

Determinants of Children's Nutritional Status among Primary School Children of Farming Households in Ekiti State, Nigeria.

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ABSTRACT

This paper assessed nutritional status and their determinants among primary school children of farming households in Ado-Ekiti, Nigeria. One hundred and seventy five (175) female parents in farming occupation were randomly drawn and surveyed for twelve weeks. Preliminary analysis indicated that majority (i.e. 67 percent) of the mothers have their ages falling between 20 and 40 years and had children within the 5-11 year old age bracket, who were in primary schools in the community. Anthropometric measures indicated that 69 percent of the male children and about 51 percent of female children had weight-for-age indices within the range 2.01 and 3.01 kg/yr. About 56 percent of male children and about 41 percent of female children posted weight-for-height measures of between 5.01 and 20.0 kg/m. Also, about 35 percent and 44 percent of male and female children, respectively, had height-for-age indices within the 0.12 and below 0.15 m/yr. Estimates of the body mass indices (BMI) revealed that 50 percent and about 51 percent, respectively, of the children fall within the 15.0 and below 20.0 kg/m². Contingency analysis revealed that mothers' educational status and mothers' appearance, child's sex, and living condition/environment of the household showed significant associations ($P < 0.10$) with indicators of nutritional status (i.e. weight-for-height, weight-for-age, and BMI) of primary school children in Ado-Ekiti. Regression analysis confirmed that frequency of reporting maladies/visitations to medical facilities had positive influence on BMI. On the contrary, child's physical appearance had negative effect on the weight-for-age indices while the size of the household and incomes of other household members had positive influence on the weight-for-age indices. Similarly, child's age, household size, frequency of illness, living condition, and incomes of other household members influenced positively children's weight-for-height indices. Child's age affected children's height-for-age indices negatively while incomes of other household members influenced child's height-for-age measures positively. The implication of some salient incidences such as obesity, stunting and wasting among primary school children of farming households in Ado-Ekiti are examined, and useful suggestions proffered.

Keywords: *Children, Nutritional Status, Farming households and Anthropometrics.*

1. INTRODUCTION

Nutrition is a fundamental pillar of human life, health and development across the entire life span. From the earliest stages of foetal development, at birth, through infancy, childhood, adolescence, and into adulthood and old age, proper food and good nutrition are essential for survival, physical growth, mental development, performance and productivity, health and well-being (FAO/WHO, 1992; WHO, 2000).

Malnutrition, and in particular protein-energy malnutrition, in young and growing children have become one of the serious health problems in Nigeria. Malnutrition is regarded as a complex outcome with multiple causation. It can have adverse effects on the physical and mental development of growing children. Moreover, since growth disorder in human being sometimes result from poor nutrition and other environmental upsets, growth surveys and empirical growth indicators would prove quite essential particularly in monitoring the nutritional outcomes and status of young children in any community.

Evidence has shown that 4% of the total children born in developing countries die of malnutrition before they are five years old (Toriola, 1990); and that the most affected are usually the children of illiterate parents in low socio-economic brackets that have low purchasing power in the economy (Adekunle, 2005). Quite a number of studies have shown that poor feeding and or recurrent infections as a result of poverty leads to stunted growth and delayed mental development. It has also been shown that physical growth and cognitive development in children are faster during early years of life and that by the age of four years, 50% of the adult intellectual capacity has been attained and before thirteen years, 92% of adult intellectual capacity is attained (Kerr & Black, 2000; Ivanovic et al., 2002; Chang et al., 2002; Braveman & Gruskin, 2003; Liu et al., 2003).

Empirical analysis of nutritional outcomes in children involves the examination of individual children's physical condition, growth and development, behaviour, the urinary, blood and tissue levels of essential and other trace elements (or nutrients), and the quality and quantity of nutrients intake (Krause and Mahan, 1979).

According to Fisher and Fungua (1979), the main purpose of most nutritional studies is to locate persons and groups (including children) whose nutritional status ought to be improved upon. Findings from such studies can lead to the development and implementation of sound nutritional and/or educational programmes, which will help people to improve their diets and food habits. Such studies can also confirm the relationships between the food consumption habits/behaviour, and the nutritional outcomes/status for those who make decisions about food production and consumption so as to meet, as well as to improve upon the people's nutritional needs at various levels and ages in Nigeria.

Childhood undernutrition remains a public health problem in Nigeria as the status did not improve substantially during the last two decades. The implications of this unrelenting situation for the well being of children and the development of the nation as a whole are unacceptable because undernutrition contributes to the high rates of morbidity, disability and mortality among children (WHO;2000). In addition, undernutrition constrains people's ability to fulfil their potential as it is also associated with impaired growth, mental development and school performance, reduced adult size and reduced work capacity, which in turn impacts on economic productivity at the national level (Hart and Atinmo; 2003). Generally, children constitute the most nutritionally vulnerable group in any community. In this study, it is hypothesized that children from farming families are at special nutritional risk, and this justifies the need for an investigation of the underlying causes of malnutrition in children living under such circumstances.

The main focus of the study therefore is to analyse, identify and to quantify the effect of major factors that determine nutritional status of children based on some morbidity conditions that can have effect on the nutritional status of children ages 5-11years in Nigeria, using some anthropometric parameters such as underweight (weight for age), wasting (weight for height) and stunting (age for height). To achieve the objective of the study, three main indicators of child malnutrition were used; stunting, underweight and wasting. By taking anthropometric measurements of sex, age, height and weight, and using them to generate Z-scores, the study estimated the prevalence of stunting, underweight and wasting among primary school children of selected farming households. In the regression analysis, the three malnutrition indices were regressed against several child-specific, households and socioeconomic variables.

2. MATERIALS AND METHODS

2.1 The Study Data and Collection Method

The study was conducted in Ado-Ekiti, Ekiti State, Nigeria. In order to achieve the objectives of the study, anthropometric data on primary school children were collected in a survey investigation. The data include those on household socio-economic status, as well as health, sanitary status and other conditions in the living environment of the farming households in the study area.

For the purpose of the survey, structured questionnaires were prepared and administered on parents of primary school children living in farming households in Ado-Ekiti. The survey spanned a period of three months and information on the height, weight, age, sex, visits to hospitals/clinics, outward health appearance of children between 5 and 11 years old, born and/or being raised in a farm family/household in Ado-Ekiti were obtained.

Similarly, information was obtained on the mothers of target children in the farming households covered in the survey. In addition, data were obtained on the composition, income, religion and occupational status of respondent households in Ado-Ekiti. Additional information was collected on farming households' access to safe water, and the type and location of living quarters, waste disposal habits and practices, and food storage. Effort was also made to confirm any incidence of epidemic within respondents' households in the last five years.

Anthropometric measurements (heights and weights) of children and their parents were measured using standard techniques (WHO, 1983). All measurements were performed between 8.00 and 12.00hr. Height was measured to the nearest millimetre, with a portable direct reading stadiometer while the subjects were shoeless. Body weight was measured with light clothing and shoes off, using Seca digital scale (German) to the nearest 100g. The weight-for-height z-score (an index of body wasting) and height-for-age z-score (an index of stunting) were determined as nutritional indicator for present and past nutritional status respectively.

2.2 Method of Data Analysis

Both descriptive and quantitative analysis was carried out in the study. Descriptive analytical tools such as frequency tables, ratios and percentages, were used to describe the households' socio-demographic characteristics. These tools were, in addition, employed to present indices of child malnutrition and the female parents' health/nutritional status as well as to present information on some basic environmental situation and sanitary status of the target households in the study area.

The quantitative analysis that was carried out in the study is in three parts. The first part entailed the construction of a body mass index (BMI) and some other health and nutritional indicators for children (5-11 year old) and their maternal parents. With these ratios/indicators, the incidence of under or mal-nutrition was determined among children and their female parents living as farm families in the study area. In addition, appropriate standards were used to establish the nutritional status (that is, cases of obesity, underweight, stunting, and wasting) of the target children in the study area.

As a second part to the quantitative analysis, several contingency tables were prepared in the study. The Chi-square analysis was carried out so as to determine the significance of the associations between several households' socio-economic and environmental variables, and the nutritional/health status and indicators for children and female parents living as farm families in the study area.

The regression analysis formed the final aspect of the quantitative analysis that was carried out in the study. In this regard, the regression equation of the form below was fitted by the ordinary least square (OLS) estimation technique to the study data.

$$V_i = f(X_{1i}, X_{2i}, X_{3i}, X_{4i}, X_{5i}, X_{6i}, X_{7i}, X_{8i}, X_{9i}) \dots\dots\dots (1)$$

Where;

V_i is the indicator of the nutritional outcomes of the i th child in the study area;

X_{1i} is the educational attainment (in years) of the i th female parent in the study area;

X_{2i} is the income (₦) of the i th mother in the study area;

X_{3i} is the household size of the i th farm family in the study area;

X_{4i} is a dummy variable for the living condition of the i th farm family with study area (1 = hygienic environment; 0 = otherwise);

X_{5i} is the frequency of visit by the i th farm child to health institutions in the last five years in the study area;

X_{6i} is a dummy variable for the access of the i th farm family to safe water and some other conveniences of living in the study area (1 = access; 0 = otherwise);

X_{7i} is the age of the i th farm child in primary school in the study area;

X_{8i} is the land holding (Ha) of the i th farm family in the study area;

X_{9i} is a dummy variable for the incidence of epidemic in the i th farm family in the study area (1 = record of epidemics; 0 = otherwise).

3. RESULTS AND DISCUSSION

3.1 Socio-demographic and health characteristics of female parents and their households.

Table 1 shows the descriptive analysis carried out in the study area which indicated that, majority (i.e. 68 percent) of the mothers have their ages falling between 20 and 40 years. The mothers were mostly of the Christian faith. Only 44 percent were Moslems while none of them practiced the traditional religion. Three quarters (i.e. 75 percent) of the sampled mothers are literate. Of this proportion, however, 42 percent had between one and six years of education. Only 25 percent among the respondent female parents in Ado-Ekiti had no formal education. The bulk (i.e. 69 percent) of the respondent mothers had between one and five members residing within their households. None of the female parents however, had more than 10 members residing within their households. Further evidence revealed that majority (i.e. 50 percent) of the mothers reside within households with ownership of income – generating asset (i.e. land of at least 1.5 Ha in size.). 70 percent of the mothers had between one and three children. None, however, was found to have more than six children living within the household. Also, majority (i.e. 66 percent) of the mothers had their individual weights falling between 40 and less than 60kg. Besides, 30 percent of the mothers weighed over 60kg while none of them had their individual weights falling below 20kg. Almost all the mothers posted height measurements that were at least 1.5m. The mothers were thus predominantly of average-to-tall heights in the study area.

3.2 Anthropometric measures distribution for Nutritional outcomes among school- age children (5-11 years old) in Ado-Ekiti

Table 2 provides the nutritional status indicators for children within the 5-11 years age bracket by sex in Ado-Ekiti. According to Table 2, there were more female children (i.e. 91) than male children (i.e. 84) within the 5-11 year age bracket among the study sample. Further, evidence revealed that the bulk (i.e. about 69 percent) of the male children within the age bracket had their weight-for-age indices falling between 2.01 and 3.00. Similarly, the bulk (i.e. about 51 percent) of the female children of the same age bracket had their weight-for-age indices between 2.01 and 3.00. While 35 percent of the female children had their weight-for-age indices above 3.00, only about 18 percent of the male children had their weight-for-age indices above 3.00. Consequently,

within the 5-11 year age category, the male children are likely to suffer global malnutrition (i.e. stunting and wasting) than the female children.

The weight-for-height indices for male and female children for this age bracket, revealed that about 56 percent of the male children and about 41 percent of the female children had their weight-for-height indices between 15.01 and 20.00 brackets. However, while about 23 percent of the male children had their weight-for-height indices above 20.00, about 40 percent of the female children had their weight-for-height measures above 20.00. The incidence of acute malnutrition (i.e. wasting) is thus likely to be more among the male children than among the female children of the same age bracket.

Table 2 further provides the distribution of children by their height-for-age indices. The bulk of both the male children (i.e. above 35 percent) and the female children (i.e. about 44 percent) had their height-for-age indices between 0.12 and below 0.15. However, while only 34 percent of the female children had their height-for-age indices above 0.15, fifty-two (52) percent of male children had their height-for-age indices above 0.15. Consequently, the male children in the study sample are most likely to suffer from stunting (or chronic malnutrition) than the female children.

The body mass indices for the children presented in Table 2, revealed that half of both the male children (50 percent) and female children (about 51 percent) had a body mass indices that fall within the 15 and below 20 category. Further, approximately equal proportions of male and female children (i.e. 89 percent and about 90 percent, respectively) had their body mass indices below 20. Consequently, sizeable proportions of both male and female children between 5 and 11 years old in the study sample are underweight. Also, while about 4 percent of the male children were overweight (i.e. 25 and below 30), only 2 percent and 1 percent, respectively, of the female children were overweight (i.e. 25 and below 30) and obese (i.e. above 30) in the study sample.

3.3 Contingency analysis of major factors influencing nutritional outcomes

The result of contingency analysis of the salient factors influencing the nutritional status of children between 5 and 11 years old in Ado-Ekiti are presented in Tables 3, empirical evidence showed that all the relationships were significant at the 10 percent level. For children between 5 and 11 years old, the hygienic status of the dwelling environment influence children body mass indices as well as their weight-for-height measures.

3.4 Socio-economic and environmental determinants of nutritional outcomes

Table 4 presents the results of the stepwise (ordinary least squares) regression analysis of the effects of household and environmental variables on children's (i.e. 5 to 11 years old) nutritional outcomes in Ado-Ekiti. It is shown that, for children 5 to 11 years old, the more paled a child's physical appearance and the higher the child frequency of visitation to health/medical facilities, the higher the child's body mass index. As such, visitations to health facilities, as well as the outward paleness and sickly appearance of children between 5 and 11 years can be expected to compel drastic improvement in their nutritional status, and hence, in their body mass indices.

The results of the analysis of the determinants of the child's weight-for-height indices are also provided in Table 4. For children 5 to 11 years old, the older the children, the lower the children's weight-for-age indices. However, the larger the size of the household, and the larger the income of other members living in farming households in the study area, the better the children's nutritional status. Large households and supplementary incomes within the households in Ado-Ekiti should be expected to improve children's exposure to supplementary meals including snacks in between normal meals. Expectedly, such exposures should improve a child's nutritional status.

The table also provides the determinants of children's weight-for-height indices in the study area. The child's age indicated a positive influence on the weight-for-height indices of children between 5 and 11 years old. In addition, the mother's income and supplementary income contributions by other household members, and incidence of illness and serenity/hygiene of the living environment had a positive effect on their weight-for-height indices. Ageing among children - 5 to 11 years old - would improve care and nutrition for children, and hence reduce the likelihood of wasting (or acute malnutrition) among children. Increase in incomes of mothers, and in supplementary income contributions by other household members would raise the children's weight-for-height indices and lower the incidence of acute malnutrition. Improvement in the living environment and frequency of maladies can be expected to improve child nutrition and health status indicator in the study area.

Finally, the results of the analysis of the determinants of the height-for-age indices for children in Ado-Ekiti, revealed that for children 5 to 11 years old, the older they become, the lower their height-for-age indices, and hence, the likelihood of revealing chronic malnutrition (or stunting). Moreover, supplementary income contributions by other household members would improve children's height-for-age indices, and reduce the possibility of showing any stunted growth.

4. SUMMARY AND CONCLUSION

The primary objective of this study was to analyse the socio-economic and environmental determinants of nutritional outcomes in primary school children of farming households in Ado-Ekiti. In order to achieve this objective, one hundred and seventy five female parents of the target children were drawn from the seven traditional quarters in the town and surveyed over a period of three months. The anthropometric data collected were analysed using both descriptive and quantitative analytical tools.

Results indicated that the majority of the mothers had between one and three children living, within the households. Empirical analysis of the nutritional outcomes among school children in Ado-Ekiti revealed that the male children are likely to suffer global malnutrition than the female children. Also, the incidence of acute malnutrition is likely to be more among the male children than among the female children of the same age bracket. Furthermore, the male children in the study sample are most likely to suffer from chronic malnutrition than the female children. According to the estimates of the body mass indices, sizeable proportion of both male and female children between 5 and 11 years old in the study sample were underweight.

The result of the contingency analysis revealed that the hygienic status of the dwelling environment influenced the children's body mass indices and their weight-for-height measures. Furthermore, regression analysis confirmed that the more paled the child's physical appearance, and the higher the child's frequency of visitation to health or medical facilities, the higher the body mass index.

The older the children become the lower their weight-for-age indices. The bigger the size of the household, and the larger the income earned by other members of the household, the better the nutritional outcomes among the children. The child's age indicated a positive influence on the weight-for-height indices. Again, the mother's income and supplementary income contributions by other household member, and incidence of illness and the nature of serenity/hygiene of the living environment had a positive effect on the weight-for-height indices for the children. Also, ageing would improve care and nutrition for children. Specifically, empirical analysis confirmed that the older the children, the lower their height-for-age indices. Moreover, supplementary income contributions by other household members would improve children's height-for-age indices in the study area.

Empirical findings suggested that male children in Ado-Ekiti are prone to incidences of global malnutrition (i.e. underweight), acute malnutrition (i.e. wasting) and chronic malnutrition (i.e. stunting). Improvement in the hygiene status of the living compound, better earning opportunities for mothers, and more access to supplementary incomes by other household members can improve nutritional outcomes among children as well as reduce paleness and frequency of visitations to health facilities.

Conclusively, the study revealed that the proportion of malnourished and intellectually deprived children among

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Table 1: Socio-demographic and health characteristics of female parents and their households.

Variables	Frequency	Percentage
Mother's Age		
20-30	44	25
31-40	76	43
41-50	28	16
51-60	17	10
61-69	10	06
Total	175	100.00
Educational Background		
No formal education (0)	43	25
Primary Education (1-6)	74	42
Secondary Education (7-12)	34	19
Tertiary Education (13-16)	24	14
Total	175	100
Household size		
1-5	120	69
6-10	55	31
>10	0	0
Total	175	100
No of Children		
1-3	123	70
4-6	52	30
> 6	0	0
Total	175	100.0
Mother's Weight		
<20	0	0.00
20-39	7	4.0
40-59	116	66
>60	52	30
Total	175	100
Mother's Height		
<1m	0	0.00
1.1-1.5m	143	82.0
>1.5m	32	18.0
Total	175	100
Land Ownership		
<1Ha	73	42
1-1.5Ha	87	50
>1.5Ha	15	8
Total	175	100

Table 2: Anthropometric measures distribution of children within the 5-11 years age bracket by sex in Ado Ekiti (2010)

Indices	Male		Female	
Weight-for-age	Frequency	percentage	Frequency	percentage
Below 1.01	-	-	1	1.10
1.01-2.0	11	13.10	12	13.8
2.01-3.0	58	69.04	46	50.55
3.01-4.0	15	17.86	28	30.77
Above 4.0	-	-	4	4.40
Total	84	100.00	91	100.00
	Male		Female	
Weight-for-height	Frequency	percentage	Frequency	percentage
Below 10.01	2	2.38	3	3.30
10.01-15.0	16	19.05	15	16.48
15.01-20.0	47	55.95	37	40.66
20.01-25.0	15	17.86	24	26.37
Above 25.0	4	4.76	12	13.19
Total	84	100.00	91	100.00
	Male		Female	
Height-for-age	Frequency	percentage	Frequency	percentage
Below 0.09	-	-	1	1.10
0.09andbelow0.12	11	13.10	19	20.88
0.12andbelow0.15	29	34.52	40	43.96
0.15andbelow0.18	20	23.81	6	6.59
Above 0.18	24	28.57	25	27.47
Total	84	100.00	91	100.00
	Male		Female	
Body mass index	Frequency	percentage	Frequency	percentage
No more than 5	-	-	1	1.10
5 and below 10	1	1.19	2	2.20
10 and below 15	32	38.10	33	36.26
15 and below 20	42	50.00	46	50.55
20 and below 25	6	7.14	6	6.59
25 and below 30	3	3.57	2	2.20
Above 30	-	-	1	1.10
Total	84	100.00	91	100.00

Table 3: Contingency analysis of the effect of living condition of the households on the children's (5-11years old) anthropometric measures

Children's Body Mass Indices				
Living Condition	Not more than 15	Below 15	Above 30	Total
Healthy	52	53	01	106
Unhealthy	16	49	0	65
Total	68	102	01	171

Children's weight-for-height measures				
Living condition	Not more than 15	Below 15	Above 30	Total
Healthy	28	77	01	106
Unhealthy	05	58	02	65
Total	33	135	03	171

Notes: Chi-square value $\Rightarrow 11.019^a$; Asymptotic Significance = 0.004. Estimate Significant at the 1 percent level.

Table 4: Regression analysis of the determinants of various anthropometric measures for primary school children in Ado-Ekiti.

Independent variables (body mass indices)	Children 5-11 years old
Constant	16.032 *** (22.86)
Age	-
Farm size	-
Frequency of illness	3.692 *** (4.308)
Appearance	-5.702 ** (-2.354)
Adjusted R ²	0.090
F	9.559***
Independent variables (weight-for-age indices)	Children 5- 11 years old
Constant	3.094 *** (11.599)
Child age	-0.102 *** (-4.331)
Other household	2.65X10 ⁻⁶ ** (2.306)
Members' income (ohh)	8.04X10 ⁻² ** (2.061)
Adjusted R ²	0.128
F	9.541***
Independent variables (weight for height indices)	Children 5- 11 years
Constant	8.654 *** (7.342)
Child's age	0.977 *** (7.366)
Other's income	2.37x10 ⁻⁵ *** (2.066)
Illness	1.025 *** (2.839)
Living condition	1.652 *** (2.678)
Other household income	1.36X10 ⁻⁵ ** (2.065)
Adjusted R ²	0.303
F	16.111***
Independent variables (height for age indices)	Children 5-11 years
Constant	0.268 *** (33.840)
Child's age	-1.5 X 10 ⁻² *** (-16.084)
Other household income	8.97 X 10 ⁻⁸ *** (2.027)
Adjusted R ²	0.603
F	132.884***

Notes: *** = Coefficient significant at 1%; ** = Coefficient Significant at 5%; * = Coefficient Significant at 10%; - Independent Variable did not enter the solution model

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