



## Nutritional status of children living in motherless babies' homes in Enugu State Southeast Nigeria

### KEYWORDS

NUTRITIONAL STATUS, CHILDREN, MOTHERLESS BABIES, HOMES.

**Dr. Eke Christopher Bismarck**

DEPARTMENT OF PAEDIATRICS, UNIVERSITY OF NIGERIA TEACHING HOSPITAL ITUKU – OZALLA, ENUGU

**Dr. Edelu Benedict Onyeka**

DEPARTMENT OF PAEDIATRICS, UNIVERSITY OF NIGERIA TEACHING HOSPITAL ITUKU – OZALLA, ENUGU

**Dr. Ukoha Oluchi Mildred**

DEPARTMENT OF PAEDIATRICS, UNIVERSITY OF NIGERIA TEACHING HOSPITAL ITUKU – OZALLA, ENUGU

**Dr. Ikefuna Anthony Nnaemeka**

DEPARTMENT OF PAEDIATRICS, UNIVERSITY OF NIGERIA TEACHING HOSPITAL ITUKU – OZALLA, ENUGU

### ABSTRACT

*Background:*

*Nutritional assessment in children especially those living in motherless babies' homes with limited resources may help in identification of those at risk of becoming or already malnourished.*

*This study aims to assess the nutritional status of children living in motherless babies homes.*

*Subjects and methods:*

*A cross-sectional descriptive survey involving ninety children aged 3 months to 16 years living in the motherless babies' homes over a 6 month period was conducted.*

*Data were collected using a semi-structured interviewer administered questionnaire.*

*Relevant clinical examinations including anthropometry (mainly weight and length/ height) of the study population were done according to standard protocols.*

*Nutritional status of the selected children was classified according to WHO classification.*

*Data analysis was done using WHO Anthro /Anthro Plus and SPSS version 19.0*

*Results:*

*More than two-thirds, 61 (67.8%) of the children had normal nutritional status while over-weight and obesity were observed in 15 (16.7%) and 12 (13.3%) of the children respectively. Also, 17 (18.8%), 7 (8.4%), 7 (8.4%) and 1(1.4%) of the children respectively were moderately stunted, severely stunted, under-weight and wasted.*

*Conclusion:*

*Majority of the children have normal nutritional status. However, over nutrition (overweight and obesity) was found to be an emerging nutritional challenge in children living in motherless babies homes.*

*Efforts should be made to create a policy for routine nutritional status assessment of children living in motherless babies homes while their proprietors/caretakers should be educated and encouraged on the need for optimal infant/ and childhood nutrition including adequate physical activity.*

### Background:

The nutritional status of an individual is determined by a complex interaction between internal/constitutional factors and external or environmental factors. The internal or constitutional factors include age, gender, nutrition, behavioural, physical activity and diseases while the external or environmental factors are: food safety (security), cultural, social and economic circumstances. The complex interaction between internal and external/ environmental factors determines the nutritional status of an individual [1].

Malnutrition in children is a global problem, [2] affecting both children living in developing and developed countries in different ways. Majority of childhood mortality worldwide is attributable to malnutrition and efforts to reduce malnutrition should be a policy priority [3]. Good nutrition implies stronger immune systems, less illness, better health and a productive community. Freedom from hunger and malnutrition is a basic human right and their alleviation is a fundamental prerequisite for human and national development [4].

Malnutrition may increase the risk/susceptibility to infection and chronic diseases. Chronic under-nutrition may lead to increased risk of infection and decreases in physical and

mental development. Over nutrition may lead to obesity. Many genetic, physiological and behavioural factors play their role in the etiology of obesity, which has been associated with several medical disorders such as hypertension, type 2 diabetes, hyper-cholesterolaemia and liver diseases among others [5].

Anthropometry which is the rationale use of body measurements to assess nutritional status is a practical and immediately applicable technique for assessing children's development patterns during the first years of life.[6] Anthropometric indices reflect the health and welfare of individuals and communities and can predict academic performances, health outcomes as well as reflect the socio-economic profile of population [7].

However, anthropometric indicators are less accurate than clinical and biochemical techniques when it comes to assessing individual nutritional status.

Resources are limited to conduct community nutritional surveys. In such situations anthropometric indices could be applied as a form of nutritional screening device to identify individuals at risk of malnutrition. Subsequently, a more robust study involving biochemical tools could then follow.

An orphanage however is an institution dedicated to the care and upbringing of children who have lost their parents [8] Orphans are vulnerable in any socio-economic setting as they are deprived of one or both of their primary caregivers. The level of vulnerability they face however increases significantly with level of poverty. Orphans are some of the most under-privileged children in the world. With few exceptions children without parents are deprived of many of the basic rights such as food, shelter, education, and a family environment [9].

UNICEF estimates that as of 2010 there were 153 million orphaned children and adolescents living in the world. While 13% of the World's Children under the age of 18 years live in sub-Saharan Africa, 36% of the World's orphans live in the regions [10].

There have been differences in nutrition related problems involving both macro- and micronutrient deficiencies between children who are living in orphanages compared to their non-orphaned counterparts [11, 12].

A United Nations Children's Fund study has reported that orphans are more likely to be stunted in their growth and less likely to be enrolled in school than children living with both parents. In general, poor nutrition and limited access to health services put orphans at increased risk of starvation, illness and death [13].

Nigeria's economy in recent times because of continued democratization of governance, is now in transition leading to re-appearance of the middle class. And so with increasing urbanization associated with 'Westernization' children are now exposed to long period of television/screen viewing alongside eating of fast foods known to have obesogenic tendencies. There is a new trend in childhood nutrition termed – "double burden of childhood nutrition, with under nutrition co-existing side by side in the same community with their counterparts with overweight and obesity. This "double burden malnutrition" stems from socio-economic inequalities. Children living in orphanages are also not living in isolation in terms of these societal drives that lead to overnutrition despite the fact that they are less privileged.

Hence, the aim of the current study is to assess the nutritional status of children living in motherless babies' homes.

### Subjects and Methods:

This was a cross-sectional descriptive study conducted in eight motherless babies' homes in Enugu State, South East Nigeria between 1st August, 2013 and 31st January, 2014.

Enugu State is one of the Federating thirty-six states of Nigeria in the South East geopolitical region.

Ethical clearance was sought from Health Ethics and Research Committee of UNTH, Enugu. Further permission was obtained from the Enugu State Ministry of Social Development and Gender Affairs, Enugu and the respective proprietors/management boards of the various motherless babies' homes studied.

There are about twenty registered motherless babies' homes in the state with only eight being functional. The institutions studied included: Guardian Angels Motherless Babies' Home Emene; Red Cross Motherless Babies' Home Ogbete, Enugu; Holy Child Motherless Babies' Home, Ogbete, Enugu; Maria Gorreti Motherless Babies' Home,

Aria Road Enugu; Children of Tomorrow Orphanage, Cornerstone Road, Abakpa Nike; CMAC Hospital Orphanage, Enugu; Obinwanne Motherless Babies' Home, Ede-Oballa Nsukka; and National Council of Women Societies Motherless Babies' Home Onu – Iyi, Nsukka.

Four are owned by private/corporate bodies while the other four are faith – based. There are about 103 in-mates in the eight functional homes (Guardian Angels Motherless Babies' Home Emene: 21; Red Cross Motherless Babies' Home Ogbete, Enugu, 17; Holy Child Motherless Babies' Home, Ogbete, Enugu, 20; Maria Gorreti Motherless Babies' Home, Aria Road Enugu, 4; Children of Tomorrow Orphanage, Cornerstone Road, Abakpa Nike, 16; CMAC Hospital Orphanage, Enugu, 1; Obinwanne Motherless Babies' Home, Ede-Oballa Nsukka, 4; and National Council of Women Societies Motherless Babies' Home Onu – Iyi, Nsukka, 7 respectively).

The following children were excluded from the study: children with history suggestive of common childhood chronic illnesses such as sickle cell anaemia and HIV. These chronic illnesses affect physical growth. One child with sickle cell disease (HbSS), eight others aged less than 1 month was excluded. Also a child with evidence of chronic neurologic disease (cerebral palsy) were excluded from the study as a result of deformity in physical growth (disorder of movement and posture seen in such group of children [14]

Two visits respectively were made to each home, the first being for the study's advocacy/sensitization while the second was for the actual data collection.

Data were collected using a semi-structured interviewer administered pre- tested questionnaire by two of the researchers. Information obtained included the following: age of the child (which was confirmed with each child's national birth certificate), gender and class in school.

Other information sought included mode of feeding in the first 6 months of life, provision of television sets in the children's sleeping in rooms and availability of adequate play ground/facilities.

Relevant clinical examinations including hair changes, loss of subcutaneous tissues, skin changes and evidence of peripheral oedema were done.

Also, the following anthropometric indices were assessed following standard protocols: Body weight was recorded in kilogram (kg) using a bathroom scale for children > 1 year who could stand while basinet was used to obtain the weights of the infants. Each child was weighed with minimal clothing and without shoes to the nearest 100 grammes. The weighing scale was re-standardized at the beginning of each day's study with a known weight while the scale is re-adjusted to zero after each singular weighing.

Height was measured in children two years of age and older using a stadiometer while recumbent length was obtained for those below two years of age using an infantometer, and results read – off to the nearest 0.1 cm. All measurements were carried out by one of the researchers.

All information for every subject was obtained from the respective proprietor/caretaker of each of the homes and in addition to older children when applicable.

Standard statistical method was used in the analysis of the data with the use of statistical package for social sciences version 19.0. Based on the age, body weight and height, a number of indices such as height – for – age, weight – for- age and weight – for – height have been suggested [14]. The children were classified using three categories: underweight (low weight – for - age), stunting (low height – for- age), wasting (low weight – for- height), overweight or obesity.

Measures of malnutrition were calculated using reference medians recommended by the World Health Organization (WHO) and classified according to standard deviation units (Z- scores), based on the WHO criteria.

Wasting (weight for height Z- score) indicates thinness. A weight – for – height (WFH) of < -2 determines the presence of acute malnutrition (wasting).

Stunting, represented by low height for age – Z score (HFA). A HFA of <-2 defines chronic malnutrition (stunting). Weight for age Z- score is a composite of WFH and HFA, thus a measure of both acute and chronic malnutrition. A weight for age Z- score of <- 2 is used for defining a child as underweight. A Z –score of < -3defines severe levels of each of the indices.

BMI for age Z-Score  $>+1 \leq +2$ : Overweight; BMI for age Z-Score  $>+2$ : obesity.

The WHO Anthro and Anthro-Plus software were used for analyzing the nutritional status of the children [15, 16].

### Results :

A total of 90 children living in motherless babies/ homes across Enugu State were studied over a 6 month period (1st July to 31st December, 2013).

The subjects were aged 3 months to 16 years. (Mean age  $3.23 \pm 3.655$ ). Males were slightly more 48(53.3%) than females 42(46.7%) with a male to female ratio of 1:1.14.

Majority of the subjects were under five children (6-59 months of age), accounting for about 73(81.1%) of the subjects.

Similarly, majority of the subjects were under-aged for schooling 49(54.4%) while 5(5.6%) meant to be in nursery were yet to be enrolled. The demographic characteristics of the study subjects are as shown in Table I.

The minimum weight of the subjects was 6.0 kg while the maximum was 57.0 kg with a mean of 14.863kg ( $SD \pm 10.7698$ ).

Similarly the minimum height was 56.5cm while the maximum height was 173.0cm with a mean height of 89.406cm ( $\pm SD 27.004$ ).

More than two-thirds of the subjects, 61(67.8%) were found to have normal nutritional status using the World Health Organization (WHO) Z – score criteria. See Table 2. This was followed by stunting 23(25.6%).

Similarly, some of the subjects showed evidence of over-nutrition. Fifteen (16.7%) were overweight while 12(13.3%) were obese. See table 2.

Also seven (8.4%) of the children were severely stunted

while 17 (18.8%) were moderately stunted as shown in Table 3.

Evidence of under-nutrition was observed as 1(1.4%) of the study population were wasted while 7(8.4%) were underweight. Nutritional status of the subjects according to WHO criteria is as shown in Table 3.

### Discussion

In this study the majority of the subjects 63(70.0%) had normal nutritional status. Similar findings have been reported by other workers [8,11,18, 19].

They found that there were no clear relationship between orphan-hood and the nutritional status of children. This is however at variance with the findings by Shukla and colleague [9] in India where less than half of the subjects living in the orphanage were not malnourished.

However, a quarter of the subjects in the current study were found to be stunted using the WHO growth criteria.

The stunting prevalence observed is grossly lower than the Nigerian national stunting prevalence of 35.8%.[10] The small sample size of the study population may partly be responsible for the low prevalence of stunting reported in the index study. Guthrie [20] had pointed out that short stature is primarily due to chronic deficiency of energy, protein and micronutrients (iodine, zinc, calcium and vitamin D).

Also, it has been reported that children living in orphanages are more likely to be stunted [11, 13, 19, 21] as their diet may not be diversified [22]. This may primarily be due to the fact that most of the orphanages studied were either charity organizations/faith based where food security may not be ensured due to poor and inadequate financing.

Also, poor nutrition and limited access to health services may put orphans at increased risk of starvation, illness and death.

It could be inferred that owing to limited resources in most orphanages provision of diversified diet may be a luxury with some months of the year especially the festive seasons when they will have surplus food from donations and other periods of food insecurity in between. Stunting adversely affects physical, mental and economic outcome of children.

Other risk factors for stunting that have been identified include low maternal education and low socio-economic class [23]. In the current study all the proprietors of the institutions studied had post secondary education qualifications while majority of their employees had minimum of secondary education. This could have contributed to the high percentage of the children with normal nutritional status.

Wasting and underweight were observed in 2.2% and 8.9% of the study population respectively. Though the rates of wasting and underweight as reported in the index study are still lower than the National prevalence rates of 10.2% and 24.2% respectively. [10]

It is known that children in fostered care are more likely to be underweight and wasted compared to the national prevalence owing to the poor financing of the institutions

and subsequent food insecurity. Similar findings have been reported in Sri Lanka and Zimbabwe [24, 25].

Also, some of the children in the current study could have been product of teenage pregnancy where the mothers may suffer from maternal malnutrition in pregnancy. It is common knowledge that most of the teenage girls when pregnant may flee from their homes due to fear and secretly find themselves in institutions where they stay till delivery. In such places there might be food insecurity with attendant consumption of non-diversified diet; the end product being delivery of low birth weight babies [26, 27].

Measures of over-nutrition including overweight and obesity were observed in the current study. This is contrary to the commonly reported nutritional findings in children living in orphanages including stunting, underweight and wasting by several researchers [11, 18, 19, 21, 23, 24, 25, 26, 27]. However, some workers have reported overweight in their series [19].

According to UNICEF estimates about 3% of Nigeria children are overweight [10] while some school-based nutritional survey in school children have revealed rising obesity and overweight prevalence [29, 30]. Higher BMI in children have been associated with higher number of TV at home, watching TV for more than 3 hours per day of weekend, at nights, and excessive consumption of caloric dense fast foods, including energy drinks known to have Obesogenic tendencies [31, 32]. It has been hypothesized that watching TV causes obesity through: displacement of physical activity, increased caloric consumption while watching TV as a result of advertising and reduced resting metabolism [33].

Some of the orphanages studied had more than one TV screen in the sleeping in rooms for their inmates.

Our country is currently undergoing economic transition. The resulting increased urbanization goes with Westernization including mechanization of domestic activities, sedentary life (physical inactivity) and availability of fast food outlets in various nooks and crannies.

People visiting children living in orphanages commonly donate these obesogenic foods. The result is that these children eat these foods without moderation.

Also majority of the centres do not have adequate facilities for recreational activities with resultant reduced physical activity in the children which might explain the possibility of overweight and obesity observed in some of the subjects [34, 35] as children living in orphanages do not totally live in isolation from the rest of the society.

#### Conclusions:

Majority of the children living in the motherless babies homes have normal nutritional status. Chronic under-nutrition (stunting, wasting, and underweight) was also observed while over-nutrition (over-weight and obesity) was observed as an emerging nutritional challenge among them.

It is recommended that periodic assessment of nutritional status of children living in motherless babies homes be carried out and efforts made to educate their proprietors/caregivers on optimal infant and childhood nutrition including physical activity.

#### Limitations:

We could not directly assess the relationship between the risk factors for obesity including TV viewing and physical inactivity on body mass Index of the subjects.

#### List of Abbreviations:

WHO: World Health Organization  
WFH: Weight for Height  
WFA: Weight for Age  
HFA: Height for Age  
TV: Television  
UNICEF: United Nation Children's Fund  
BMI: Body Mass Index

COMPETING INTERESTS: the authors hereby declare that we do not have any competing interests.

#### Authors' Contributions:

ECB: Conceived of the work, participated in the collection of data as well as analysis and was in-charge of the manuscript write-up.

EBO: Participated in the collection of the data and its analysis.

UOM: Participated in the collection of the data and its analysis.

IAN: Co-conceived of the work and revised the manuscript critically for important intellectual content.

All authors read and approved the final draft.

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**TABLE I: Demographic Characteristics of Study Subjects**

	Variables	Frequency (n=90)	Percent (%) (100%)
a.	Gender:		
	Male	48	53.3
	Female	42	46.7
b.	Age (years):		
	0-<5	73	81.1
	5-12	10	11.1
	≥13-16	7	7.8
c.	Educational status:		
	Under-aged for school	49	54.4
	Pre-nursery school	15	16.7
	Nursery school	7	7.8
	Primary school	11	12.2
	Secondary school	3	3.3
	Not in school	5	5.6

**Table 2: Body Mass Index for Age (BMIFA) (WHO Classification, 2007)**

Z Score	Description	0 - <5 Freq(%age) (n=73)	5 - 10 Freq(%age) (n=10)	11 - 16 Freq(%age) (n=7)	0 - 16 Freq(%age) (n=90)
< - 3	(severe Thinness)	1 (1.4)	0(0.0)	0(0.0)	1 (1.1)

< -2 to -3	(Thinness)	0(0.0)	1 (10.0)	0(0.0)	1 (1.1)
+1 to 2	(Normal)	46 (63.0)	9 (90.0)	6 (85.7)	61 (67.8)
>+1 to +2	(Over- weight)	14 (19.2)	0(0.0)	1 (14.3)	15 (16.7)
>+2	(Obese)	12 (16.4)	0(0.0)	0(0.0)	12 (13.3)

Freq – Frequency, %age – percentage  
BMIFA – Level of body fat

**Table 3: Nutritional Status of the children according to WHO classification**

Z – Score	WFH		WFA		HFA	
	Fre- quency n =73	(%age) (100%)	Fre- quency n = 83	(%age) (100%)	Fre- quency n = 90	(%age) (100%)
< - 3	1	(1.4)	3	(3.6)	7	(7.8)
< - 2 to	1	(1.4)	7	(8.4)	17	(18.9)
+2 to -2	60	(82.2)	71	(85.6)	66	(73.3)
+3 to +2	7	(9.6)	2	(2.4)	0	-
> +3	4	(5.5)	0	-	0	-

WFH: Weight for Height, WFA: Weight for Age, HFA: Height for Age,  
WFH (Acute Malnutrition) – Wasting  
HFA (Chronic Malnutrition) – Stunting  
WFA (Underweight) – Any Protein Energy Malnutrition

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