Maternal and household Predictors of Malnutrition among Under-five Children in Internally Displaced Person Camps of Adamawa and Yobe States, Nigeria

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Abstract Malnutrition is a significant cause of morbidity and mortality among under-five children, especially in low- and middle-income countries (LMICs). This study aimed to assess the predictors of malnutrition among children less than five years in IDP camps of Adamawa and Yobe states, Nigeria. It was a cross-sectional study conducted from September 2018 to January 2019. A sample of 807 children aged 6 to 59 months was selected using the probability proportionate to size sampling (PPSS) technique. A structured questionnaire was administered to collect information on the children and their caregivers. The overall prevalence of stunting, wasting, and underweight were 17.1%, 40.9%, and 29.7%, respectively. The predictors of stunting were the mother's level of education and family planning usage. For wasting, identified predictors include the mother's level of education, family planning usage, family planning interest, mother's visit to the antenatal clinic, and the number of mother's visits to the antenatal clinic. In contrast, the predictors of underweight consisted of mother's level of education, family planning usage, family planning interest, mother's visit to antenatal clinic, and household income. In conclusion, it is evident from these findings that malnutrition, especially the acute form (wasting), is not only disproportionately high among under-five children but is a public health emergency that calls for urgent attention from concerned authorities. Collaborative efforts among sectors like health, agriculture, education, environment and finance; are very critical.

Keywords: socio-demographic, malnutrition, under-five children, IDP camps, Nigeria

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1. Introduction

Malnutrition is one of the significant health challenges faced by under-five children [1]. It was the critical factor contributing to disease burden among under-five children in 2018, with about 149 million children remaining stunted, 49 million wasted and about 40 million overweight internationally [2].

Malnutrition has been described as disproportions, extremes, or deficiencies in the energy intake of nutrients by an individual [3]. It affects all categories of people, but its impact is more severe among under-five children [4]. The most significant period of a child's dietary requirements is the first 1,000 days of life that starts from the gestational period to the child's second birthday[5]. At this age, the child is more susceptible to infections. It, therefore, has an increased need for nutrients to support rapid growth and development [5,6]. Inadequate access to food, repeated outbreaks of diseases, poor environmental hygiene, and poor socio-economic status have contributed immensely to malnutrition among the under-five children in IDP camps [7].

Studies have shown that women and children are more vulnerable to malnutrition [8,9]. For example, when a woman is not well fed during pregnancy, she is more likely to give birth to low birth weight. Stunted or wasted child due to inadequate nutrients intake, thus giving rise to insufficient breast milk and eventually exposing the child to low immunity with a high risk of opportunistic infectious diseases like diarrhea, measles, acute respiratory infections and malaria, which ultimately leads to malnutrition [10]. Sub-Sahara African children were 15 times more likely to die before celebrating their fifth birthday than those from civilized regions [11]. The prevalence of child mortality in 2012 among under-five children in low-income nations was 82 deaths/1000 live birth which was 13 times higher than the regular rate in higher-income countries [11]. Studies have highlighted that mother's education is associated with the child's nutritional status [12]. The assertion could be possibly due to how the mother takes care of the child regarding both feeding and hygiene practices [13].
Internationally, about 159 million children were stunted because of insufficient dietary intake during childhood; over 49 million children below five years old were wasted, and nearly 17 million were severely wasted in 2018 [2]. The malnutrition trends indicated an increase in stunting, wasting and overweight from 4.9% in 2000 to 7.3% in 2018 [9]. Presently, over 40 million children are overweight internationally, with an increase of 10 million since the year 2000 [10]. In Africa, the prevalence of malnutrition among under-five children was 59 million [14], and in Nigeria, it was estimated at 1.7 million as of 2015 [15].

The prevalence of child malnutrition differs considerably across the six geopolitical zones in Nigeria [16]. Children living in the northwest and the northeast of Nigeria are particularly disadvantaged with stunting rates of 55% and 42%, respectively, as against 29% in North Central, 18% in the South-South, 22% in South West, and 16% in the South-East [16].

Some of the few studies conducted on nutritional status and its determinants among under-five children in IDPs camps in other parts of the globe include Ghana, Somalia, Ukraine, Iraq, and Pakistan. The researchers, however, did not look at predictors of malnutrition among under-five children in the IDP camps.

Similarly, studies conducted in Nigeria have focused chiefly on food consumption patterns and nutritional status among under-five children within rural and urban areas and didn't evaluate the predictors of malnutrition among under-five children in IDP camps. Furthermore, no such study was done in the north-eastern part of the country and the study area. Hence, this work was designed to determine the predictors of malnutrition among under-five children in the IDP camps of Adamawa and Yobe States, Nigeria.

2. Materials and Methods

2.1. Study Design, Participants, Period and Study Area

This study design was a cross-sectional study conducted among 807 children 6-59 months old living in the IDP camps of Malkohi, Fufore camp in Adamawa state and Yobe Broadcasting Corporation IDP camp (Damaturu) Yobe state, Nigeria.

2.2. Study Population and Sampling Technique

The 807 pairs (of the children and their caregivers) were selected from a population of 1,049 IDP pairs using the probability proportionate to size sampling (PPSS) technique to assess predictors of malnutrition among them.

2.3. Questionnaire Design

The instrument used for this study was a pretested questionnaire. Though it comprised six sections (A-F), only Sections A, B and F were considered relevant for this article. Section A consisted of socio-demographic characteristics of the caregivers, which included mother's age, mother's occupation before coming to IDP camp, mother's level of education, and monthly household income before coming to IDP camp. Others include the total number of persons in the family, source of family income, and maternal medical condition. Section B covers parental factors, including the mother's visit to the antenatal clinic, the number of times she visited the antenatal clinic, family planning usage, and interest in family planning. Other items were made up of mother's weight, mother's height, and Body Mass Index, while section F captured Anthropometric measurements of the children and their caregivers. The self-structured questionnaire was used to collect data from the caregivers on themselves and on behalf of their children. The eligible and consented caregivers were invited to the camp clinic for the anthropometric measurements.

2.4. Anthropometric Measurements

The anthropometric measurement carried out on the children include weight and height. The size is to taken to assess stunting, wasting, and underweight, whereas the weight and height of the caregivers taken are to determine their BMI. SECA weighing scale is employed to measure the caregiver's body weight by adjusting it to the nearest 0.1kg. Resetting of the weight scale was done at 0.1kg before the following weighting. Stadiometer was used to measure the height of the children who were over two years. Weights were measured without shoes and with very light clothing. The stadiometer was adjusted to starts from 71 cm to 190 cm. For children less than two years old who cannot stand, Infantometer was used. The measurements ranged from 0-100cm (39 inches) and were calibrated per 1mm units. To measure the height of a child who is less than two years old, usually, two people are involved; one holds the legs while the other holds the head to avoid movement and to have the legs touch the end of the mat for an accurate result.

2.5. Indicators of Nutritional Status and Classification of Participants

The nutritional status of the under-five children was classified based on WHO Child Growth Standards and the identification of severe acute malnutrition in infants and children [17]. Weight-for-age categories were based on the number of standard deviations (SD) from median value of the National Center for Health Statistics / WHO international reference population, (<-3SD, -3SD to <-2SD, <2SD to <1SD, and >1SD). In this study, mild and normal malnutrition was considered as (-2SD to <-1SD) of height-for-age (stunting), weight-for-height (wasting), and weight-for-age (underweight) were categorized as not stunted, wasted and underweight. While severe and moderate (<-3SD to <-2SD were categorized as stunted, wasted, and underweight, and other variables to be run for binary and multiple logistic regression analysis in this study. Moreover, these variables were considered as the dependent variables during statistical analysis. The dichotomous variables stunting, underweight, and wasting were defined as 1 = for stunted and 0 = for not stunted,

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1 = for underweight and 0 = for not underweight, and
1 = for wasted and 0 = for not wasted, respectively [18].

2.6. Data Analysis

IBM Statistical Package for Social Sciences (SPSS) version 25 was used for the data analysis. Descriptive statistics were used to describe the socio-demographic characteristics of the caregivers and parental factors. The Chi-square test was used to determine the association between independent and dependent variables. Multiple logistic regression analysis was used to determine the predictors of malnutrition. Factors with P-values < 0.25 in simple logistic regression were included in the multiple logistic regression analysis. The result of the normality test showed that quantitative variables such as age, birth weight, birth order, and height of the child were normally distributed while the number of siblings, weight of the child were not normally distributed. However, age, weight, height, BMI of the mother, household income, total number in family, number attended antenatal clinic when pregnant, number of attacks of watery stool, number of attacks of infectious disease, duration in IDP camp and number of people in a tent were all not normally distributed.

2.7. Validation and Reliability of the Study Instrument

The instrument used for this study was validated by two experts in the field of public health and two experts in the field of nutrition. They reviewed the questionnaire to ensure that the wordings of the items were clear and the content was standardized. The result of the content validity ratio was 0.98%. And to ensure the reliability of the instrument, a pilot test was conducted in Kagarawal IDP camp in Gombe State, which is about 140 km away from the main study area Adamawa State and 219 km (136 miles) from Yobe State. The Kagarawal IDP camp in Gombe State had 263 IDPs children between 6 to 59 months, and 81 of these children were randomly selected to give the sample size for the pilot testing. The pilot testing served as trial testing for the instruments to ensure that the wordings of the items were clear and the content was standardized. The findings helped to modify and update the instruments before the primary data collection. The reliability test results yielded Cronbach's alpha coefficient value of at least 0.7 for all sections of the instrument. For an instrument to be considered reliable, a Cronbach's alpha has to be ≥ 0.7 [18]. The questionnaire was translated from the English language to the Hausa language by linguistics in the Hausa Department of Bayero University Kano. It was again translated back into the English language to ensure that the two versions conveyed the same meaning.

2.8. Ethical Consideration

Ethical approval was granted on the 6th September 2018 by the Ethics Committee for Research involving Human Subjects of Universiti Putra Malaysia with reference number UPM/TNCPI/RMC/1.4.18.2 (JKEUPM). Also, written permission to collect data from the two IDP camps of Adamawa State and YBC Yobe State was secured from the National Emergency Management Agency (NEMA) Adamawa and the Yobe States, Nigeria. This was dated 9th October 2018 with reference number NEMA/YOO/STKH/1/141.

3. Results

The eligible pairs (children and their caregivers) for this study in Adamawa state were 575 (71.3%), while in Yobe State, there were 232 (28.7%) pairs. The overall response rate was 100%, as the respondents consisted of captive groups of IDPs staying in isolated camps.

3.1. Socio-demographic Characteristics of the Caregivers and Parental Factors

Table 1 shows the distribution of socio-demographic characteristics of the caregivers in the three IDP camps. The median age of the caregivers was 29 years (11%). The distribution of the caregiver's age depicts that most (33.7%) of the caregivers were within the age group of 26 to 30 years. The educational level of the caregivers revealed that 82.4% of them have no form of formal education. The majority (47.0%) of the caregivers were farmers, and most (65.1%) of them earned less than ₦18,000,000 per month. Additionally, most (43.5%) of the caregivers have 6 to 8 people in their family. For the majority (72.6%) of the respondents, fathers were responsible for their family source of income. In contrast, most (84.3%) of them have no form of any medical condition. In terms of the visit to the antenatal clinic when pregnant, most (88%) of them visited ante-natal clinics, and the majority (79.3%) visited more than four times. Additionally, 90.3% of them have no interest in family planning usage, and they were within the range of <55kg (81.9%); and 95.8% were above 145cm, respectively. The Body Mass Index showed that 66.9% were within the normal range, and the median weight, height, and BMI of the mothers were 55.0kg, 160cm, and 21.3kg/m² respectively. Table 2 illustrates the prevalence of malnutrition among under-five children that were studied in the three IDP camps in which 138 (17.1%), 331 (40.9%), and 241 (29.7%) were stunted, wasted and underweight, respectively.

Table 3a & Table 3b presents the results of simple logistic regression analysis between the socio-demographic characteristics of the caregivers, maternal factors and child's malnutrition. The results showed that the odds of giving birth to a stunted child was 1.88 times higher among mothers who are within the age range of <25 years old compared to those >36 years old (OR=1.884; 95% CI=1.040-3.413; p=0.037). However, there was no significant association between the age of the mother and wasting and underweight among the children. On the other hand, mothers who attended primary education were 0.37 times less likely to give birth to stunted children than those who had no formal education (OR=0.367; 95% CI=0.174-0.775; p=0.009). Similarly, the odds of having a stunted child was 1.54 times higher among those who have no formal education compared to those who had...
attended primary education (OR=1.538; 95% CI=1.097-2.516; p=0.017). Contrarily, there was no significant association between the mother's level of education and underweight in the child.

The odds of having wasted children was 0.62 times lower among farmers compared to housewives (OR=0.624; 95% CI=0.414-0.940; p=0.024). Similarly, the odds of having underweight children was 0.64 times lower among farmers compared to housewives (OR=0.643; 95% CI=0.417-0.992; p=0.046). But there was no association between stunting of the child and the mother's occupation. Furthermore, the odds of having an underweight child is 1.59 times more likely among those earning ₦19,000.00 to ₦24,000.00 per month compared to those who make ₦31,000.00 and above per month (OR=1.587; 95% CI=1.125-2.241; p=0.009).

Table 1. Distribution of socio-demographic characteristics of the caregivers and parental factors (N = 807)

| Socio-demographic characteristics                  | Frequency | Percentage |
|---------------------------------------------------|-----------|------------|
| Age in years                                      | 29 (IQR: 11) |
| < 25 years                                        | 207       | 25.7       |
| 26-30 years                                       | 272       | 33.7       |
| 31-35 years                                       | 210       | 26.0       |
| >36 years                                         | 118       | 14.6       |
| Mother's level of education                       | 665       | 82.4       |
| No formal education                               | 104       | 12.6       |
| Primary                                           | 36        | 4.5        |
| Tertiary                                          | 2         | 0.2        |
| Mother's occupation                               | 379       | 47.0       |
| Civil servant                                     | 11        | 1.4        |
| Farmer                                            | 379       | 47.0       |
| Housewife                                         | 124       | 15.4       |
| Household income                                  |           |            |
| <₦18,000.00 per month                             | 525       | 65.1       |
| ₦19,000-24,000.00 per month                       | 200       | 24.8       |
| ₦25-30,000.00 per month                           | 60        | 7.4        |
| ₦31,000.00 and above per month                    | 22        | 2.7        |
| Family size                                       |           |            |
| ≤5 People                                         | 300       | 37.2       |
| 6-8 People                                        | 351       | 43.5       |
| ≥9 People                                         | 156       | 19.3       |
| Source of family income                           |           |            |
| Father                                            | 586       | 72.6       |
| Mother                                            | 221       | 27.4       |
| Mother's medical condition                        |           |            |
| Yes                                               | 127       | 15.7       |
| No                                                | 680       | 84.3       |
| Mother's visit to the antenatal clinic             |           |            |
| Yes                                               | 710       | 88.0       |
| No                                                | 97        | 12.0       |
| Number of times visit the antenatal clinic         |           |            |
| <4 visits                                         | 167       | 20.7       |
| >4 visits                                         | 640       | 79.3       |
| Family planning usage                             |           |            |
| Yes                                               | 78        | 9.7        |
| No                                                | 729       | 90.3       |

Table 2. Prevalence of stunting, wasting and underweight among under-five children (N=807)

| Malnutrition          | Frequency | Percentage |
|-----------------------|-----------|------------|
| Height-for-age (Stunting) |          |            |
| Stunted               | 138       | 17.1       |
| Not stunted           | 669       | 82.9       |
| Weight-for-height (Wasting) |          |            |
| Wasted                | 331       | 40.9       |
| Not wasted            | 476       | 59.1       |
| Weight-for-age (underweight) |        |            |
| Underweight           | 241       | 29.7       |
| Not underweight       | 566       | 70.3       |
In this study, no statistically significant association was observed between a child's stunting and household income and between a child's wasting and household income, respectively. Furthermore, the odds of having wasted children were 1.98 times higher among mothers who did not visit the antenatal clinic when pregnant than those who visited the antenatal clinic when pregnant (OR=1.975; 95% CI=1.287-3.030; p=0.002). Once more, the odds of having an underweight child was 2.12 times higher among mothers who have no interest in family planning compared to those who have an interest in family planning (OR=2.117; 95% CI=1.307-3.430; p=0.002). But there was a significant association between interest in family planning and child's stunting. Moreover, there was no significant association between mother's weight and stunting, wasting and underweight among the children. Likewise, there was no significant association between the mother's height and stunting, wasting and underweight among the children. Also, no significant association was observed between Mother's BMI and stunting, wasting and underweight among the children.

| Variables                          | Stunting OR 95% CI | p-value | Wasting OR 95% CI | p-value | Underweight OR 95% CI | p-value |
|------------------------------------|-------------------|---------|------------------|---------|-----------------------|---------|
| Mother's age in years              |                   |         |                  |         |                       |         |
| >36                                | 1                 | 1       | 1                | 1       | 1                     | 1       |
| 31-35                              | 1.357             | 0.812-2.269 | 0.244 | 1.094 | 0.756-1.584 | 0.632 | 1.197 | 0.791-1.811 | 0.396 |
| 26-30                              | 1.520             | 0.892-2.592 | 0.124 | 1.123 | 0.759-1.662 | 0.562 | 0.878 | 0.588-1.312 | 0.525 |
| <25                                | 1.884             | 1.040-3.413 | 0.037* | 1.251 | 0.791-1.979 | 0.339 | 1.051 | 0.642-1.720 | 0.844 |

In this study, no statistically significant association was observed between a child's stunting and household income and between a child's wasting and household income, respectively. Furthermore, the odds of having wasted children were 1.98 times higher among mothers who did not visit the antenatal clinic when pregnant than those who visited the antenatal clinic when pregnant (OR=1.975; 95% CI=1.287-3.030; p=0.002). Once more, the odds of having an underweight child was 2.12 times higher among mothers who have no interest in family planning compared to those who have an interest in family planning (OR=2.117; 95% CI=1.307-3.430; p=0.002). But there was a significant association between interest in family planning and child's stunting. Moreover, there was no significant association between mother's weight and stunting, wasting and underweight among the children. Likewise, there was no significant association between the mother's height and stunting, wasting and underweight among the children. Also, no significant association was observed between Mother's BMI and stunting, wasting and underweight among the children.

Table 3a. Binary logistic regression for associated factors of stunting, wasting and underweight among children 6-59 months old

| Variables                          | Stunting OR 95% CI | p-value | Wasting OR 95% CI | p-value | Underweight OR 95% CI | p-value |
|------------------------------------|-------------------|---------|------------------|---------|-----------------------|---------|
| Mother's visit to ANC              |                   |         |                  |         |                       |         |
| Yes                                | 1                 | 1       | 1                | 1       | 1                     | 1       |
| No                                 | 1.034             | 0.592-1.690 | 0.906 | 1.975 | 1.287-3.030 | 0.002* | 1.703 | 1.099-2.637 | 0.017* |
| Number of visits to ANC            |                   |         |                  |         |                       |         |
| >4                                 | 1                 | 1       | 1                | 1       | 1                     | 1       |
| <4                                 | 1.024             | 0.653-1.606 | 0.919 | 2.204 | 1.561-3.114 | <0.001* | 1.433 | 1.000-2.054 | 0.050 |
| Family planning usage              |                   |         |                  |         |                       |         |
| Yes                                | 1                 | 1       | 1                | 1       | 1                     | 1       |
| No                                 | 1.899             | 0.892-4.043 | 0.096 | 2.389 | 1.482-3.851 | <0.001* | 1.849 | 1.148-2.980 | 0.012* |
| Interest in family planning         |                   |         |                  |         |                       |         |
| Yes                                | 1                 | 1       | 1                | 1       | 1                     | 1       |
| No                                 | 2.117             | 0.951-4.715 | 0.066 | 2.353 | 1.482-3.851 | <0.001* | 2.117 | 1.307-3.430 | 0.002* |
| Mother's weight                    |                   |         |                  |         |                       |         |
| >45kg                              | 1                 | 1       | 1                | 1       | 1                     | 1       |
| <45kg                              | 1.470             | 0.943-2.291 | 0.089 | 1.266 | 0.873-1.834 | 0.213 | 1.392 | 0.953-2.032 | 0.087 |
| Mother's height                    |                   |         |                  |         |                       |         |
| >150cm                             | 1                 | 1       | 1                | 1       | 1                     | 1       |
| <150cm                             | 2.183             | 0.659-7.256 | 0.201 | 1.148 | 0.575-2.293 | 0.696 | 1.136 | 0.545-2.369 | 0.734 |
| Mother's BMI                       |                   |         |                  |         |                       |         |
| Underweight                        | 1                 | 1       | 1                | 1       | 1                     | 1       |
| Normal                             | 1.500             | 0.340-6.616 | 0.592 | 1.137 | 0.686-1.899 | 0.953 | 1.014 | 0.663-1.548 | 0.950 |
| Overweight                         | 2.310             | 0.500-10.671 | 0.284 | 0.686-1.885 | 0.616 | 1.531 | 0.898-2.611 | 0.117 |
| Obese                              | 2.525             | 0.552-11.593 | 0.233 | 0.679 | 0.243-1.899 | 0.461 | 0.907 | 0.305-2.698 | 0.861 |

Table 3b. Binary logistic regression for associated factors of stunting, wasting and underweight among children 6-59 months old Cont.
In addition, mothers underweight children than those who did (AOR=7.198; 95% CI=1.450-35.721, p=0.016). Contrarily, there was no significant association between interest in family planning and child's stunting.

Furthermore, the odds of having underweight children were 1.65 times higher among mothers who had not visited antenatal clinics than those who did (AOR=1.651; 95% CI=0.191-2.579; p=0.027). Conversely, there was no significant association between child's stunting, underweight and number of visits to the antenatal clinic. On the other hand, households that earn <₦18,000.00 per month were 1.59 times more likely to have underweight children than those who have (AOR=1.512; 95% CI=1.073-2.499; p=0.022). Equally, caregivers who had secondary education were 0.43 times less likely to have wasted children than those who had primary education (AOR=0.379; 95% CI=0.179-0.801; p=0.011). Again, those who had primary education were 1.64 times more likely to have wasted children than those who visited antenatal clinics <4 times (AOR=1.433-3.975; p=0.001). Furthermore, the odds of being underweight were 0.72 times lower among mothers who had secondary education than those who had no formal education (AOR=0.427; 95% CI=0.191-0.952; p=0.037).

Table 4 demonstrates the factors that were significant predictors of stunting, wasting and underweight among under-five children in the IDP camps. The result showed that mothers who had primary education were 0.38 times less likely to have stunted children than those who had no formal education (AOR=0.379; 95% CI=0.179-0.801; p=0.011). Again, those who had primary education were 1.64 times more likely to have wasted children than those who did not have interest in family planning were 2.60 times more likely to have wasted children than those who do (AOR=2.596; 95% CI=1.529-4.409, p<0.001). Likewise, mothers who have no interest in family planning were 7.20 times more likely to have underweight children than those who have (AOR=7.198; 95% CI=1.450-35.721, p=0.016). Contrarily, there was no significant association between interest in family planning and child's stunting.

Those mothers who visited antenatal clinics <4 times had 2.36 odds of having wasted children than those who didn't (AOR=2.364; 95% CI=1.654-3.377, p<0.001). Conversely, there was no significant association between child's stunting, underweight and number of visits to the antenatal clinic. On the other hand, households that earn <₦18,000.00 per month were 1.59 times more likely to have underweight children than those who make >₦31,000.00 per month (AOR=1.588; 95% CI=1.121-2.132, p=0.009). However, there was no significant association between stunting, wasting and household income.

4. Discussions

The prevalence of stunting (an indicator of chronic malnutrition) reported in this study (17.1%) is consistent with other findings in most parts of Africa and Nigeria, where prevalence rates between 16 and 23% have been documented [6,17,18]. This work also revealed that the prevalence of wasting (40.9%) is unacceptably relatively high among the study participants. It indicates a high burden of sudden or acute malnutrition. Under normal circumstances, a study conducted in Ghana reported lower rates of wasting (9.9%), and even from another part of Nigeria, one of the highest figures reported (23.6%) is way below the finding of this study [19,20]. These
apparent differences might be due to the sudden disruption in supplies of basic human needs, lack of farming, loss of other means of livelihood occasioned by the insurgency [21,22,23]. Other factors include poor environmental and living conditions, psychological trauma and continuous intake of the same types of food in the IDP camps. Additionally, some cultural beliefs that prohibit the consumption of certain kinds of nutritious foods could be other contributory factors [24]. The prevalence of underweight among under-five children in this study was 29.7%, which agrees with 29.5% reported from other studies [7]. Contrarily, the prevalence of underweight reported in a few other studies indicated a low prevalence [18]. However, higher figures were reported in Guatemala in the Americas and Madagascar [25,26].

This study found a significant association between the caregiver's level of education and stunting of the child, which agrees with earlier studies done in South African and Asian countries where the mother's educational level was one of the determinants of stunting (p=0.08). It could be that the more knowledgeable the mother, the more likely she takes care of her child, and the more likely is she able to prepare nutritious food of inappropriate quality and quantity. Maternal education has been shown to have a significant effect on the child's nutritional status [27].

Additionally, a study was done in Malaysia also found there was a significant association between the number of children and malnutrition (AOR= 5.86; 95% CI: 1.96; 17.55) [28]. The risk of stunting among the less privileged children rises significantly (OR=2.26 95% CI: 1. 77-2.89) compared to well to do. There is a significant rise in severe shortness (OR=2.53; 95% CI= 1.34-4.79) and reasonable stunting (OR=2.37; 95% CI=1.47-3.83) against normal in children who had wasted mother [29].

One of the factors that significantly contributed to stunting among under-five children in the IDP camps was mothers' level of education. Mothers with primary education were 1.64 times more likely to have a stunted child than those with tertiary education: (AOR=1.638; 95% CI=1.073-2.499, p=0.022). Similarly, those who had secondary education were 0.43 times less likely to have stunted children than those who had primary education (AOR=0.427; 95% CI = 0.191-0.952; p=0.037). This was in agreement with a study conducted in Ethiopia which found that mothers with higher educational levels were less likely to have underweight children than children whose mothers had no forms of formal education (AOR=0.344; 95% CI =0.123, 0.669) [30].

A mother who did not use family planning was 2.42 times more likely to have a stunted child compared to those who used family planning (AOR=2.420; 95% CI=1.457-4.021, p=0.001). In addition, mothers who attended antenatal visits <4 times when pregnant were 2.36 times more likely to have a stunted child compared to those who attended >4 visits when pregnant (AOR=2.364; 95% CI=1.654-3.377, p=0.001). This aligns with a study conducted [31] in Nigeria in which mothers who visited antenatal clinics <4 times when pregnant are more likely to have malnourished children OR 1.29, 95% CI= 1.02-1.63). On the other hand, the household earning <₦31,000.00 per month was 1.59 times more likely to have stunted children than those who made>₦31,000.00 per month (AOR=1.588; 95% CI=1.121-2.132, p=0.009). This agrees with a study carried out [32] in Uganda, which found a significant association between underweight and household income (OR 1.85, 95%CI=1.33-2.55).

5. Conclusion

This study concludes that there is an unacceptably high burden of malnutrition among the under-five children studied - the prevalence of stunting was 17.1%, wasting was 40.9%, and underweight was 29.7%. The study further showed that the significant predictive factors for stunting were the mother's educational level, family planning usage, mother's visit to antenatal clinic and household income. In contrast, the predictors of wasting include the child's age, sex of the child, birth weight of the child, symptoms of watery stool in the last two weeks and household income. On the other hand, underweight was predicted by family planning interest, age and gender of the child, symptoms of watery stool in the last two weeks, number of people in the family, mother's visit to antenatal clinic, household income, and birth weight. Combating malnutrition in the IDP camps of Nigeria needs a multi-sectoral collaboration to address the issues related to these identified predictors of malnutrition among the under-five children. Therefore, it is strongly recommended that more emphasis should be laid on reducing the prevalence of stunting and wasting (in line with SDG 3) by implementing a supplementary feeding programme among the IDPs. There should be intensified dietary education, immunization, and other health promotion measures that enhance sanitation and hygiene along with the prevention of infectious diseases among children. Improved plans and policies should be put in place to create awareness of the causes, signs, and symptoms of malnutrition to the caregivers to reduce the risk of chronic and severe malnutrition.

Author Contributions

Conceptualization, F.D.M. and N.A.M.Z.; methodology, F.D.M. and N.A.M.Z.; software, F.D.M.; validation, F.D.M., N.A.M.Z and H.M.S.; formal analysis, F.D.M.; investigation, F.D.M. and N.A.M.Z.; resources, F.D.M.; data curation, F.D.M.; writing—original draft preparation, F.D.M., N.A.M.Z and H.M.S.; ; writing—review and editing, F.D.M., N.A.M.Z and H.M.S visualization, F.D.M., and N.A.M.Z.; supervision, N.A.M.Z and H.M.S.;; project administration, N.A.M.Z, funding acquisition, F.D.M., All authors have read and agreed to the published version of the manuscript.

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Informed Consent Statement

Informed consent was obtained from all subjects involved in the study.
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Conflicts of Interest

The authors declare no conflict of interest.

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