African Journal of Health, Nursing and Midwifery
Volume 2, Issue 2, 2019 (pp. 1-14)

www.abjournals.org

THE PREVALENCE AND SOCIOECONOMIC DETERMINANTS OF MALNUTRITION AMONG UNDER-FIVE CHILDREN IN EKITI STATE, NIGERIA

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ABSTRACT: *Background: In Nigeria, malnutrition has become a serious health crisis in growing children, especially among under-five children and many factors have been attributed to its causes. This study examined the prevalence rate and socioeconomic determinants of malnutrition among under age 0-59 month's children in the urban and rural areas of Ekiti state, Nigeria. A Cross-section of 152 children was recruited. Methods: To measure the prevalence of malnutrition, anthropometric measures using the WHO child growth reference standards were employed. Probit model was used to examine the socioeconomic determinants of malnutrition. Results: In the urban, there was prevalence rate of 20.8% in the case of Moderate Acute Malnutrition for HAZ with 9.8% higher rate among male than female and 60(80%) in the rural area. Using Severe Acute Malnutrition for HAZ, the prevalence rate was 16.9% with 20.5% and 12.2% for male and female respectively in urban area, while it was 25.8% higher in the rural area. The prevalence rate was higher among children within the age bracket of 0-11 months. The probit result revealed that the prevalence of malnutrition in urban areas was determined by the parent's marital status, parent's type of occupation and the household size. However, for the rural areas, the determinants of malnutrition were mother's type of occupation and the mother's level of income. Discussion: The findings indicate that the larger percentage of malnourished and stunted under-five children are male and those within the age range of 0-23months with higher prevalence in the rural area. This condition is attributed to occupation and income of mothers. These findings clamor for women empowerment through skill acquisition and training, especially for those in the rural areas so as to increase their income level and aid them in providing sufficient nourishing food for their ward.*

JEL Classification: I12

KEYWORDS: Malnutrition, Prevalence Rates, Under-Five Children, Anthropometric Indicators, Nigeria.

INTRODUCTION

Despite the growing awareness about the impact of nutrition, malnutrition remains one of the leading causes of child morbidity and mortality globally, especially in the developing countries. Malnutrition is the intake of insufficient, excessive or imbalanced foods. Malnutrition occurs as a result of poor nutrition, whether excess consumption of nutrients (overnutrition) or

inadequate consumption of nutrients (under nutrition). [1] Poor nutrition affect negatively the potential for cognitive development of infants and children. Malnutrition can result into decreased immunity, increased vulnerability to disease, impaired physical and mental development, and low productivity. [2] Malnutrition has negative attendant implications on school performance. [3] It causes deterioration of health, reduces life expectancy, individual productivity, and hinders the potential for countries to reduce poverty and maximize socioeconomic development. [4-5]

In Nigeria, malnutrition has become a serious health crisis in growing children, especially among under-five children. In Nigeria, 37 percent of under-five children were severely malnourished or stunted, while 18 percent of these children were wasted and 29 percent were underweight, they had low weight for age, almost half of them suffer severely from these conditions. [6] Poverty is the number one cause of malnutrition among under-five children in Nigeria and it plagues about 70% of the Nigerian population. [7] This is an indicative that considerable amount of the population is living in wretched poverty. These individuals eat not good food that provides them with the necessary nutrients, but what is available. In Nigeria food items such as Garri (cassava flakes), bread among others is relatively cheap so it is consumed by poor people. These foods are high in carbohydrates, and this confines their nutrients to basically one class of food. It was noted that children from illiterate parents with lower socioeconomic status are the most affected by poverty.[8]

In Nigeria, malnutrition prevalence varies with children's age; stunting prevalence is the highest among children aged 24-47 months, underweight is very high among 12-23 months, and wasting is the highest among 6-11 months children. One of the most detrimental effects of malnutrition is the failure to resist diseases. [9] If children do not have access to adequate vital minerals, their immune systems can be compromised as their bodies become feeble. This condition is common in developing nations where illnesses such as malaria, tuberculosis and diarrhea are rampant.

In 2015, under-five mortality rate in Nigeria was 108.8 deaths per thousand live births. In the ranking by under-five mortality rate that included 193 countries, Nigeria has 173rd rank that is closed to the positions of such countries as Niger and the Rwanda.[10] Malnutrition in children continues to be a serious health crisis in many communities. In Ekiti state, the percentage of children who were severely and moderately stunted, severely underweight, moderately underweight, severely wasted and acutely wasted in 2007 was put at 13.1, 33.6, 4.1, 17.2, 1.6 and 7.8 respectively. [11] However, in 2013, a significant reduction was observed in the prevalence of stunted and underweight with the rates of 19.2 and 10.4 for acute malnutrition in Ekiti state. [12] The infant mortality and under-five mortality was 33 and 45 deaths per thousand live births in 2014.[13] These estimates are higher and they reveal insufficient progress to reach the SDGs goal 3 target 3.2 of reducing newborn mortality. Therefore, the underlying factors that determine malnutrition needs to be addressed in Nigeria and her environs so as to reduce the morbidity and mortality that results from malnutrition. This research work aims to uncover the current prevalence of child malnutrition in the rural and urban areas of Ekiti State, Nigeria and to investigate the socioeconomic causes of malnutrition among under-five in these areas.

LITERATURE REVIEW

The Measurement of Malnutrition

Malnutrition is the inadequate, excessive or disproportionate intake of nutrients. [1] Individuals are likely to experience malnutrition if the diet they consume does not supply adequate calories and protein for sustenance and growth, or such individuals have problems utilizing the nutrients in the food they consume due to illness. To observe the magnitude of malnutrition, different anthropometric measures have been employed. A malnourished child can be recognized using the Mid-Upper Arm Circumference (MUAC), height for age (HAZ), weight for age (WAZ), weight for height (WHZ) Z-Scores. The MUAC is the arm circumference taken at the midpoint between the tip of the shoulder and the elbow. The acute malnutrition has two types.

Moderate Acute Malnutrition (MAM) and Severe Acute malnutrition (SAM)

This is defined as anthropometric indicator with 2 z-scores below the median of the WHO child growth standards. It can be due to a low WHZ and HAZ, which are referred to as wasting and stunting respectively. Also, it can be linked to a MUAC between 11cm and 12.5cm. Children with MAM have a high risk of mortality and it is related with most of the nutrition-related mortality. If the moderately malnutrition does not receive ample support, it may become severe with >-3 z-scores, which can be life-threatening. Severe Acute malnutrition (SAM) is defined by a very low WHZ that is below -3 z-scores. It can be obvious by visible severe wasting, or by the occurrence of nutritional oedema. To achieve reduction of child death and improvement of maternal health, reducing malnutrition policy must be seriously embraced.

Linking Theory with the Empirical Findings

Household production has its derivations in the microeconomic models of Becker, (1965). The economics of household production was expanded on the notion that household behavior influences health. [14] The household purchases of goods and services as well as time were assumed to influence health. The economic model of household production was analog to the proximate determinants of health. [15] The determinants such as nutrition and medical care were assumed to have a biological impact on health. This influencing process was referred to as the health production function.[16] The household nutrition production function is explained as a function that relates the child's nutritional status to a set of health inputs.[17] These inputs include; child's nutrient consumption and time of the mother care. The quality of child mother care time was proxied by age, income, experience, education, mother's health status and occupation among others.

Empirically, food consumption and nutritional status of under five children were examined and the study revealed 12.5, 14.8, and 8.5% incidence of stunted, wasted and underweight children respectively. [18] The findings from the study showed that more nutrition education is needed on the part of the mothers. Moreover, the assessment of the nutritional status and determinants of child nutritional status among primary school children of farming households in urban was done. Data were collected from female parents in farming occupation and it was found that mother's educational status, child's sex and living conditions significantly associated with nutritional status. [19] Equally, the determinants of socioeconomic and family related risk factors for undernutrition among children in Ibadan, Nigeria was examined. It was revealed that maternal factors related to malnutrition were mother's education less than secondary level, average monthly income and polygamous marriage. [20]

The prevalence, pattern and co-morbidities of malnutrition among under-five children in rural and urban communities of Imo State, Nigeria was assessed. It was found that the prevalence of malnutrition in urban is higher than in rural areas and the malnourished children were within the age bracket of 0-12 months. Moreover, underweight condition was significantly more in the rural than urban, whereas the overweight condition was more in the urban than in the rural. This situation was attributed to the challenge of food security in the rural area. [21] Moreover, the comparative significance of environmental and social correlates of child malnourishment was investigated. The study revealed that 46% of the children are stunted, 6% are underweight and 21% are wasted. The study shows that the key factors that increased the possibility of malnutrition in Iseyin Area of Oyo State were age of the child, poor sanitation and diarrhoea infection. [22] In summary, all the studies concluded that mother's level of education has an impact on the nutritional status of the children, hence, better learning opportunities should be created for mothers so they can be well educated on child care and nutrition.

METHODS

Study Area and Sample Size

This study was carried out between August, 2018 and February, 2019. It covers the urban and rural areas of Ekiti State. The desired sample size for this study was derived using random sampling and the formula was expressed as; $n = \frac{z^2 p(1-p)}{d^2}$ p = is the estimated prevalence for the defined population. An estimated value of 19.2 was obtained following the NDHS, (2013) estimated prevalence of the HAZ in Ekiti state. Z is the significance level set at 5%, which corresponds with 1.96. The precision level is d, due to high variability in determining the population of under five children in the urban and rural areas, the study applied precision level of 6.5%. The calculation of the sample size was 141, this was approximated to 180 to make up for data inconsistencies. Considering that the urban population is higher than the rural, 100 and 80 copies of the questionnaire were administered in the urban and rural areas separately.

Data and Method of Collection

The cross-section data of children within the age range of 0-59 months were obtained using a close ended 49 item questionnaire containing questions regarding the height, weight, age, birth size and socioeconomic status of the parents. A Class III infant scale (Seca 334) was used to measure the body weight without clothing and shoes off, while height (cm) was measured using a Leicester scale. The non-stretch tape was used for the Mid-upper arm circumference measure. Incentives like (biscuit and sweet) were given to the children for easy cooperation and the cooperation of the parent was solicited for, in administering the questionnaire. The parents were guaranteed concealment of the information obtained as the information was for research mainly. About 10% copies of the questionnaires were first distributed in order to clear errors before the final distribution. The response rates for urban and rural areas were 77% and 94% respectively.

Model Specification and Estimation Strategy

To estimate the prevalence (*p*) of child malnutrition, the procedure is presented below as;

$$\hat{p} = \sum_i \frac{y_i}{n} \quad (1)$$

$\sum y_i$ = number of all cases of malnutrition

n = number of people who were sampled

$\hat{p}$ = prevalence rate

Anthropometric Indicators

The anthropometric indicators used to measure malnutrition include HAZ, WHZ, WAZ Z-scores and MUAC. HAZ was specifically used to establish the link between malnutrition and socioeconomic factors. This is because HAZ is usually considered as the best index to represent child's long-term health status. [23] A Z-score of -2 and -3 was used to determine

if a child has moderate or severe acute malnutrition respectively. The Z-score was expressed as:

$$z_{ij} = \frac{x_{ij} - \varepsilon_j}{\sigma_j} \quad (2)$$

z_{ij} = Anthropometric Indicator

x_{ij} = observed value for the child/ height of the child

ε_j = Mean of the reference population/ Median from the WHO Growth Standard Table

σ_j = Standard deviation of the reference population

The MUAC < 12.5 cm represents malnourished, between 12.5 and 13.5cm signifies at risk of malnutrition, while ≥ 14cm means well nourished. To examine the socioeconomic determinants of malnutrition, let y^* be a continuous variable that is not observe i.e. a latent variable and assume that y^* is determined by the model;

$$y^* = \beta_1 + \beta_2 x_i + ... + \beta_k x_k \varepsilon_i$$

$$y^* = x_i \beta_i + \varepsilon$$

ε = error term which is assumed uncorrelated with x (i.e. x is not endogenous).

x_i = vector of explanatory variables.

β_i = parameters of x_i .While y^* is not observed, the discrete individual malnutrition status can be observed, whether it is 0 or 1 according to this rule;

$$y_i = \begin{cases} 1 - if - y^* > 0 \\ 0 - if - y^* \leq 0 \end{cases}$$

The individual child is considered **malnourished** if the child has Z-scores below the cutoff and is assigned the value of 1, while a child with a Z-score above the cutoff is assigned the value 0 representing a normal child. To model the probability that the child is **malnourished**, it was assumed that ε follows a standard normal distribution, which yield;

$$p(y_i = 1 / x_i) = \phi(x\beta)$$

Thus, the empirical model derived from the theoretical framework of the household nutrition production function which relates the child's nutritional status to a set of health inputs was presented in a probit model, as specified;

$$MAL_N = f(AG, GEN, FOCC, MOCC, Y_f, Y_m, PR, LEDU_{f,} LEDU_m, \varepsilon)$$

$$MAL_N = \lambda_0 + \beta_1 AG + \chi_2 GEN + \phi_3 FOCC + \gamma_4 MOCC + \iota_5 Y_f + \varpi_6 Y_m + \vartheta_7 PR + \iota_8 LEDU_f + \rho_9 LEDU_m + \varepsilon$$

AG=Age

GEN=Gender

FOCC=Fathers occupation

MOCC= Mothers occupation

$LEDU_{f\ and}$ $LEDU_m$ = Level of education of father and mother

$Y_{f\ and}$ Y_m = Father and Mothers' Income

PR= Place of residence

Estimation Strategy

Frequency distribution was employed to describe the socioeconomic status, the data analysis was done using SPSS and STATA. Statistical significance was accepted at 1% and 5% levels of significance.

RESULTS

Descriptive Statistics

In the urban, the majority of the children are male with 57.1%, while female 42.9%. Also, in the rural area, 31(41.3%) female and male 44(58.7%). The children age was distributed into 5 groups, the highest number of children, 28.6% of the urban population, was in the age group of 0-11 and 12-23 months. In the rural, the highest number of children, were in the age bracket of 12-23 months, the lowest number of children, 2(2.7%) were in the age of 36-47 months.

Table 1: Gender and Age Distribution of the Respondents

	Gender Distribution		Age Distribution					
	Male	**Female**	**0-11**	**12-23**	**24-35**	**36-47**	**48-59**	**Total**
Urban	44(57.1%)	33(42.9%)	22(28.6%)	22(28.6%)	20(26.0%)	5(6.5%)	8(10.4%)	77(100.0%)
Rural	44(58.7%)	31(41.3%)	22(29.3%)	24(32.0%)	21(28.0%)	2(2.7%)	6(8.0%)	75(100.0%)
Total	88(57.9%)	64(42.1%)	44(28.9%)	46(30.3%)	41(27.0%)	7(4.6%)	14(9.2%)	152(100.0%)

Source: Field Survey, (2019)

The highest percentage of fathers, which represent 41(53.2%) and 27(36.0%) in urban and rural areas respectively, had post-secondary education. This is followed by 30(39.0%) and 26(34.7%) fathers in the secondary education category in urban and rural areas correspondingly, while the lowest number of fathers indicated no formal education. Thus, the majority of fathers were those with a minimum level of education. Moreover, the highest percentage of mothers, 53(68.8%) for urban and 36(48.0%) in rural area, had secondary education. However, the lowest number of mothers indicated no formal and primary education in urban and rural areas correspondingly. Thus, more mothers were in the category of secondary education than in other categories. Also, from table 2, 51(66.2%) of the fathers in urban, were in the category of the wage employed. In the rural, many fathers, 39(52%), were in the group of self-employed. The distribution of mother's type of occupation shows that the highest percentage of the mothers, 31(40.3%) and 52(69.3%) in urban and rural areas respectively, were self-employed.

Table 2: The Distribution of Father and Mother's Level of Education and Type of Occupation

	Father's Level of Education				**Mother's Level of Education**				
	None Education	Primary Education	Secondary Education	Post-Secondary Education	None Education	Primary Education	Secondary Education	Post-Secondary Education	Total
Urban	3(3.9%)	3(3.9%)	30(39.0%)	41(53.2%)	3(3.9%)	7(9.1%)	53(68.8%)	14(18.2%)	77(100.0%)
Rural	9(12.0%)	13(17.3%)	26(34.7%)	27(36.0%)	14(18.7%)	10(13.3%)	36(48.0%)	15(20.0%)	75(100.0%)
Total	12(7.9%)	16(10.5%)	56(36.8%)	68(44.7%)	17(11.2%)	17(11.2%)	89(58.6%)	29(19.1%)	152(100.0%)
	Father's Type of Occupation				**Mother's Type of Occupation**				
	Wage Employed	Self-Employed	Unemployment	Not Available for Employment	Wage Employed	Self-Employed	Unemployment	Not Available for Employment	Total
Urban	51(66.2%)	24(31.2%)	2(2.6%)	0(0.0%)	22(28.6%)	31(40.3%)	23(29.9%)	1(1.3%)	77(100.0%)
Rural	25(33.3%)	39(52.0%)	7(9.3%)	4(5.3%)	12(16.0%)	52(69.3%)	11(14.7%)	0(0.0%)	75(100.0%)
Total	76(50.0%)	63(41.4%)	9(5.9%)	4(2.6%)	34(22.4%)	83(54.6%)	34(22.4%)	1(0.7%)	152(100.0%)

Source: Field Survey, (2019)

Prevalence of Malnutrition among Under-five Children

The results of malnutrition prevalence are presented in relation to gender and age in tables 3-5. Table 3 presents the incidence of both Moderate Acute Malnutrition (MAM) and Severe Acute Malnutrition (SAM) as indicated by HAZ, WAZ, WHZ and MUAC. In urban area, 16 were malnourished, which gives rise to prevalence rates of 20.8% MAM for HAZ and 60(80%) in the rural area. The incidence among male and female children also shows 9.8% higher prevalence rates among male than female. Using SAM for HAZ, the prevalence rates of 16.9% were obtained with 20.5% and 12.2% for male and female respectively in urban area, while it is 25.8% higher in the rural area. Moreover, the prevalence rates of 42.9% was recorded with 47.7% and 36.4% for male and female correspondingly in urban areas, while 60% rate was obtained in rural areas with higher prevalence rates among male children in the case of MAM for (WAZ). This similar trend was observed about the incidence of SAM for (WAZ). Furthermore, the MAM for (WHZ) has prevalence rates of 16.7% and 9.3% in the urban and rural areas respectively, while 5.2% and 1.3% were obtained for SAM (WHZ) urban and rural individually. This analysis shows that the incidence rates were pronounced among children in the urban area. Lastly, the results from MAM and SAM (MUAC) also corroborates the findings obtained from other aforementioned indicators with higher prevalence rates in the rural area than in urban area and among the male than female under-five children.

Table 3: The Prevalence Rate (PVR) of Malnutrition in Relation to Gender

	Urban Areas			Rural Area		
	Male	**Female**	**Total**	**Male**	**Female**	**Total**
Moderate acute malnutrition (HAZ)	11(25%)	5(15.2%)	16(20.8%)	36(82.8%)	24(77.2%)	60(80%)
Severe acute malnutrition (HAZ)	9(20.5%)	4(12.2%)	13(16.9%)	19(43.2%)	13(41.9%)	32(42.7%)
Moderate acute malnutrition (WAZ)	21(47.7%)	12(36.4%)	33(42.9%)	24(54.6)	21(67.7%)	45(60%)
Severe acute malnutrition (WAZ)	3(6.8%)	1(3%)	4(5.2%)	4(9.1%)	10(32.3%)	14(18.7%)
Moderate acute malnutrition (WHZ)	9(20.5%)	4(12.2%)	13(16.7%)	6(13.6%)	1(3.2%)	7(9.3%)
Severe acute malnutrition (WHZ)	4(9.1%)	0(0%)	4(5.2%)	0(0%)	1(3.2%)	1(1.3%)
Moderate acute malnutrition (MUAC)	18(40.9%)	13(39.4%)	31(40.3%)	24(54.6%)	18(58.1%)	42(56%)
Severe acute malnutrition (MUAC)	1(2.3%)	2(6.1%)	3(3.9%)	3(6.8%)	1(3.2%)	4(5.3%)

Source: Field Survey, (2019)

From the results in table 4, in the urban area, MAM for (HAZ) show that 16 children out of the 22 children surveyed within the age group of 0-11 months in urban areas were malnourished. Also, 59.1% prevalence rates among the children in age group of 12-23 months were obtained for SAM (HAZ). Likewise, the MAM (WAZ) for children in the age categories of 0-11, 12-23, 24-35, 36-47-and 48-59 are 72.7%, 27.3, 40.0, 40.0 and 12.5 respectively. The prevalence rates calculated by the SAM (WAZ) show higher rates among the children in the age bracket of 0-11 months. Moreover, the analysis of the MAM (WHZ) shows the highest prevalence rates of 25% among those in the age bracket of 48-59 months, while the SAM (WHZ) shows highest prevalence rates of 10.0% among the 24-35 months. The MAM and SAM for (MUAC) z-scores show the highest prevalence rates of 62.5% and 25% among children in the age group of 48-59 months individually. Overall the analysis implies that children within the age group of 0-11months have higher prevalence rates than other age groups using HAZ and WAZ. In addition, children within the age group of 48- 59 months have higher prevalence rates using MUAC indicator.

Table 4: The Prevalence Rate (PVR) of Malnutrition in Relation to Age (Urban areas)

	0-11	**12-23**	**24-35**	**36-47**	**48-59**	**Total**
Moderate acute malnutrition (HAZ)	16(72.7%)	0(0.0%)	0(0.0%)	0(0.0%)	0(0.0%)	16(20.8%)
Severe acute malnutrition (HAZ)	13(59.1%)	0(0.0%)	0(0.0%)	0(0.0%)	0((0.0%)	13(16.9%)
Moderate acute malnutrition (WAZ)	16(72.7%)	6(27.3%)	8(40.0%)	2(40.0%)	1(12.5%)	33(42.9%)
Severe acute malnutrition (WAZ)	3(13.6%)	1(4.5%)	0(0.0%)	0(0.0%)	0(0.0%)	4(5.2%)
Moderate acute malnutrition (WHZ)	4(18.2%)	2(9.1%)	4(20.0%)	1(20.0%)	2(25.0%)	13(16.9%)
Severe acute malnutrition (WHZ)	1(4.5%)	1(4.5%)	2(10.0%)	0(0.0%)	0(0.0%)	4(5.2%)
Moderate acute malnutrition (MUAC)	11(50.0%)	4(18.2%)	8(40.0%)	3(60.0%)	5(62.5%)	31(40.3%)
Severe acute malnutrition (MUAC)	1(4.5%)	0(0.0%)	0(0.0%)	0(0.0%)	2(25.0%)	3(3.9%)

Source: Field Survey, (2019)

The moderate and severe acute malnutrition (HAZ), highest 95.5% and 62.5% prevalence exist among the children in age group of 0-11 and 12-23 months. Equally, the highest prevalence rates were obtained from the moderate and severe acute malnutrition (WAZ) for children in the age categories of 0-11 are 63.6% and 36.4% individually. Moreover, the analysis of the moderate and severe acute malnutrition (WHZ) shows the highest prevalence rates among the children in the age bracket of 48-59 and 12.23 months. Similarly, in table 5, the moderate and severe acute malnutrition (MUAC) z-scores show the highest prevalence rates of 66.7% and 8.3% among the children in the age bracket of 24-35 and 12-23 months respectively.

Table 5. The Prevalence Rate of Malnutrition in Relation to Age (Rural area)

	0-11	12-23	24-35	36-47	48-59	Total
Moderate acute malnutrition (HAZ)	21(95.5%)	19(79.2%)	13(61.9%)	2(100.0%)	5(83.3%)	60(80.0%)
Severe acute malnutrition (HAZ)	12(54.5%)	15(62.5%)	5(23.8%)	0(0.0%)	0(0.0%)	32(42.7%)
Moderate acute malnutrition (WAZ)	14(63.6%)	14(63.6%)	11(52.4%)	2(100.0%)	4(66.7%)	45(60.0%)
Severe acute malnutrition (WAZ)	8(36.4%)	5(20.8%)	1(4.8%)	0(0.0%)	0(0.0%)	14(18.7%)
Moderate acute malnutrition (WHZ)	1(4.5%)	3(12.5%)	2(9.5%)	0(0.0%)	1(16.7%)	7(9.3%)
Severe acute malnutrition (WHZ)	0(0.0%)	1(4.2%)	0(0.0%)	0(0.0%)	0(0.0%)	1(1.3%)
Moderate acute malnutrition (MUAC)	9(40.9%)	15(62.5%)	14(66.7%)	0(0.0%)	4(66.7%)	42(56.0%)
Severe acute malnutrition (MUAC)	1(4.5%)	2(8.3%)	1(4.8%)	0(0.0%)	0(0.0%)	4(5.3%)

Source: Field Survey, (2019)

The Socioeconomic Determinants of Malnutrition in Ekiti State

The likelihood ratio chi-square of 34.55 and 37.83 with a probability value of 0.0028 and 0.000 were obtained, indicating that the models are statistically significant. The coefficients of the variables as well as the partial effects were all presented in the table 6. Variables include, a dummy variable that measure the probability of having moderate acute malnutrition (HAZ), marital status of parent, religion, mother and father's type of occupation, size at birth and household size. The marginal effects for the probit model give the quantitative meaning of the effect of socioeconomic factors on malnutrition, measured in unit of probability. From the results, the probability that a child from a parent in the married polygamous group will be malnourished is 0.129 more than a child from a parent in the married monogamous group. The probability that a child with higher household size will be malnourished is 0.044 more than a child with lower household size. The probability that a child from a wage-employed father and mother will be malnourished is 0.156 and 0.285 less than a child from an unemployed father and mother. This analysis has effect on income and the family wealth status. Also, the chance that a child with higher size at birth will be malnourished is 0.027 less than a child with lower size at birth. Likewise, the probability that a respondent that live in urban area will be malnourished is 0.477 less than a child that reside in the rural area.

The result for the rural areas shows that religion, mother's type of occupation, availability of fruit in the child's diet, size at birth and average monthly income of the mother were statistically significant. The marginal effects of the results show that the probability that a child from a wage-employed mother will be malnourished is 0.496 less than a child from an unemployed mother. Furthermore, the probability that a participant with access to fruits will be malnourished is 0.035 less than a participant with no access to fruit. Also, the likelihood that a

child with higher size at birth will be malnourished is 0.003 less than a child with lower size at birth. Lastly, the probability that a child from a mother with higher levels of income will be malnourished is 0.011 less than a child from a mother with lower levels of income.

Table 6. The Probit Model for the determinants of Malnutrition (Urban and Rural area)

	Urban Area		Rural Area	
The probability of having moderate acute malnutrition (HAZ)	Coefficient	Marginal Effect	Coefficient	Marginal Effect
Parent Marital Status Married Polygamous	2.346***(2.73)	0.129***(2.73)	1.922(1.09)	0.011(1.09)
Islamic Religion	1.048***(1.69)	0.182***(1.69)	2.425**(2.44)	0.023**(2.44)
Father's Occupation (Wage employment)	-1.985***(-3.23)	-0.156***(-3.23)		
Mother's Occupation (Wage employment)	-1.633**(-2.52)	-0.285**(-2.52)	-3.109***(-3.26)	-0.496***(-3.26)
Father's Education (Post-Secondary)	-0.876(-1.44)	-0.093(-1.44)		
Number of times the child is feed (3 times)	0.985(1.11)	0.151(1.11)		
Fruit Availability	0.41(0.7)	0.041(0.7)	-2.29***(-2.95)	-0.035***(-2.95)
Place of residence (Urban)	-1.777**(-1.74)	-0.477**(-1.74)		
Classes of foods	-0.073(-0.11)	-0.007(-0.11)	-1.657(-1.52)	-0.008(-1.52)
Father's Education (Post-Secondary)	-0.656(-0.76)	-0.046(-0.76)		
Size at Birth	-0.28**(-1.92)	-0.027**(-1.92)	-0.567**(-2.21)	-0.003**(-2.21)
Age of the Child in Month	-0.037(-1.03)	-0.004(-1.03)	-1.393(-0.25)	-0.007(-0.25)
Log of Father's Income	-3.484(-1.61)	-0.337(-1.61)	-0.386(-0.34)	-0.002(-0.34)
Log of Mother's Income	2.3(1.07)	0.222(1.07)	-2.111***(-2.68)	-0.011***(-2.68)
Household Size	0.455***(2.71)	0.044***(2.71)	-0.214(-0.84)	-0.001(-0.84)
Constant	10.282(1.44)		24.591(1.56)	
No of Observation.	76	76	38	38
R-sq	0.426	0.426	0.674	0.674
Wald chi2(15)	34.55(0.0028)	34.55(0.0028)	37.83(0.0000)	37.83(0.0000)

*Z-statistics in parentheses** p<.05, *** p<.01 represent a level of significance at 10%, 5% and 1%.*
Source: Author's computation from STATA 13, (2019).

DISCUSSION

The findings of the study indicate that the malnutrition prevalence rates are still high in the urban and rural areas of Ekiti state. In the case of moderate acute malnutrition for HAZ, the prevalence rate was 20.8% for urban area and higher rate for the rural area. As clarified by Awoyemi and Ogunniyi (2012), 5% and above prevalence of malnutrition should be considered significant and detrimental to children's health with attendant implications on their physical and mental growths. In addition, this situation has a negative reflection on the health profile of the country at large and it also reveals inadequate progress to achieve the target 3.2 of SDGs goal 3 to decrease infant mortality

Moreover, the largest malnourished population are male children and those within age of 0-23 months. This means that the incidence was higher among the male than female children, indicating that the physical and cognitive development of male children are compromised. Malnutrition is a critical public health unruly as it affects both the physical and mental development of a child. The mental damage, which is often attributed to deficiency of iodine is permanent and directly connected to poor school performance [3] and loss of productivity. The malnutrition prevalence rates recorded highest among the children in the age bracket of 0-23months, indicate that these children are at risk of death and diseases in their first two years. In the case of severe acute malnutrition, it causes failing health, increases risk of infection as noted by. [9] It can also increase the mortality rate if the child is not given apt and adequate treatment

Moreover, the prevalence rate of malnutrition is much more in the rural area as compared to the urban area. This indicates that the larger percentage of under-five children in the rural areas are malnourished as they are stunted and underweight. Also, it was emphasized that underweight condition was significantly more in the rural than in urban area as a result of problem of food security. [21] This analysis showcases inequity in the distribution of resources, especially health resources in the rural area. Higher prevalence rates of malnutrition in the rural area also revealed low standard of living and high infant death rates in Ekiti State and in Nigeria at large.

The results also indicate that parent's marital status, household size, mother's type of occupation and the mother's level of income influence the prevalence of malnutrition in Ekiti state. This situation is anticipated because the majority of the mothers in Ekiti, especially in the rural area are self-employed with low level of education. This may have implications for malnutrition, since mother's education and income are maternal factors related to malnutrition. [20] As indicated in the results, the majority of the children were male from parents with married monogamous status, wage employed and self-employed parents. These findings are similar to the findings of other related studies, as they all concluded that mother's level of education and income has an impact on the incidence of child malnutrition. [18-22]

CONCLUSIONS

This study examined the prevalence and socioeconomic determinants of malnutrition among under-five children in the urban and rural areas of Ekiti state, Nigeria. On the account of the findings of the study, it was concluded that the mothers' level of education is not adequate, a more reason why they are self-employed with consequent implications on their level of income.

Thus, the findings clamor for women empowerment through skill acquisition and training, especially for those in the rural areas. This will increase their income level and aid them in providing sufficient nourishing food for their ward. Learning opportunities should be made available for women to improve their level of education and position them for better employment prospects. A survey of this nature should be conducted at intervals, to lean support for adequate planning and monitoring for improvement so as to meet up with the international goals on nutritional status of under-five children in 2025.

Conflict of Interest

The authors declare no conflict of interest.

Acknowledgements

The author acknowledges the support of John Awoyemi for proofreading this work and the students of Economics Department, Afe Babalola University Ado-Ekiti, who participated in data entry and cleaning.

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