

## Prevalence of malnutrition among under-fives in Okrika Town, Nigeria

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**Abstract:** Malnutrition is a public health problem in developing countries and an underlying factor in one-third of the 6.6 million global under-five deaths recorded in 2012. Malnutrition is still prevalent in Nigeria as, 35.8% and 10% of Nigerian under-fives were stunted and wasted respectively in 2011. The study was undertaken to determine the prevalence of malnutrition among under-fives in Okrika Town in South-South region of Nigeria. It was a cross sectional descriptive study that obtained data on socio-demographics and nutritional history from the caregivers of 410 children selected by multistage random sampling. Their measured weights and heights were used to calculate their WAZ, HAZ and WHZ anthropometric indices. Children with WAZ, HAZ and WHZ < -2SD were classified as underweight, stunted and wasted respectively and overweight if WHZ was > +2SD. The 410 children were aged 0-59 months. Forty three (10.5%) were underweight, 56 (13.6%) stunted, 36 (8.8%) wasted and 6 (1.5%) overweight. There were no statistically significant differences in the prevalence of underweight, stunting and wasting among males and female under-fives, ( $p > 0.05$ ).

**Conclusion:** Stunting was the most prevalent and overweight least prevalent forms of malnutrition among under-fives in Okrika Town.

**Keywords:** Malnutrition, stunting, under-fives, underweight, wasting.

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### I. Introduction

The nutritional status of children is a reflection of their overall health and children are expected to grow maximally and be well developed if they are well cared for, fed appropriately and protected from recurrent childhood illnesses.<sup>1,2</sup> Therefore, the nutritional status of a child may be normal or abnormal.<sup>3</sup> Abnormal nutritional status, also referred to as malnutrition ranges from undernutrition on one hand to overnutrition on the other hand. Undernutrition is the deficiency of one or more essential nutrients especially protein and calories or impaired metabolism of these nutrients while overnutrition is an excess of one or more nutrients, usually of protein and energy.<sup>3,4</sup> Undernutrition of protein and energy manifests as underweight, wasting and stunting while overnutrition manifests as overweight and obesity.<sup>5</sup>

Malnutrition is a major contributor to childhood morbidity and mortality. It was a direct or underlying cause of death of 6.6 million under-fives globally in 2012.<sup>6,7</sup> It has been reported that malnutrition is more prevalent in Asia and sub-Saharan Africa, as 90% of the world's stunted under-fives live in these regions.<sup>8</sup> The prevalence of stunting, underweight and wasting among under-fives in Nigeria as at 2011 stood at 35.8%, 24.2% and 10.2%.<sup>2</sup>

The causes of malnutrition among under-fives are often multi-factorial and in most cases interwoven. These include household food security, food intake and metabolism, maternal and child care practices, childhood diseases, safe and healthy environment, socio-economic factors, political wars and conflicts among others. These factors determine to a large extent the prevalence of malnutrition in a locality.<sup>1,8</sup>

Okrika Town a sub urban community in Rivers State, Nigeria, was one of the communities engulfed by the Niger Delta armed militia crisis between 2004 and 2008. This resulted to illegal activities such as destruction of oil pipelines, oil bunkering activities and gang violence. These activities in turn led to increased oil spills, destruction of the ecosystem, clashes between rival groups, destruction of lives and properties and internal displacement of people in affected communities.<sup>9</sup> In addition, the crisis had devastating effects on the socioeconomic activities in affected towns and there was a drastic reduction in oil exploration in the region.<sup>10</sup> Studies have shown that this kind of situation impacts negatively on the nutritional status of the vulnerable, especially the under-fives.<sup>11,12</sup> The study was therefore undertaken to determine the prevalence of malnutrition in Okrika Town.

## II. Materials and methods

A cross sectional descriptive study was carried out in Okrika Town, the headquarters of Okrika Local Government Area, Rivers State, Nigeria. Ethical approval for the study was obtained from the Ethics Committee of the University of Port Harcourt Teaching Hospital and permission obtained from the Okrika Local Government Authority. Multistage random sampling was used to select 410 underfives from 410 households from the communities in the town. Informed consent was obtained from the caregivers of recruited children. Data on socio-demographic characteristics and nutritional history were collected through an interviewer administered questionnaire. The children were weighed, their supine lengths (for children less than 2yrs) or heights (for those aged 2yrs and above) measured and their anthropometric indices; weight-for-age (WAZ), height-for-age (HAZ) and weight-for-height (WHZ) calculated using WHO Anthro 3.2 calculator. Children who had WAZ, HAZ and WHZ Z scores below -2SD were classified as underweight, stunted and wasted respectively. Those with WAZ, HAZ and WHZ Z scores below -3SD were classified as severely underweight, stunted and wasted respectively. Children with WHZ Z score above +2SD were classified as overweight malnutrition. The test of statistical significance was set at p value <0.05 at 95% confidence interval.

## III. Results

Four hundred and ten children in Okrika Town participated in the study, comprised of 217 (52.9%) males and 193 (47.1%) females, giving a male: female ratio of 1.1:1. They were aged 0-59 months with mean age of  $26.61 \pm 15.95$  months, 96 (23.4%) were aged 12-23 months and 37 (9%) aged 0-6 months (Table 1).

The mean WAZ, HAZ and WHZ scores for the study population were  $-0.61 \pm 1.19$ ,  $-0.58 \pm 1.37$  and  $-0.39 \pm 1.16$  SD respectively. Table II shows the nutritional status of the children with 27 (7.1%) underweight, 14 (3.4%) severely stunted, 6 (1.5%) severely wasted and 6 (1.5%) overweight. Fig.1 shows the global prevalence of underweight, stunting, wasting and overweight malnutrition among under-five children in Okrika. Underweight malnutrition was most prevalent (16.2%) among children aged 36-47 months and stunting most among those aged 48-59 months. Among children aged < 6 months 10.8% were overweight and 3.8% of children aged 6-11 months were overweight. There were no statistically significant differences in the prevalence of malnutrition in the different age groups, (Fig 2). The prevalence of underweight malnutrition was higher among females than males but the difference was not statistically significant, (Table III). There were no statistically significant differences in prevalence of underweight, wasting and stunting among children from households with less than 6 persons and those living in households with 6 or more persons.

Among the 408 (99.5%) children who were breastfed, 254 (62.3%) children had breastfeeding commenced within one hour of delivery, 65 (15.9%) children had prelacteal feeds and 173 (46.3%) of the 373 children aged 6-59 months were exclusively breastfed for six months. Two hundred and ninety three (71.8%) children had stopped breastfeeding. The duration of breastfeeding was 0.5 to 36 (mean  $13.9 \pm 4.06$ ) months. Three hundred and eighty one (92.9%) children had commenced complementary feeding from age 1 - 18 (mean  $5.9 \pm 2.3$ ) months with 233 (61.2%) starting at age 6 - 8 months, 122 (32%) at age <6 months and 26 (6.8%) at age > 8 months. Children who were exclusively breastfed for 6 months had lower prevalence rates of wasting (8.6%), stunting (13.3%) and underweight malnutrition (9.8%) compared to those who were not, (Fig 3). The observed differences were however not statistically significant, ( $p > 0.05$ ), (Fig 3). The prevalence of underweight malnutrition was higher among children who commenced complementary feeds before 6 months (10.7%) compared to those who commenced after 8 months (3.8%). The difference was however not statistically significant. Of the 370 children aged 6-59 months who received semi-solid/solid foods, 150 (40.5%) received the recommended minimum frequency of feeds per day. The prevalence rates of underweight (6.7%), stunting (10%) and wasting (6.7%), were lower in children who received the recommended minimum frequency of semi-solid/solid foods, but the observed differences were not statistically significant, ( $p > 0.05$ ), (Table III).

**Table I: Age and sex distribution of the study population.**

| Age Group (months) | Female No          | Male No            | Total No (%)     |
|--------------------|--------------------|--------------------|------------------|
| 0-5                | 20                 | 17                 | 37(9.0)          |
| 6-11               | 30                 | 23                 | 53(12.9)         |
| 12-23              | 41                 | 55                 | 96(23.4)         |
| 24-35              | 47                 | 46                 | 93(22.7)         |
| 36-47              | 31                 | 43                 | 74(18.0)         |
| 48-59              | 24                 | 33                 | 57(13.9)         |
| <b>Total</b>       | <b>193 (47.1%)</b> | <b>217 (52.9%)</b> | <b>410 (100)</b> |

**Table II: Nutritional status of the study population using anthropometric indices**

| Anthropometric indices | Severely malnourished (< -3SD) | Moderately Malnourished (-3SD - <2SD) | Normal (-2SD - < 2SD) | Overnutrition (> 2SD) | Total (%) |
|------------------------|--------------------------------|---------------------------------------|-----------------------|-----------------------|-----------|
| WAZ                    | 14 (3.4)                       | 29 (7.1)                              | 367 (89.5)            | -                     | 410 (100) |
| HAZ                    | 14 (3.4)                       | 42 (10.2)                             | 354 (86.4)            | -                     | 410 (100) |
| WHZ                    | 6 (1.5)                        | 30 (7.3)                              | 368 (89.8)            | 6 (1.5)               | 410 (100) |

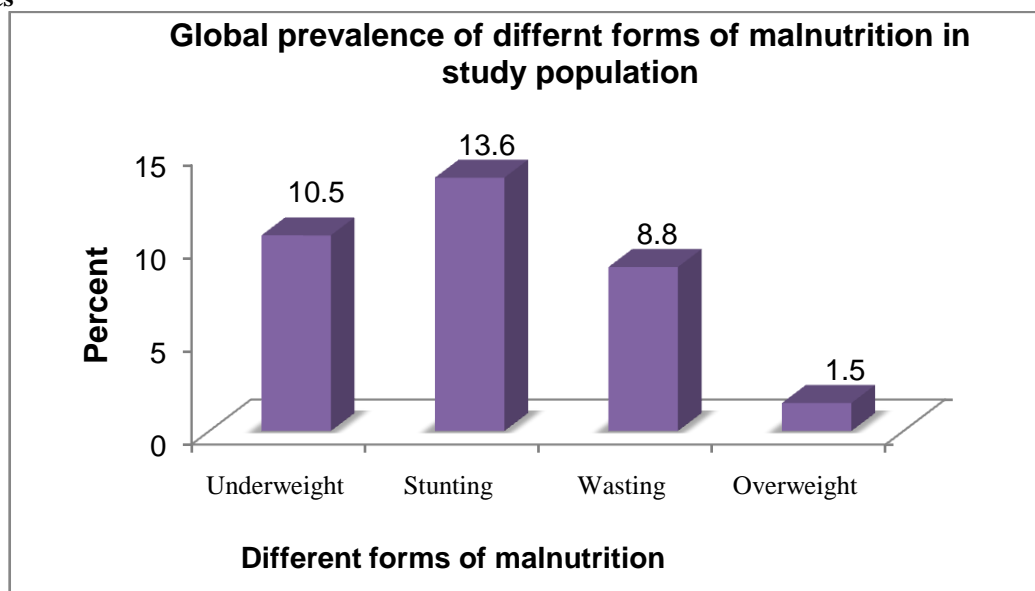
| Gender         | Underweight      |                   | Stunting         |                   | Wasting         |                   |
|----------------|------------------|-------------------|------------------|-------------------|-----------------|-------------------|
|                | Yes N (%)        | No N (%)          | Yes N (%)        | No N (%)          | Yes N (%)       | No N (%)          |
| Female (N=193) | 23 (11.9)        | 170 (88.1)        | 27 (14.0)        | 166 (86.0)        | 16 (8.3)        | 177 (91.7)        |
| Male (N=217)   | 20 (9.2)         | 197 (90.8)        | 29 (13.4)        | 188 (86.6)        | 20 (9.2)        | 197 (90.8)        |
| <b>Total</b>   | <b>43 (10.5)</b> | <b>367 (89.5)</b> | <b>56 (13.6)</b> | <b>354 (86.4)</b> | <b>36 (8.8)</b> | <b>374 (91.2)</b> |
| $\chi^2$       | 0.794            |                   | 0.034            |                   | 0.109           |                   |
| p value        | 0.373            |                   | 0.854            |                   | 0.741           |                   |

**Table III: Gender and nutritional status**

**Table IV: Recommended minimum frequency of feeding with semi-solid/solid foods per day and nutritional status of under-fives.**

| Minimum frequency of feeds per day | N          | Underweight      |                   | Stunting         |                   | Wasting         |                   |
|------------------------------------|------------|------------------|-------------------|------------------|-------------------|-----------------|-------------------|
|                                    |            | Yes N (%)        | No N (%)          | Yes N (%)        | No N (%)          | Yes N (%)       | No N (%)          |
| Appropriate                        | 150        | 10 (6.7)         | 140 (93.3)        | 15 (10.0)        | 135 (90.0)        | 10 (6.7)        | 140 (93.3)        |
| Inappropriate                      | 220        | 27 (12.3)        | 190 (87.7)        | 34 (15.4)        | 186 (84.6)        | 20 (9.1)        | 200 (90.9)        |
| <b>Total</b>                       | <b>370</b> | <b>37 (10.0)</b> | <b>333 (90.0)</b> | <b>49 (13.2)</b> | <b>321 (86.8)</b> | <b>30 (8.1)</b> | <b>340 (91.9)</b> |
| $\chi^2$                           |            | 3.114            |                   | 1.859            |                   | 0.704           |                   |
| P value                            |            | 0.077            |                   | 0.172            |                   | 0.444           |                   |

**Figures**



**Figure 1: Global prevalence of different forms of malnutrition among the study population.**

Prevalence of Different forms of malnutrition among the age groups

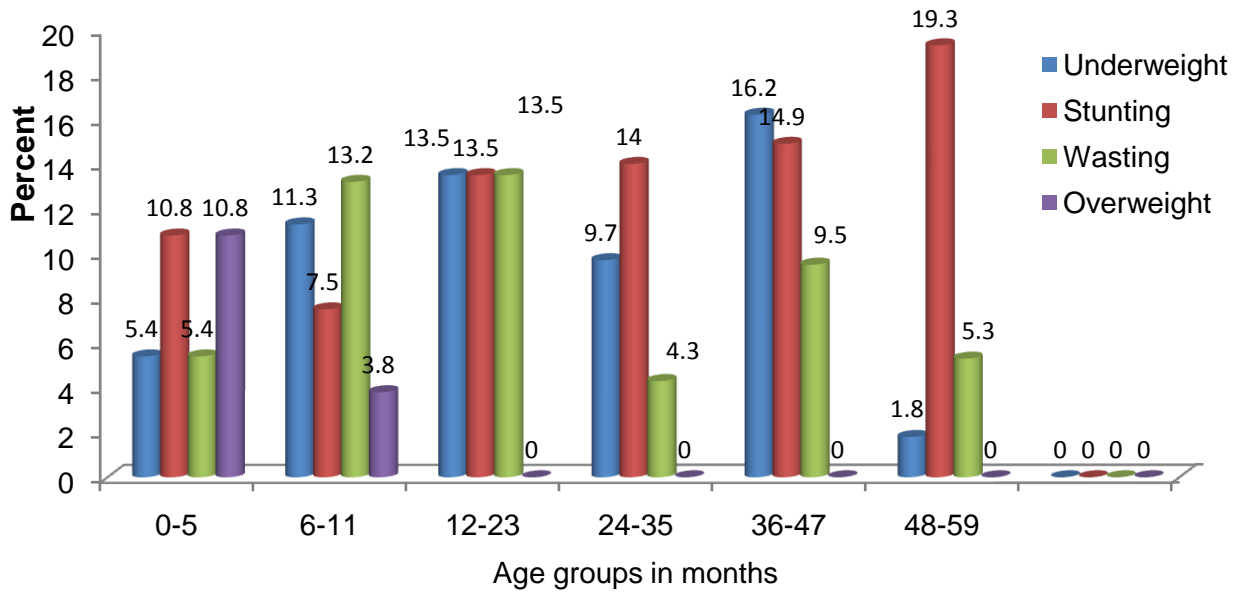


Figure 2: The prevalence of various forms of malnutrition among the age groups.

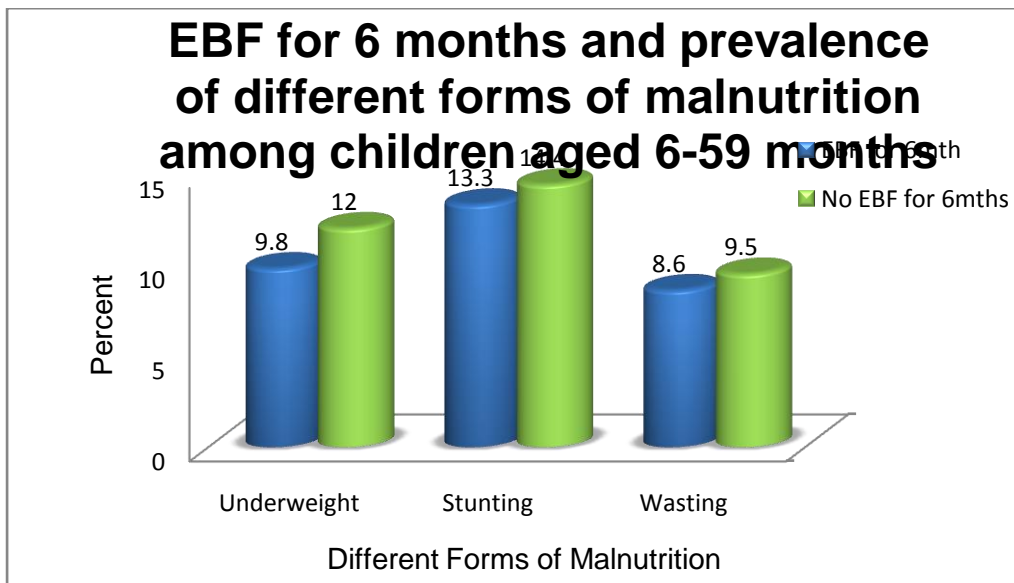


Figure3: Exclusive breastfeeding for 6 months and prevalence of different forms of malnutrition among children aged 6-59 months

#### IV. Discussion

The 10.3% prevalence of underweight malnutrition found in this study was comparable to the 8.5% reported in Akure South Local Government Area in Ondo State, Nigeria, a study carried out in an urban community<sup>13</sup> It was however lower when compared to studies carried out in rural communities in Nigeria such as 15.5% reported by Sebanjo et al in Ifewara, in Osun State,<sup>14</sup> and 29% in Babban Dodo, Zaria.<sup>15</sup> Similarly, the prevalence of wasting in this study is comparable to those reported in semi urban settlements in Aguata, Anambra State, Nigeria (7.7%)<sup>16</sup> and 6.9% in the Akwapim North District in the Eastern region of Ghana.<sup>17</sup> It was however lower than the 17% reported by Ojiako and Ikpi in rural communities in Kano and Kaduna States in Nigeria.<sup>18</sup> The 13.6% prevalence of stunting in this study was comparable to the findings from studies carried out in similar urban communities in Akure Local Government Area, Nigeria<sup>13</sup> and a semi urban community in Akuapim, Ghana.<sup>17</sup> It was however lower than the prevalence rates of 26.7 – 69% reported in nutritional surveys of under-fives carried out in a rural communities in Ifewara, Osun State,<sup>14</sup> Kano and Kaduna States<sup>18</sup> and Daura and Zango Local Government Areas in Katsina State, Nigeria.<sup>19</sup> The lower prevalence of malnutrition found in this study being a semi urban community, in comparison to rural communities was not surprising, as malnutrition is reportedly hi

gher in rural communities.<sup>20,21</sup> This could be as a result of the more prevalent levels of poverty, food insecurity, lower educational status of the caregivers in the rural communities. In addition, ignorance on the part of the caregivers in the rural communities on appropriate feeding practices that promote optimal growth and development of the under fives could be contributory. Similar to reports from other studies,<sup>15,22</sup> this study also found stunting to be more prevalent in female than male under-fives. In contrast, the Demographic and Health Surveys in Nigeria<sup>23</sup> and Ghana<sup>24</sup> reported that males were more stunted and wasted than females. The higher prevalence of underweight malnutrition in females in this study was comparable to that reported by Ndiku<sup>25</sup> in Kenya but contrast with the findings of Zere<sup>26</sup> in South Africa who found no difference in the prevalence of underweight malnutrition among male and female under-fives. Although the reasons for the gender differences in the nutritional status of under-fives in this study was not certain, the study in Kenya<sup>25</sup> reported that females consistently had lower food and calorie intake than males, which could explain their poorer nutritional status.

The low prevalence of wasting and underweight malnutrition in the first six months of life and thereafter increasing in the 6-11 month age group compared favourably with other reports in Africa<sup>2,11,15</sup> and Asia.<sup>27,28</sup> This could be as a result of the protective effect of breastfeeding in the first six months of life and the lower calorie intake after six months as the children had to adjust from breast milk to complementary foods.<sup>11,29,30</sup> Following a decline at 6-11 months, the rising prevalence of stunting from 12-23 months and peaking at 48-59 months in the present study was similar to that reported by Abwola et al<sup>11</sup> in Uganda, Ruwali<sup>28</sup> in Nepal and Nguhen<sup>27</sup> in Vietnam. Studies have attributed this to the cessation of breastfeeding and the sole reliance of children in this age group on family diet which may be consumed in portions that are inadequate to promote optimal growth and development.<sup>11,30</sup> The prevalence of overweight malnutrition in this study was low and compares favourably with those from other developing countries.<sup>27</sup>

Studies in Nigeria,<sup>2,29,31</sup> other parts of Africa<sup>32,33</sup> and Asia<sup>27</sup> have also reported that a high proportion (95-99.8%) of under-fives were breastfed as found in this study. However the 46.3% prevalence rate of exclusive breastfeeding for six months found in this study is lower than the 80% reported by Ajao et al in Ile Ife<sup>29</sup> and 64% reported by Amsalu et al in Ethiopia<sup>33</sup> but higher than 31.2% in Ifewara,<sup>14</sup> 23.5% in India<sup>34</sup> and 17.1% reported in Vietnam.<sup>27</sup> This is probably because of sociocultural differences and attitude of caregivers to exclusive breastfeeding. In comparison to findings in other studies in Nigeria,<sup>14,29</sup> and India,<sup>34</sup> this study also found no statistically significant relationship between exclusive breastfeeding for six months and the prevalence of wasting, stunting and underweight malnutrition, probably because a large proportion of children in the first six months were still receiving breast milk in their diet.

The frequency and appropriateness of complementary foods given to under-fives is a contributing factor to their growth and development.<sup>3,23</sup> Teshome et al<sup>30</sup> in Ethiopia reported that age at commencement of complementary foods did not statistically significantly affect the nutritional status of under-fives as reported in this study. Teshome et al<sup>30</sup> also reported that although not statistically significant, children who did not receive the recommended minimum frequency of meals per day were more likely to be malnourished, in agreement with the result of the present study. Ruwali et al<sup>28</sup> however reported a statistically significantly elevated risk of stunting and underweight malnutrition among children who did not receive the minimum frequency of feeds. These findings underscore the need to counsel caregivers on appropriate methods of feeding their children in order for them to grow optimally.

## V. Conclusion

Malnutrition was prevalent among under-fives in Okrika Town and undernutrition was more prevalent than overnutrition with stunting as the most prevalent form of malnutrition. Caregivers should be encouraged to exclusively breastfeed their children in the first six months of life and give adequate complementary foods that will promote the growth and development of their children.

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**Conflict of interest:** The authors declare that there was no conflict of interest.

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