DOI: https://dx.doi.org/10.4314/gjpas.v30i2.13

GLOBAL JOURNAL OF PURE AND APPLIED SCIENCES VOL. 30, 2024: 249-257
COPYRIGHT© BACHUDO SCIENCE CO. LTD PRINTED IN NIGERIA ISSN 1118 – 0579, e-ISSN: 2992 - 4464
www.globaljournalseries.com.ng, Email: globaljournalseries@gmail.com

PREVALENCE AND DETERMINANTS OF MALNUTRITION AMONG UNDER-FIVE CHILDREN IN SELECTED PRIMARY SCHOOLS IN NASARAWA TOWN

MUSA, G. K., MAHMUD, S. M. AND OMAKU, P. E
Email: ganakamusak@gmail.com[1]

(Received 12 December 2023; Revision Accepted 25 April 2024)

ABSTRACT

This study aimed at carrying out a survey of the prevalence and determinants of malnutrition among under-five children in selected primary schools in Nasarawa town. Cross sectional research design was adopted for the study. Stratified sampling technique were adopted where the three selected schools served as the strata. The data for the study were collected using structured questionnaire. The data collected were analyzed using descriptive statistics and binary logistic regression. The findings of the study revealed among others that malnutrition in the form of wasting and underweight is more prevalent than stunting in the study area. The study revealed further that exposure to diarrhea, mother's educational level, mother's occupation, total number of children, family monthly income, water treatment practice, were significant determinants of wasting among under five children. Also, factors like age of mother, source of food, frequency of water treatment, Antenatal Care (ANC) follow up, mothers' eating habits during pregnancy, exclusive breastfeeding practice and meal frequency were significant determinants of underweight among under five children. Furthermore, exposure to infectious disease, mothers' educational level, source of food and frequency of water treatment were the significant determinants of stunting among under five children in the study area. Based on these findings, it was recommended among others that at the community level, instruction and training should be provided to women regarding exclusive breastfeeding, child care, and infectious illness prevention protocol.

KEYWORD: Malnutrition, Under-five children, Stunting, Wasting, Underweight

1. INTRODUCTION

The most prevalent nutritional condition in underdeveloped nations is malnutrition, which continues to be one of the leading causes of morbidity and mortality in children globally. Malnutrition impacts human performance, health, and survival by affecting physical growth, illness, mortality, cognitive development, reproduction, and physical work capability (Mahgoub et al., 2006).

Globally, around 144 million children under five have stunted growth, 47 million are wasted, 14.3 million significantly wasted, and 38.3 million are overweight or obese (Clark et al, 2020). In sub-Saharan Africa, 24 million children under the age of 5 are stunted, compared to over 47 million in Eastern and Southern Africa (WHO, 2021). Nigeria bears the greatest burden of undernutrition. More specifically, 44% of Nigerian children are stunted, 32% underweight, and 1% wasted (WHO, 2018).

Musa, G. K., Department of Statistics, Nasarawa State University, Keffi, Nasarawa State Nigeria
Mahmud, S. M., Department of Mathematics and Statistics, Federal Polytechnic Nasarawa, Nasarawa State, Nigeria
Omaku, P. E., Department of Mathematics and Statistics, Federal Polytechnic Nasarawa, Nasarawa State, Nigeria

Stunting is an indication of previous growth failure, which reveals a history of inadequate nutrition. It is linked to several long-term problems, such as persistently low protein and energy intake, recurrent infections, persistently incorrect feeding practices, and poverty. Wasting is a symptom of acute or current malnutrition and is indicated by a failure to gain weight or by real weight loss (Bruce, 2001).

Malnutrition is a lack of or incorrect intake of nutrients and energy. It comprises both under nutrition and over nutrition, which can lead to obesity, some cancers, and non-communicable diseases (UNICEF, 2020; Asfaw, et al., 2020). Under nutrition includes wasting, stunting, being underweight, and micronutrient deficiency. Malnutrition is a common issue that affects everyone at some point in their lives, but young children are more susceptible. For the best start in life and long-term advantages, nutrition should be optimized from conception to age two. Malnourished children are at risk for infection and they are more prone to death due to common infantile respiratory and diarrhea disease. United Nations Decade of Action on Nutrition from 2016 to 2025 proclaimed to eliminate malnutrition and guarantee worldwide access to improved diets everywhere and for everyone and ensuring healthy lives for all ages (SGD, 2017).

Despite these measures, malnutrition prevalence is still significant; over half of all fatalities in children under the age of five are related to malnutrition since it increases the severity of diseases. Worldwide, 47 million children under the age of five were wasted in 2019. Of these, half were in South Asia and one in every four were in sub-Saharan Africa. 21.3% of children under the age of five had stunted growth. In which case, two out of every five stunted children resided in sub-Saharan Africa (UNICEF, 2020).

Empirically, Zhang et al., (2022) conducted a study which aimed to determine the prevalence of childhood malnutrition and its associated risk factors as well as to explore the best developmental strategy among infants and young children in Shaanxi Province, China and found that the prevalence of stunting was higher among children age 18 – 24 months in the study area as compared to wasting and underweight while the prevalence of overweight was height among children age 6 – 12 months. The study found further that mother with parity, infant and children with educated fathers, correct supplementary food time and separate supplementary food preparation were significantly associated with lower malnutrition. Talukder (2017) discovered that factors like low calorie consumption, high HIV/AIDS rates, political unrest, racial tensions, and ineffective government policy execution contribute to the highest rates of malnourished child mortality in Sub-Saharan Africa. Musenge, et al., (2019) conducted a study in Lusaka urban, Zambia and found that mother's good nutritional practices and Mid Upper Arm Circumference (MUAC) > 12.5cm are significantly associated with stunting, wasting and underweight. Jude, et al., (2019) conducted a study in South Eastern Nigeria metropolitan City and found that maternal education and low socioeconomic class were seen to be a risk factors of malnutrition while upper socioeconomic class was the risk factors of overnutrition. Menalu, et al., (2021) conducted a study which aimed at estimating the prevalence and identifying the risk factors for undernutrition among under-five children in Debre Berhan Town, North Shewa, Ethiopia and found that the prevalence of underweight, stunted, and wasting were 26%, 41%, and 33%, respectively while maternal illiteracy, not breastfeeding exclusively, preterm birth, absence of antenatal care, exposure to infectious diseases and diarrhea were the factors associated with under five malnutrition. Khanam and Haque (2021) found that Stunting, wasting, and underweight were more common in girls than in boys (39%, 54%, and 45% respectively), while 36%, 42%, and 36%, respectively, in the latter group. The risk factors for malnutrition as identified by their study included an increase in the age of children (5–6 years), a greater number of children in the family, and a delay in providing additional food after six months. On the other hand, it was discovered that more frequent meals and land ownership were strongly connected with a lower risk of malnutrition. Hagag, et al., (2022) conducted a study which aimed at assessing the prevalence and determinants of malnutrition among under-five children in rural village in Giza governorate, Egypt and found that mother's education, number of children in the family, age of mother at giving her first birth and child birth weight were the risk factors of malnutrition.

Few empirical studies on malnutrition status of under-five children in Nasarawa State has been documented in literatures. For instance, Joseph et al (2023) examined the relationship between parent socioeconomic status and child malnutrition in Nasarawa State, Nigeria. The data for the study were collected by administering structured questionnaire to 480 women who had children between the age of 0 – 5 years in Lafia metropolis. The data collected were analyzed using Descriptive statistics, chi-square, and mediation analysis. The findings of the study revealed that mother's education level is the primary determinants child nutrition. Further, the study showed a perfect mediation between the mother's Education, toilet facility, and child malnutrition.

In another study by Charles (2021) who studied the nutritional status of under five children of low-income earners in Nigeria with focus on Nasarawa State case. The data for the study were collected using structured questionnaire. The data collected were analyzed using descriptive statistics and logistics regression method of analysis. The finding revealed that income level of parents 1.22 had no significant effect on nutritional status of under - five children in Nasarawa State. At the Dalhatu Araf Specialist Hospital in Lafia, Nigeria, Francis et al. (2020) evaluated the nutritional status of children under five.

A total of 165 children under the age of five were randomly selected for the study. The research findings indicated a noteworthy correlation among the mother's nutritional awareness, her socioeconomic level, her child-feeding practices, and the nutritional well-being of her offspring.

Although a few studies have been done on prevalence and determinants of malnutrition among under five years children, nonetheless, literature is still scanty about what determines the malnutrition of under-five years children in rural and sub-urban areas of Nigeria. The prevalence of malnutrition among disadvantaged communities are mostly unknown as such studies relating to the prevalence of malnutrition among under five years is still lacking in developing nations like Nigeria. Therefore, it becomes imperative for this study to examine the prevalence and determinants of malnutrition among under five years children in selected Primary Schools in Nasarawa town, Nigeria. The findings and recommendations from this study will be significance to government, policy makers, school management and future researchers.

2. METHODOLOGY

2.1 Study Area

The study was conducted in three selected primary schools in Nasarawa town, Nasarawa State Nigeria. Nasarawa State is one of the North-Central States of Nigeria, bordered to the east by the states of Taraba and Plateau, to the north by Kaduna State, to the south by the states of Kogi and Benue, and to the west by the Federal Capital Territory.

2.2 Research Design

The cross-sectional survey research design was adopted in this study.

2.3 Study Setting and Population

The population of this study is mother-child pairs. Mothers coming to picked up their kids after school closing hour or drop their kids in school in the morning were asked to participate in the survey.

2.4 Sample size and Sampling technique of the Study

The sample size of the study was determined using a sample size determination formula developed by Cochran (1963). The formula is given as:

$$n = \frac{Z^2 pq}{e^2}$$

Where n is the sample size, Z^2 is the abscissa of the normal curve that cuts off an area $\propto$ at the tails ($1-\propto$ equals the desired confidence level, e.g. 95%) e is the desired level of precision, p is the estimated proportion of an attribute that is present in the population, and q is $1 - p$. The value of z is found in statistical Tables which contains the area under the normal curve.

Thus,

$$n = \frac{(1.96)^2(0.5)(0.5)}{(0.05)^2} = 385$$

Hence, the sample size of the study is 385 under five children in the three selected schools in Nasarawa town.

Two sampling techniques were employed in this study. The purpose and convenient sampling techniques. The purpose sampling technique was used in selecting the three primary schools while the convenient sampling technique was used in selecting the mother-child pairs that participated in the study.

2.5 Method of Data Collection

Primary data was used in this study. The primary data was collected using structured questionnaire which was administered personally by the researcher to reduce the risk of failure to respond and also ensure that relevant and accurate information are obtained from the respondents. The Weight of the under-five child were measured using weighing scale; height was measured using stadio-meter and age was recorded in months.

2.6 Instrument for Data Collection

The instrument for data collection used in this study is the structured questionnaire. The structured questionnaire was divided into five sections (A, B, C, D & E). The section A covered the biodata of the respondents, Section B covered items related to socio-demographic information of the parents, section C covered items related to food water and sanitation services of the respondents, section D covered asked questions related to maternal Health conditions and antenatal follow up of the respondents and section E covered items related to feeding practice and vaccination status of the child.

2.7 Variables of the Study

Under-five child malnutrition status (stunting, wasting, and underweight) was used as the dependent variable of the study.

The weight, height, and age of child (months) measured were changed to height-for-age (HA), weight-for-age (WA), and weight-for-height (WH) z-scores by using STATA software syntax.

Children with HA, WA, and WH z-score below −2 standard deviation (SD) of the median of a reference standard were considered as stunted, underweight, and wasting, respectively (EDHS, 2016; WHO, 2018). The dichotomous variables for stunting, underweight, and wasting were defined as 1 for stunted and 0 for not stunted, 1 for underweight and 0 for not underweight, and 1 for wasting and 0 for not wasting, respectively.

The independent variables of the study include Socio-Demographic information and Health condition of under-five child, Socio-Demographic information of Parents, Food, Water and Sanitation Services, Maternal Health Conditions and Antenatal Follow Up and Feeding Practice and Vaccination Status of the Child.

2.8 Method of Data Analysis

The method of data analysis used in this study is frequency, percentage and binary logistic regression. With logistic regression we model the natural log odds as a linear function of the explanatory variable:

$$\text{logit}(y) = \ln(\text{odds}) = \ln\left(\frac{p}{1-p}\right) = \alpha + \beta x \quad (1)$$

where p is the probability of interested outcome and x is the set of explanatory variables. The parameters of the logistic regression are α and β. This is the simple logistic model. Taking the antilog of equation (1) on both sides, one can derive an equation for the prediction of the probability of the occurrence of interested outcome as:

$$p = p(Y = \text{interested outcome}/X = x, \text{a specified value})$$

$$= \frac{e^{\alpha+\beta x}}{1 + e^{\alpha+\beta x}}$$

Extending the logic of the simple logistic regression to multiple predictors, one may construct a complex logistic regression as:

$$\text{logit}(y) = \ln(\text{odds}) = \ln\left(\frac{p}{1-p}\right) = \alpha + \beta_1 x_1 + \cdots + \beta_k x_k \quad (2)$$

$$p = p(Y = \text{interested outcome}/X_1 = x_1 + \cdots + x_k, \text{a specified value})$$

$$= \frac{e^{\alpha+\beta_1 x_1+\cdots+\beta_k x_k}}{1 + e^{\alpha+\beta_1 x_1+\cdots+\beta_k x_k}}$$

Where $P(X)$ is the probability of the outcome of interest, α is the Y intercept (constant) and $\beta's$ are the slope parameters. $X's$ are the set of predictors. According the NPC and ICF (2013) α and βs are estimated by the maximum likelihood estimators.

3. Results and Discussion of Findings

The findings of the study had revealed an overall prevalence of stunting among children under five to be 14.5%, wasting was 30.1% and 20.3% children were under-weight. This suggest that the prevalence of wasting was higher among under five children in the study area (Table 1). This contradicts findings of Zhang et al., (2022) who conducted a study in China and found that prevalence of stunting was higher among children age 18 – 24 months compared to wasting and underweight.

The logistic regression results presented in Table 2 revealed among others that children that are not expose to diarrhea are less risk to develop wasting that those that are expose to diarrhea (OR = 16.739, p < 0.05). Children whose mother had primary, secondary and tertiary education were at less risk of developing wasting than those whose mother has no formal education (OR = 0.103, p < 0.033, OR = 0.049, p < 0.05 and OR = 0.052, p < 0.05), these findings is in line with findings from previous study by Jude et al., (2019) who conducted a study in South-Eastern Nigeria and found that maternal education is a risk factor of malnutrition among under-five children. Also, children whose mother's occupation were farming, own business, and government employee were less likely to develop wasting than those whose mothers were house wives (OR = 0.301, p < 0.05; OR = 0.132, p < 0.05 and OR = 0.061, p < 0.05). However, children whose mothers are private employee are more likely of developing wasting than those whose mothers are house wife (OR = 7.260, p < 0.05). In addition, children who were from family whose monthly income is within N25, 000 – N50,000 and above N50,000 are more likely to develop wasting than those who were from family with monthly income of less than N25,000 (OR = 44.416, p < 0.05 and OR = 22.024, p < 0.05). This finding support findings of Jude et al., (2019) whose study revealed that under-five children from parents with upper socioeconomic class were at less risk of malnutrition.

Table 3 indicates that water treatment practice, frequency of water treatment, household waste disposal and hand washing before feeding children are significant determinants of underweight among under five children. Therefore, children whose parents treat water by adding chlorine are 5.161 more likely to develop wasting than those whose parent used boiling method (OR = 5.161, p< 0.05). Children whose parent used other methods of water treatment are 0.068 less likely to develop wasting than those whose parent used boiling method of water treatment (OR = 0.068, p < 0.05). Similarly, children who were from homes where drinking water are treated sometimes and always are 0.252 and 0.144 less likely to develop wasting than those who were from home where drinking water are not treated at all (OR = 0.252, p < 0.05 and OR = 0.144, p < 0.05). Furthermore, children who were from home where waste are disposed in the street open are 6.726 more likely to develop wasting than those whose waste are collected by municipal (OR = 6.726, p < 0.05). Also, children whose parent washed their hand always before feeding them are 0.043 less likely to develop wasting than those children whose parent do not wash their hand before feeding them (OR = 0.043, p < 0.05).

The findings of the study as presented in Table 4 revealed further that children whose parent did not obtain maternal nutritional information as part of ANC visit are more likely to developed wasting than those children whose parent obtained maternal nutritional information as part of ANC visit (OR = 2.977, p < 0.05). Children whose mothers eat more than usual during pregnancy are more likely to developed wasting than those children whose mothers eat less than usual during their pregnancy (OR = 7.205 p < 0.05). Also, children whose parent practice infant feeding formula and breast milk and infant formulae are more likely to developed wasting than those children whose parent used breast milk only (OR = 8.455, p < 0.05 and OR = 7.205, p < 0.05). Furthermore, children who had complete and incomplete vaccination are less likely to developed wasting than those children who were not vaccinated at all (OR = 0.094, P < 0.05 and OR = 0.229, p < 0.05).

The findings of the study revealed further that children whose mothers were within the age bracket of 26 – 30 and more than 30 years are less likely to be underweight than children whose mother's age is less than 25 years (OR = 0.203, p < 0.05 and OR = 0.034, p < 0.05) (Table 5). Also, children who are practicing traditional religion are less likely to be under weight than those who are Christian (OR = 0.019, p < 0.05). However, children who are practicing other religion are more likely to be underweight than those who are Christian (OR = 14.129, p < 0.05).

Table 1: Prevalence of Malnutrition among Under five years Children

Nutrition Indicators	Status	Frequency	Percentage
Wasting	Not wasting	179	69.9
	Wasting	77	30.1
	Total	**256**	**100.0**
Stunting	Not stunted	219	85.5
	Stunted	37	14.5
	Total	**256**	**100.0**
Underweight	Not underweight	204	79.7
	Under weight	52	20.3
	Total	**256**	**100.0**

Source: Extracted from SPSS Output

Table 2: Socio-Demographic Determinants of wasting among under five years children in selected schools in Nasarawa town

Variable	Classification	B	Sig	OR
Constant		2.818	0.000	16.739
Exposure to Diarrhea	Yes			
	No	-3.654	.000	.026
Mother's Education level	No formal Education			
	Primary	-2.273	.033	.103
	Secondary	-3.023	.004	.049
	Tertiary	-2.956	.000	.052
Mother's Occupation	House wife			
	Farming	-1.200	.042	.301
	Own Business	-2.023	.023	.132
	Govt employee	-2.795	.001	.061
	Private employee	1.982	.003	7.260
Total Number of Children	Less than 2			
	3 and above	1.866	.000	6.462
Family Monthly Income	Less than 25,000			
	25,000 – 50,000	3.794	.000	44.416
	Above 50, 000	3.092	.000	22.024

Source: Extracted from SPSS Output

Table 3: Logistics regression analysis of Food, Water and Sanitation Determinants of wasting among under five years children in selected primary schools Nasarawa town

Variable	Classification	B	Sig	OR
Constant		1.753	.005	5.772
Water treatment Practice	Boiling			
	Add chlorine	1.641	.021	5.161
	Others	-2.689	.000	.068
Frequency of water treatment practice	None			
	Always	-1.378	.040	.252
	Sometimes	-1.938	.001	.144
Household waste disposal	Collected by municipal			
	Buried	-.661	.323	.516
	Dump in the street open	3.906	.000	6.726
	Dispose in the compound	-1.422	.077	.241
	Burned	2.509	.002	12.292
Hand washing before feeding children	None			
	Sometimes	1.501	.086	4.486
	Always	-3.151	.000	.043

Source: Extracted from SPSS Output

Table 4: Maternal Health Conditions, Antenatal Follow Up, Feeding Practice and Vaccination Status of the Child as Determinants of wasting among under five children in selected schools Nasarawa town

Variable	Classification	B	Sig	OR
Constant		1.731	.000	5.645
Getting maternal nutritional information as part ANC visit	Yes			
	No	1.091	.002	2.977
Eating habits during pregnancy	Less than Usual			
	Same as usual	.827	.087	2.287
	More than usual	1.975	.000	7.205
Feeding practice for the first 6 months of a child's life	Breast milk only			
	Infant formulae	2.135	.000	8.455
	Breast milk and Infant formulae	1.894	.000	6.647
Child vaccination	None			
	Complete	-2.365	.000	0.094
	Incomplete	-1.473	.002	0.229

Source: Extracted from SPSS Output

From Table 6, it was discovered that children whose parent treat their water some times and always are less likely to be under weight than those children whose parent do not treat their water at all (OR = 0.167, $p < 0.05$ and OR = 0.127, $p < 0.05$). However, toilet facility was an insignificant determinant of underweight among under five children ($p > 0.05$).

In addition, children whose parent had incomplete ANC follow up are less likely to be under weight than those whose parent do not do any ANC follow up (OR = 0.029, $p < 0.05$). Children whose mothers eat same as usual and more than usual during pregnancy were less likely to be underweight than those whose mothers eat less than usual in their pregnancy time (OR = 0.055, $p < 0.05$ and OR = 0.005, $p < 0.05$); children who were not exclusively breastfed are more likely to be underweight than those who were exclusively breastfed (OR = 50.878, $p < 0.05$) (Table 7). Menalu, et al., (2021) in Ethiopia also found that exclusive breast feeding is significantly associated with malnutrition among under five children.

Table 5: Socio-Demographic Determinants of Underweight among under five children in selected schools in Nasarawa town

Variables	Classification	B	Sig.	Exp(B)
Constant		2.648	0.001	14.129
Age of mother	Less than 25			
	26 – 30	-1.594	.009	.203
	More than 30	-3.381	.000	.034
Religion	Christian			
	Islam	-1.070	.138	.343
	Traditional	-3.973	.000	.019
	Others	2.648	.001	14.129

Source: Extracted from SPSS Output

Table 6: Food, Water and Sanitation Services Determinants of Underweight among under five children in selected schools in Nasarawa town

Variable	Classification	B	Sig.	Exp(B)
Constant		-1.644	.000	.193
Source of Food	Own Production			
	Purchase	1.398	.004	4.047
	Own production and purchase	.084	.039	1.087
Frequency of water treatment	None			
	Always	-1.788	.006	.167
	Sometimes	-2.061	.000	.127
Toilet facility	Pour flush to a pipe sewer system		.970	
	Flush pit latrine	-38.459	.995	.000
	Ventilated improved pit latrine	-38.693	.994	.000
	Bush/Field	-38.578	.994	.000

Source: Extracted from SPSS Output

Table 7: Maternal Health Conditions, Antenatal Follow Up, Feeding Practice and Vaccination Status of the Child as Determinants of underweight among under five children in selected schools Nasarawa town

Variable	Classification	B	Sig.	OR
Constant				.094
ANC follow up	None		.000	
	Complete	-.597	.456	.550
	Incomplete	-3.540	.000	.029
Eating habits during pregnancy	Less than Usual		.000	
	same as usual	-2.901	.000	.055
	More than usual	-5.286	.000	.005
Exclusive breastfeeding practice	Yes			
	No	3.929	.000	50.878

Source: Extracted from SPSS Output

Table 8: Socio-Demographic Determinants of stunting among under five children in selected schools in Nasarawa town

Variable	Classification	B	Sig.	OR
Constant		.206	.564	1.229
Exposure to Infectious Disease	Yes			
	No	-1.846	.000	.158
Mother's Education Level	No formal Education		.000	
	Primary	.230	.731	1.259
	Secondary	-1.808	.001	.164
	Tertiary	-2.839	.000	.058

Source: Extracted from SPSS Output

Table 9: Food, Water and Sanitation Services Determinants of stunting among under five children in selected schools in Nasarawa town

Variable	Classification	B	Sig.	OR
Constant		-2.326	.000	.098
Source of Food	Own Production			
	Purchase	2.488	.009	12.04
	Own production and purchase	.175	.037	1.191
Frequency of water treatment	None			
	Always	-1.990	.007	.1367
	Sometimes	-2.809	.000	0.060

Source: Extracted from SPSS Output

In assessing the determinants of stunting, it was discovered that children who are not exposed to infectious disease are less likely to be stunting than those who are exposed (OR = 0.158, $p < 0.05$); children whose mothers' education level were secondary and tertiary are less likely to be stunting than those whose mothers has no formal education (OR = 0.164, $P < 0.05$ and OR = 0.058, $p < 0.05$) (Table 8). The source of food was significantly associated with stunting among under five children. Under five children from families whose source of food is through purchased were more likely to be stunted than those who were from families that produced food on their own (OR = 2.488, $p < 0.05$). Also, children whose source of water are always and sometimes treated are less likely to be stunting than those whose water are not treated (OR = 0.1367, $p < 0.05$ and OR = 0.060, $p < 0.05$) (Table 9). These findings were in agreement with findings from previous study by Menalu, et al., (2021) and Hagag, et al., (2022).

4. CONCLUSION

The findings of the study showed that among children under the age of five in Nigeria, and particularly in Nasarawa, malnutrition remains a significant health concern. Stunting is less common than wasting and underweight in the research location. Significant determinants of wasting among under five children were exposure to diarrhea, mother's educational level, occupation, total number of children, family monthly income, water treatment practice, frequency of water treatment, receiving maternal nutritional information as part of ANC visit, eating habits during pregnancy, feeding practice for the first six months of a child's life, and child vaccination. Also, significant determinants of underweight among under five children includes the mother's age, religion, source of food, frequency of water treatment, ANC follow-up, eating behaviors throughout pregnancy and exclusive breastfeeding practice. Additionally, the research area's major predictors of stunting in children under five included maternal education level, source of food, frequency of water treatment, and exposure to infectious diseases.

5. RECOMMENDATIONS

Based on the findings of the study, the following recommendations were made:

i. At the community level, instruction and training should be provided to women regarding exclusive breastfeeding, child care, and infectious illness prevention protocol.

ii. It is important to start and establish an anti-natal care program for all expectant mothers.

iii. Antenatal/postnatal care should be made mandatory and free to all parents.

iv. Policies aimed at lowering malnutrition among children under five should receive special consideration from policymakers.

v. The government should also prioritize a key intervention plan to address income inequality among rural households.

REFERENCES

Asfaw, M., Wondaferash, M. and Taha M., 2020. Prevalence of undernutrition and associated factors among children aged between six to fifty-nine months in Bule Hora district, South Ethiopia. BMC Public Health, 15(1):41.

Bruce, C., 2001. Anthropometric indicators measurement guide. Food and nutrition technical assistance project. Academy for Educational Development Washington DC. 98.

Charles, A., 2021. Nutritional status of under-five children of low-income households in Nasarawa State. FUW Trends in Science & Technology Journal, 6(3): 977 – 983.

Clark, H., Coll-Seck, A. M., Banerjee, A., Peterson, S., Dalglish, S. L., Ameratunga, S., ... and Costello, A., 2020. A future for the world's children? A WHO–UNICEF–Lancet Commission. The Lancet, 395(10224), 605-658.

Cochran, W. G., 1963. Sampling Techniques, 2nd Ed., New York: John Wiley and Sons, Inc.

Ethiopia Demographic and Health Survey, 2016. Addis Ababa, Rockville, Marryland, USA, CSA and ICF: Central Statistical Agency, CSA.

Francis, E. K., Bamidele, T., and Enemali, M., 2020. Assessment of the Nutritional Status of Under-Five Years (6–59 Months) Children Attending Dalhatu Araf Specialist Hospital Lafia, Nasarawa State, Nigeria. Current Developments in Nutrition, 4, nzaa043_034.

Hagag, S., Nasser, S., Elden, N. M. K., and Taha, A. M., 2022. Prevalence and Determinants of Malnutrition among Under-Five Children in a Rural Village in Giza Governorate. Open Access Macedonian Journal of Medical Sciences, 10(E), 1125-1131.

Joseph, P., Peace, A. E., and Izuchukwu, O. O., 2023. Parent Socioeconomic Status and Child Malnutrition in Nasarawa State, Nigeria. International Journal of Innovation and Economic Development, 9(2), 24-37.

Jude, C. K., Chukwunedum, A. U., and Egbuna, K. O., 2019. Under-five malnutrition in a South-Eastern Nigeria metropolitan city. African health sciences, 19(4), 3078-3084.

Khanam, S. J., and Haque, M. A., 2021. Prevalence and determinants of malnutrition among primary school going children in the haor areas of Kishoreganj district of Bangladesh. Heliyon, 7(9), 1 – 7.

Mahgoub, S. E. O., Nnyepi, M., Bandeke, T., 2006. Factors affecting prevalence of malnutrition among children under three years of age in Botswana. AJFAND.

Menalu, M. M., Bayleyegn, A. D., Tizazu, M. A., and Amare, N. S., 2021. Assessment of prevalence and factors associated with malnutrition among under-five children in Debre Berhan town, Ethiopia. International Journal of General Medicine, 1683-1697.

Musenge, E. M., Tembo, S., Hankwebe, M., Kahinga, N., Mushibwe, O., Mulenga, I., and Tembo, S., 2019. Prevalence and determinants of malnutrition among under-five children in Lusaka urban, Zambia. Tanzania Journal of Health Research, 21(1), 1-13.

Talukder, A., 2017. Factors associated with malnutrition among under-five children: illustration using Bangladesh demographic and health survey, 2014 data. Children, 4(10), 69 - 74.

UNICEF, 2008. Tracking progress on child and maternal nutrition a survival and development priority.

UNICEF, 2020. Child survival and the SDGs; 2020.Available from: https://. data.unicef.org/child/survival. Accessed October 3, 2020.

WHO, 2018. Child growth Standards Length/height for age, weight for age, weight for length/weight and body mass index for age methods and development. http://www.who.int/childgrowth/publications/tecnicalreportpub/en/indexhtml.

WHO, 2021. Levels and trends in child malnutrition: UNICEF.

World Health Organization, 2017. The double burden of malnutrition policy brief. World Health Organization.

Zhang, M., Giloi, N., Shen, Y., Yu, Y., Sherin, M. A., and Lim, M. C., 2022. Prevalence of malnutrition and associated factors among children aged 6–24 months under poverty alleviation policy in Shanxi province, China: A cross-sectional study. Annals of Medicine and Surgery, 81, 104317. 1- 6.