD$ according to age groups

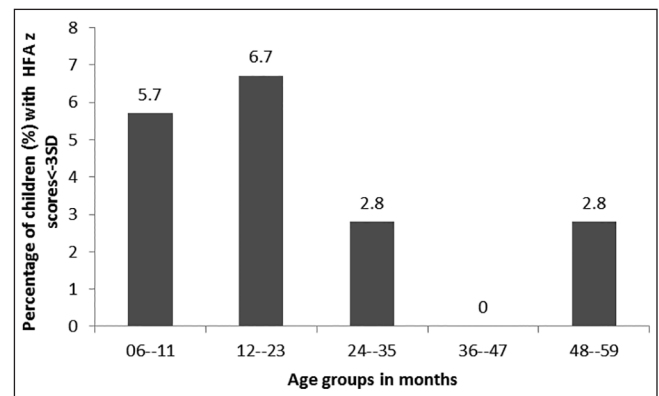


Figure 2: Prevalence of severe stunting (HFA z scores $< -3SD$) according to age groups

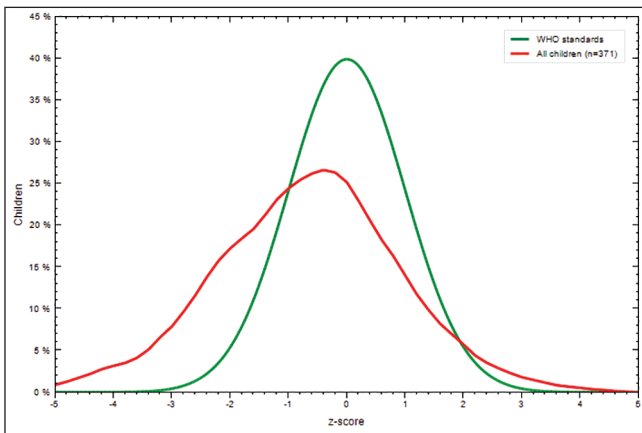


Figure 3: The distribution of children lying within different categories of WFH z-scores

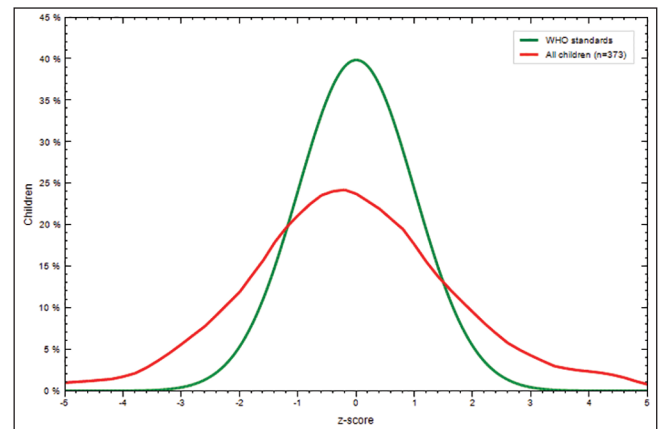


Figure 4: The distribution of children lying within different categories of HFA Z-scores

population of apparently healthy children, the current study was undertaken in acutely ill children seen in a health facility. Acute illness in children particularly those due to infections are usually associated with fever which leads to increased metabolic activity and nutrient utilisation. Furthermore, acutely ill children may have anorexia which could decrease their actual food intake. There may also be increased loss through vomiting and diarrhoea in certain conditions. Since wasting is an evidence of acute malnutrition, these factors may have contributed to the higher prevalence of wasting in the study population as compared to stunting and underweight which are signs of chronic malnutrition as in the NDHS reports. Nevertheless, the overall lower prevalence of all the forms of malnutrition could have been an indication of improvement in the nutritional status of children in this part of Nigeria since all the children in the study were apparently healthy before the onset of illness.

Similar to our findings, in a study among children of Roma ethnic group 2-year old or younger from Serbia, comparable prevalence rates of 21.6% and 23.8% for wasting and stunting was reported.¹⁷ The disparity in the study populations may have been responsible as many children in our study were older than 2 years. However, when the children in our study were stratified into age groups, it was observed that prevalence rates for all the forms of malnutrition in both moderate and severe categories were lower than the rates for the Roma children. Wasting was highest in the age group 6-11 months while stunting was in the age group 12-23 months in our study but with prevalence values that was lower than theirs.

The factors responsible for early childhood malnutrition have been thought to include early introduction of complementary feeding, inappropriate and unhygienic preparation and handling, inadequate intake particularly in infants.^{18,19} These factors though not specifically investigated in the present study could, in addition to the acute illness may be important factors responsible for malnutrition. Most of the children in the study were exclusively breast fed and complementary feed generally introduced immediately at the sixth month of life or thereafter. This also may have contributed to the lower prevalence of both wasting and stunting in the current study.

The figures in our report also differ slightly from the recent global mean prevalence rates for stunting and wasting at 27% and 9%, respectively.²⁰ Similarly, it also differs from values reported from India and South Africa for instance, where prevalence of stunting was even much higher, 43%²¹ and 23.4%,²² respectively. These reports all showed that stunting remains the commonest form of childhood malnutrition.

Our finding may be an indication on the one hand that infant and early childhood nutrition may be improving

among Nigerian children particularly in this region of the country. It is also a subtle reminder to clinicians responsible for child health that careful attention should be paid to nutritional status of children presenting with acute illness. This is relevant as it has been shown that majority of children seen in paediatric emergency and outpatient clinics are not evaluated for the malnutrition.²³

In conclusion, this study has shown that wasting was the most prevalent form of malnutrition among children presenting with acute illness in the emergency unit. The condition is more pronounced in the first twelve months of life. Furthermore, overall it also showed that there may have been an improvement in the prevalence of malnutrition in this part of the country. Although, this study is limited by the fact that it was conducted in a health facility and did not critically look at other risk factors for malnutrition such as household income and caring practices, the study population cut across different social-demographic strata. However, this study has highlighted an important point, that children presenting with acute illness have a higher prevalence of acute malnutrition particularly in the first year of life. This suggests therefore, the importance to assess all children presenting with acute illness in emergency unit with the aim of identifying those affected and giving appropriate nutritional advice to parents and follow-up.

REFERENCES

1. de Onis M, Monteiro C, Akre J, Clugston G. The worldwide magnitude of protein-energy malnutrition: An overview from the WHO Global Database on Child Growth. *Bull World Health Organ* 1993;71:703-12.
2. Smith LC, Haddad L. Overcoming child malnutrition in developing countries, past achievement and future choices. IFPRI vision 2020. Discussion paper 30. IFPRI, Washington DC, USA; 2000.
3. World Health Organisation. Management of severe malnutrition: A manual for physicians and other senior health workers. Geneva: WHO, 1999.
4. UNICEF. Progress for children; 2006. Available from: http://www.unicef.de/fileadmin/content_media/presse/Progressforchildren/PFC4 [Last accessed on 2012 May 19].
5. Pelletier DL, Frongillo EA Jr, Schroeder DG, Habicht JP. The effect of malnutrition on child mortality in developing countries. *Bull World Health Organ* 1995;73:443-8.
6. WHO and UNICEF. Countdown to 2015 decade report (2000-2010). Taking stock of maternal, newborn and child survival. Geneva: WHO; 2010.
7. Black RE, Allen LH, Bhutta ZA, Caulfield LE, de Onis M, Ezzati M, et al; Maternal and child under nutrition study group. Maternal and child under nutrition: Global and regional exposures and health consequences. *Lancet* 2008;371:243-60.
8. Black RE, Morris SS, Bryce J. Where and why are 10 million children dying every year? *Lancet* 2003;361:2226-34.
9. Rice AL, Sacco L, Hyder A, Black RE. Malnutrition as an underlying cause of childhood deaths associated with infectious diseases in developing countries. *Bull World Health Organ* 2007;78:1207-21.
10. Svedberg P. Undernutrition in Sub-Saharan Africa: A critical assessment of the evidence. World Institute for Development Economic Research, Working paper No 15. Helsinki: UNU/WIDER; 1987.

11. Nemer L, Gelband H, Jha P. The evidence base for intervention to reduce malnutrition in children under-five and school age children in low and medium-income countries. Commission on Macroeconomics and Health, CMH Working Paper Series, No WG5:11. Geneva: WHO; 2001.
12. Legg C, Kormawa P, Mazi-Dixon B, Okechukwu R, Ofodile S, Alabi T. Report on mapping livelihood and nutrition in Nigeria using data from the national rural livelihoods survey and the national food consumption and nutrition survey. International Institute of Tropical Agriculture Ibadan, Nigeria; 2001.
13. Nigerian national demographic and health survey; 2003.
14. Nigerian national demographic and health survey; 2008.
15. World Health Organisation 2005. The Millennium Development Goals. World Health Organisation: Geneva. Available from: <http://www.who.int/hdp> [Last accessed on 2012 Jul 26].
16. Adelakan DA. Childhood nutrition and malnutrition in Nigeria. Editorial, SAJCN 2001;14:83-7.
17. Janevic T, Petrovic O, Bjelic I, Kubera A. Risk factors for childhood malnutrition in Roma settlement in Serbia. BMC Public Health 2010;10:509.
18. Bloss E, Wainaina F, Bailey RC. Prevalence and predictors of under-weight, stunting and wasting among children aged 5 years and under in Western Kenya. J Trop Pediatr 2004;50:260-70.
19. Wang X, Wang Z, Kang C. Feeding practices in 105 counties in rural China. Child Care Health Dev 2005;31:417-23.
20. Lutter CK, Daelmans BM, de Onis M, Kothari MT, Ruel MT, Arimond M, *et al.* Undernutrition, poor feeding practices and low coverage of key nutrition interventions. Pediatrics 2011;128:e1418-27.
21. WHO. World health statistics 2010. Available from: <http://www.who.int/whosis/whostat/2010/en/index.html> [Last accessed on 2012 Jul 26].
22. Tollman SM, Kahn K, Sartorius B, Collinson MA, Clark SJ, Garenne ML. Implications of mortality transition for primary health care in rural South Africa: A population-based surveillance study. Lancet 2008;372:893-901.
23. Antwi S. Malnutrition: Missed opportunities for diagnosis. Ghana Med J 2008;42:101-4.

How to cite this article: Ocheke IE, Thandi P. Malnutrition in acutely ill children at the paediatric emergency unit in a tertiary hospital in Nigeria. Niger Med J 2015;56:113-7.

Source of Support: Nil, **Conflict of Interest:** None declared.

New features on the journal's website

Optimized content for mobile and hand-held devices

HTML pages have been optimized of mobile and other hand-held devices (such as iPad, Kindle, iPod) for faster browsing speed.

Click on [**Mobile Full text**] from Table of Contents page.

This is simple HTML version for faster download on mobiles (if viewed on desktop, it will be automatically redirected to full HTML version)

E-Pub for hand-held devices

EPUB is an open e-book standard recommended by The International Digital Publishing Forum which is designed for reflowable content i.e. the text display can be optimized for a particular display device.

Click on [**EPub**] from Table of Contents page.

There are various e-Pub readers such as for Windows: Digital Editions, OS X: Calibre/Bookworm, iPhone/iPod Touch/iPad: Stanza, and Linux: Calibre/Bookworm.

E-Book for desktop

One can also see the entire issue as printed here in a 'flip book' version on desktops.

Links are available from Current Issue as well as Archives pages.

Click on  View as eBook