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Assessing The Prevenance and Determinants of Malnutrition Among Under 5 Children Attending Primary Health Crae in Oke Baale, Osogbo, Osun

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A B S T R A C T

Background: Malnutrition among children under five remains a significant public health challenge in Nigeria, driven by factors such as poverty, low maternal education, and inadequate healthcare access.

Aim: The study aimed to determine the prevalence of malnutrition (underweight, stunting, and wasting) and identify socio-demographic determinants influencing nutritional status.

Methodology: A descriptive cross-sectional design was used, employing a validated questionnaire.

Results: The study included 420 children, with a slightly higher percentage of females (57.1%) than males (42.2%). Most parents had attained tertiary education, and 62.9% of households earned ₦70,000 or more monthly. The mean age of the children was 1.84±1.16 years, with an average of 2.0±1.0 siblings and complementary feeding introduced at 5.0±1.5 months. The prevalence of malnutrition was 21.2%, with 23.7% underweight, 11.5% stunted, and 23.1% wasted. Maternal education and household income were strongly associated with malnutrition. Children from households earning less than ₦70,000 had significantly higher odds of malnutrition (OR: 4.494, CI: 2.022–9.991, p=0.001). Each unit increase in the number of siblings increased the odds of malnutrition by 3.270 (CI: 2.069–5.172, p=0.001), while delayed introduction to complementary feeding increased the odds by 1.743 (CI: 1.398–2.172, p=0.001).

Conclusion: The study highlights a high prevalence of malnutrition among children under five in Oke Baale, with significant associations between malnutrition and low maternal education, household income, number of siblings, and delayed complementary feeding. These findings underscore the need for targeted interventions, including nutrition education, economic empowerment, and improved access to healthcare, to address the root causes of malnutrition in this community.

Introduction

Children are the cornerstone of society, and their health directly influences the future well-being of a nation. Proper growth during childhood is crucial for cognitive development, academic success, and overall societal progress. Research indicates that malnutrition significantly affects children's growth, leading to stunting, wasting, and underweight conditions, which in turn impair their learning and intellectual potential [1]. Malnutrition, defined as an imbalance in calorie or nutrient intake, manifests in two forms: undernutrition (stunting, wasting, and underweight) and overnutrition (obesity and overweight). Stunting reflects long-term nutritional deficits, wasting results from acute food shortages or illness, and underweight encompasses both chronic and acute malnutrition [2]. The high prevalence of malnutrition is driven by factors such as poverty, inadequate breastfeeding, food insecurity, poor sanitation, and limited access to healthcare. Globally, an estimated one in three individuals experiences some form of malnutrition, with developing nations bearing the greatest burden [3]. In Nigeria, it's a pressing public health issue, with contributing to approximately 45% of under-five deaths globally; current estimates indicate that 37% of Nigerian children aged 6–59 months are stunted, 7% are wasted, and 22% are underweight. Nigeria's under-five mortality rate remains alarmingly high, ranking among the worst globally, further emphasizing the need for urgent and sustained interventions [4].

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Despite existing interventions, child malnutrition remains a critical public health challenge, particularly in low-income regions. Malnourished children face higher risks of infections, delayed cognitive development, poor academic performance, and reduced productivity in adulthood [5]. Statistics from WHO and UNICEF highlight that millions of children suffer from malnutrition, with Africa showing an increasing trend in stunting, while Asia accounts for a majority of severely wasted children. Poor nutrition remains a leading cause of disease and mortality, surpassing risks associated with smoking or alcohol consumption. Key contributors to malnutrition include food insecurity, poverty, poor sanitation, inadequate healthcare, and insufficient maternal nutrition during pregnancy [6]. Addressing these challenges requires targeted policies and sustained efforts to improve child nutrition and overall public health. It's important to note that understanding the prevalence and determinants of malnutrition in specific local contexts is essential for designing targeted interventions [7]. While national and state-level data provide a broad overview, localized studies are necessary to capture the unique socio-economic, cultural, and environmental factors that influence nutritional status. This study seeks to fill this gap by assessing the prevalence and determinants of malnutrition among children under five attending Primary Health Care facilities in Oke Baale, Osogbo, Osun State. Hence the need for this study.

Aim

To determine the prevalence and determinants of malnutrition among under 5 children attending primary health care in Oke Baale, Osogbo, Osun State.

Specific Objectives

This study aims to assess the prevalence of malnutrition among children aged 6 to 59 months, providing insight into the extent of the issue within this age group. It also seeks to analyze the patterns of malnutrition, identifying variations in nutritional deficiencies among these children. Furthermore, the study aims to identify the key factors contributing to severe malnutrition among undernourished children, helping to understand the underlying causes and potential interventions to address the problem.

Methodology

Study Location

Primary health care in Oke Baale, Osogbo, Osun State

Study Design

The study employed a descriptive cross-sectional design and was conducted with the use of a validated questionnaire**.**

Target Population

The target population for this study comprises all children under 5 years of age attending primary health center in Oke-Baale Area, Osogbo Local Government, Osun State.

Study Population

All children under the age of under 5 years of age attending primary health center in Oke-Baale Area, Osogbo Local Government, Osun State.

Inclusion Criteria

The study will focus on children aged 0–59 months (under five years) at the time of the research. It will include only those who are permanent residents of the Oke-Baale area in Osogbo Local Government, Osun State, specifically those who have lived in the area for at least six months before the study. Additionally, the study will consider children who have visited any of the primary health care (PHC) centers in the Oke-Baale area at least once within the past six months. This criterion ensures that the data collected accurately represents children who utilize local health services.

Exclusion Criteria

Children aged 60 months and older at the time of the study will be excluded to maintain the focus on the under-five age group. Additionally, children who do not permanently reside in the Oke-Baale area or have lived there for less than six months prior to the study will be excluded to ensure that the sample accurately represents the local population. Furthermore, children who have not visited any primary health care centers in the Oke-Baale area within the last six months will not be included, as the study aims to reflect those who actively utilize local health services.

Sample Size Determination

In order to get the sample size for this study, the Leslie Fisher's formula for estimating proportions in a population > 10,000 was used.

Where n= sample size

z= standard normal deviation (95%)

p= Being the prevalence of stunting from previous study = 17.0%=0.17 (8)

q= 1-p= 1-0.17=0.83

= degree of accuracy (0.05)

$n= 1.96*1.96*0.83*0.17/ (0.05)^2$

n= 216.8

Adding 10% to make up for possible non-response,

10*216.8/100

=21.6

Therefore, n= 216.8 + 21.6 =238.4

The calculated sample size (n) = 238.4

Total of 300 questionnaires were administered to the study respondents.

Sampling Technique

The study respondents were recruited using a multi-stage sampling technique. In the first stage, a comprehensive list of all primary health care centres in the Oke-Baale area was compiled. In the second stage, all primary health care centres in the selected local government areas were assigned numbers, and two centres were randomly selected from each ward. In the final stage, children who met the inclusion criteria were randomly selected to participate in the study, ensuring a representative sample of the target population.

Procedure

Children of five years and below who meet the inclusion criteria and were attending the immunization clinic at the randomly selected PHC in Oke baale area Osogbo Osun state was randomly selected during the immunization clinic after detailed explanation and collection of informed consent from the mother. The questionnaire was filled by the mothers. Data of the child was collected by direct measurement of anthropometric parameters; weight, height/length, head circumference and mid upper arm circumference (MUAC) and percentages of these parameters among the participants were compared with the expected calculated values for the child's age using the appropriate formulas [9]. Weight was recorded in kilograms to the nearest 0.1 kg using a standardized weighing scale. The height/length of the children was measured using a measuring board graduated to the nearest 0.1 cm. The head circumference and MUAC were measured using a tape rule. The following classification was used for this survey [10].

Mid Upper Arm Circumference (MUAC)

< 12.5 cm – Malnutrition

12.5 – 13.5 cm – At risk of malnutrition

≥ 14cm – Well Nourished

Modified Wellcome Working Party Classification [11]

S/N	Type Observed Weight as % of Ideal Weight for Age
1	Obesity > 120
2	Overweight 110 – 120
3	Normal Range 90 – 110
4	Underweight < 90

Weight for Height

(Wasting) > 80%

Normal 70 – 79% <70%

Based on above parameters, the children were classified as well nourished (normal), underweight, overweight, or wasted.

Data Analysis

Data collected from the research were processed (cleaned and entered into the computer) and analyzed using Statistical Product and Service Solutions (IBM SPSS) Version 25.0.

Descriptive statistics using frequency tables and chart were used to report frequencies of the variables. Inferential statistics: Chi-square (X2) statistical analysis, were the major techniques that were used in data analysis which is aimed at establishing any significant difference that might exist among respondent's frequencies. Significance level were set at 95% confidence interval at a p-value < 0.05.

Ethical Considerations

Ethical approval to carry out the study were sought and obtained from the Health Research and Ethics Committee of the College of Health Sciences (CHS HREC), Osun State University. Permission was obtained from the Ministry of Education and Each of the selected school Authority

Voluntariness: participation of respondents in the study were completely voluntary. A written informed consent was obtained from each of the study respondents. All information supplied by the respondents were handled with strict confidentiality.

Results

Among the respondents, the distribution of children by sex showed a slightly higher percentage of females (57.1%) compared to males (42.2%). A majority of the parents had attained tertiary education. In terms of employment, an overwhelming proportion of parents were employed, and 62.9% of households had an average monthly income of ₦70,000 or more, exceeding the new minimum wage in Nigeria. The mean age of the children, number of siblings and the age at which the child was introduced to complementary diet were 1.84±1.16 years, 2.0 ±1.0, and 5.0±1.5 months respectively. (Table 1)

The association of socio demographic variable and combined malnutrition and respondents at risk using Chi Square

Among the respondents the maternal education level shows a strong relationship with child malnutrition and respondents at risk. Significant proportion of respondents whose mothers had only secondary and primary education were malnourished and or at risk compared to other respondents whose parents had tertiary education. (42.9%) (χ^2 = 58.768, p = 0.001 Furthermore, children from households earning less than 70,000 naira monthly had a higher proportion of malnutrition or at risk (76.0%) compared to those from higher-income households (54.5%) (χ^2 = 12.793, p = 0.000) (Table 3).

The mean score of number of siblings in the household of children with malnutrition or at risk was 2.3 ± 1.1 compared to 1.3 ± 0.7 among respondents with normal nutritional status the association is statistically significant (t =7.894 p value= 0.001. In addition, the mean age at which child was introduced to complementary food was 5.9 ± 0.8 months among children with malnutrition or at risk of malnutrition compared to 5.0 ± 2.1 among respondents with normal nutritional status the association is statistically significant (t = 5.351 p value= 0.001), (Table 4).

Socio demographic determinant of Malnutrition among the Respondents

Among the respondents, children whose mothers had a tertiary education had 0.072 times lower odds of malnutrition or at risk of malnutrition compared to those whose mothers had primary education. This association was statistically significant (OR: 0.070, CI: 0.031–0.166, *p=0.001*). Additionally, respondents with an average monthly income of less than ₦70,000 had 4.494 times higher odds of having a malnourished or a child at risk compared to families earning above the new minimum wage. This finding was statistically significant (OR: 4.494 CI: 2.022– 9.991, *p=0.001*). Furthermore, for each unit increase in the age at which a child was introduced to complementary feeding, the odds of malnutrition or children risk increased by 1.743 this association was also statistically significant (OR: 1.743, CI: 1.398–2.172, *p=0.001*). Finally, for each unit increase number of sibling in the household the odds of malnutrition or children at risk

Table 1: Socio-demographic Characteristics of Respondent (N=280).

Variable	Frequency	Percentage
Sex of child		
Male	120	42.2
Female	160	57.1
Mother's education level ILR		
Primary	25	8.9
Secondary	111	39.6
Tertiary	144	51.4
Father's education level		
Primary	16	5.7
Secondary education	96	34.3
Tertiary education	168	60
Occupation of mother		
Employed	249	88.9
Unemployed	31	11.1
Occupation of father		
Employed	178	63,6
Unemployed	102	36.4
Household income		
Less than 70k 104 37.1		
More than 70k 176 62.9		
Mother's education level		
Primary education 24 8.6		
Secondary education 112 40.0		
Tertiary education 144 51.4		

Table 2: Nutritional status among the Respondents.

Nutritional Status	N	%
1 Weight for age		
Underweight	66	23.6
Overweight/Obesity	30	10.7
Normal	184	65.7
2 Weight for height		
Wasting	65	23.1
Normal	215	76.9
3 MUAC		
Malnutrition	59	21.2
Risk of malnutrition	107	38.4
Normal	114	40.4

Table 3: Association between Sociodemographic Variable and Nutritional Status Using Chi square.

Variable	Malnourished	Not Malnourished	X^2	df	p-value
Sex of child Male Female	72 (60.0%) 103 (64.4%)	48 (40.0%) 57 (35.6%)	0.560	1	0.454
Mothers educational level Tertiary education Secondary education Primary education	48 (42.9%) 24(100.0%) 103(71.5%)	64(57.1%) 0(0.0%) 41(28.5%)	58.768	2	***0.001***
Occupation of mother Employed part-time Unemployed	153(61.4%) 22(71.0%)	96(38.6%) 9(29.0%)	1.066	1	0.302
Occupation of father Employed full-time Unemployed part-time	115(64.6 %) 60(58.8%)	63(35.4 %) 42(41.2%)	0.925	1	0.336
House income Less than 70k More than 70K	79(76.0%) 96(54.5%)	25(24.0%) 80(45.5%)	12.793	1	***0.001***

Table 4: Association between Sociodemographic Variable and Nutritional Status Using T test.

S/N	Variable	Normal Nutritional status Mean ± SD	Malnourished Mean ± SD	T Value	DF	P Value
1	Age of child	1.7 ± 1.2	1.9 ± 1.3	1.136	278	0.257
2	Number of siblings in the household	1,3 ± 0.7	2.3 ± 1.1	7.894	278	***0.001***
3	Age at which child was introduced to complementary food	5.0 ± 2.1	5.9 ± 0.8	5.351	278	***0.001***

Table 5: Sociodemographic Determinant of Malnutrition among the Respondents using Binary Logistic Regression.

S/N	Variables	O/R	P/Value	Low	High
1	Mother level of education Primary ref Tertiary Secondary	 1 0.072 1701.5	 ***0.001*** 0.999	 0.031 0.001	 0.166
2	Household income More than 70k(ref) Less than 70k	 1 4.494	 ***0.001***	 2.022	 9.991
3	Number of siblings in the household	3.270	***0.001***	2.069	5.168
4	Age at which child was introduced to complimentary food	1.743	***0.001***	1.398	2.172

increased by 3.270 this association was also statistically significant (OR, 3.270 CI: 2.069–2.172, *p=0.001*).

Discussion

This study assessed the prevalence and determinants of malnutrition among children under five attending primary healthcare centers (PHCs) in Oke Baale, Osogbo, Osun State, Nigeria. The findings provide critical insights into the factors influencing malnutrition in this population, highlighting the need for targeted interventions to address this public health challenge. The discussion is structured to explore the prevalence of malnutrition, the socioeconomic and demographic determinants, and the implications of these findings for policy and practice.

Prevalence of Malnutrition among the Respondents

The study revealed a malnutrition prevalence of 21.7% among children under five in Oke Baale, Osogbo. This rate is significantly higher than both regional and national averages in Nigeria. For instance, malnutrition rates vary across the country, with the North West Zone reporting the highest stunting rate at 57%, while the South East Zone has the lowest at 18% [12]. The higher prevalence observed in this study may be attributed to the focus on children attending PHCs, who are likely more vulnerable due to underlying health conditions, leading to an overrepresentation of malnourished children. This finding aligns with studies in other low-resource settings, where children accessing healthcare services often exhibit higher rates of malnutrition due to pre-existing health vulnerabilities [13].

The reported mean age of the children in this study was 1.84 ± 1.16 years, indicating that the sample predominantly comprised toddlers. This age group is particularly vulnerable to malnutrition due to their high nutritional requirements for growth and development [14]. Additionally, the average number of siblings per child was 2.0 ± 1.0, suggesting that most children have between one and five siblings. Larger family sizes can strain household resources, affecting food availability, parental attention, and overall child development [15]. This finding is consistent with studies in other developing countries, where larger family sizes have been linked to poorer nutritional outcomes [16].

Determinants of Malnutrition among the Respondents

Socioeconomic Factors

The study identified a strong relationship between low household income and malnutrition. Families earning below the minimum wage had higher odds of having malnourished children compared to those earning above the minimum wage. This finding is consistent with empirical evidence highlighting poverty as a significant predictor of malnutrition in Nigeria [12]. Economic deprivation limits access to nutritious foods and healthcare services, exacerbating the risk of malnutrition. Data from the Nigeria Demographic and Health Survey (DHS) indicate that children from the poorest households are three times more likely to be stunted (54%) than those from the wealthiest households (18%) [12]. This disparity underscores the need for economic interventions to improve household income and food security. Poverty also restricts access to quality healthcare services, including prenatal and postnatal care, which are crucial for preventing and managing malnutrition. Limited healthcare access exacerbates the vulnerability of children to malnutrition, as families are unable to seek timely medical interventions [13]. Furthermore, economic hardship limits the ability of households to afford diverse and nutritious foods, leading to diets deficient in essential nutrients. This inadequacy contributes to high rates of undernutrition among children, particularly in low-income settings [15].

Family Size and Resource Allocation

The study found that each additional sibling in a household increased the odds of malnutrition. This aligns with findings from other Nigerian studies, which consistently demonstrate a significant relationship between large family sizes and increased rates of malnutrition [16]. Larger families often face resource constraints, leading to inadequate food availability, limited healthcare access, and reduced parental attention, all of which negatively impact child nutrition. A study focusing on urban children in Nigeria revealed that children with fewer siblings had a higher prevalence of overweight and obesity, suggesting that resource allocation plays a critical role in nutritional outcomes [17].

The strain on household resources in larger families is further compounded by the high dependency ratio, where a greater number of children rely on limited resources. This often results in inadequate dietary diversity and poor-quality diets, which are key determinants of malnutrition [17]. Addressing these challenges requires targeted interventions to improve household resource allocation and promote family planning practices.

Maternal Education

Maternal education emerged as a critical determinant of child malnutrition in this study. Children of mothers with lower academic levels had higher odds of malnutrition. This finding is supported by evidence from the Multiple Indicator Cluster Survey (MICS) in Nigeria, which found that each additional year of maternal education correlates with improved child height-for-age z-scores (HAZ), indicating reduced stunting rates [18]. Educated mothers are more likely to possess better nutrition-related knowledge, utilize healthcare services, and provide adequate care for their children, all of which contribute to improved nutritional outcomes [15].

Furthermore, the 2013 Nigeria DHS highlights that maternal education independently influences children's height-for-age z-scores (HAZ) and weight-for-height z-scores (WHZ), underscoring the importance of educating mothers to combat child malnutrition (12). Educated mothers are more likely to understand essential nutrition and health information, enabling them to make informed decisions about their children's diets and healthcare. Education also enhances women's employment opportunities and earning potential, allowing for better access to nutritious foods and healthcare services [14].

Complementary Feeding Practices

The study reported that delaying the introduction of complementary foods beyond the recommended age increased the odds of malnutrition. The mean age for introducing complementary foods in this study was 5.0 ± 1.5 months, which is earlier than the World Health Organization (WHO) recommendation of six months [19]. Early or delayed introduction of complementary foods can negatively impact child nutrition. A study in Ethiopia found that 53% of children aged 6–8 months had not consumed solid, semisolid, or soft foods, leading to linear growth faltering [20]. Similarly, research in India and Tanzania has shown that inappropriate complementary feeding practices contribute to high rates of stunting and undernutrition [21].

Timely introduction of complementary foods is crucial for meeting the nutritional needs of growing children. Delays in complementary feeding can lead to inadequate nutrient intake, resulting in malnutrition and impaired growth [19]. Conversely, early introduction of complementary foods may expose children to contaminated foods and increase the risk of infections, further exacerbating malnutrition [13]. These findings emphasize the importance of adhering to WHO guidelines on complementary feeding to prevent malnutrition and promote optimal child growth.

Conclusion

The study conducted in Oke Baale, Osogbo, Osun State, examined the prevalence and determinants of malnutrition among children under five attending primary healthcare centers. The average age of introduction to complementary diets was 5.0-11.5 months, with a higher percentage of female children.

The findings revealed a malnutrition prevalence of 21.7%, exceeding regional and national averages. Key risk factors identified included delayed introduction to complementary feeding, large family size, low household income, and maternal education level. Financial instability may restrict access to quality nutrition and healthcare, with children from the poorest households being three times more likely to be malnourished than those from wealthier backgrounds. Additionally, maternal education played a crucial role, with higher education levels correlating with improved child nutrition outcomes.

Recommendations

Targeted nutrition education programs should enhance parental awareness of children's nutritional needs through schools, healthcare facilities, and community organizations. Promoting dietary diversity by encouraging the consumption of fruits, vegetables, and animal-source foods is essential. Addressing socio-demographic risk factors, such as family size and income, requires targeted policies and support. Strengthening healthcare systems can improve the diagnosis, management, and prevention of malnutrition-related conditions.

Limitation of study

Participants may provide incomplete or inaccurate information due to recall bias, social desirability bias, or misunderstanding of questions**.**

Conflict of interest statement

The authors declare no conflicts of interest

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