The Anthropometric Status of Farming households in Kogi State, Nigeria

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Abstract

A country needs a well nourished population of children for a productive future. Malnutrition is by far the biggest contributor to child morbidity and mortality; therefore, combating malnutrition in our communities should be an issue to policy makers. With the use of anthropometric indices derived from survey data collected from 150 randomly selected children from 150 farming households in Kabba Bunu Local Government Area of Kogi State, this study assessed malnutrition of children in the Central part of Nigeria. Logit model was used to examine the relationship between some anthropometric indices and the general characteristics of the household and the children. A structured questionnaire was used to collect information from the sampled households. The result showed that about one-quarter of the children are underweight while a very insignificant number of the sampled children were wasted. The probit result showed that daily calorie intake and access to safe water had significant effect on underweight of children in the study area. Daily calorie intake per child was also significant on stunting and wasting. Over 66% of the farming households had access to well water and only 21% had access to bore-hole. Majority of the children could be said to be more susceptible to water borne diseases. Provision of better domestic water source, mass food production strategies can be policy options for a virile labour force in the study area.

Introduction

The world is currently experiencing both a food and a financial crisis. These are linked in complex ways through their implications for food security, financial and economic stability, and political security. It has been revealed that because the developing countries are more integrated within world markets, the latest food and financial crises will have stronger effects on those

countries than during previous crises. The impact is also stronger on the poor and hungry, many of whom are now more closely linked to the wider economy. The International Food Policy Research Institute (IFPRI) estimates that recession and reduced investment in agriculture could push 16 million more children into malnutrition in 2020. Nigeria with a GHI between 10.0 to 19.9 with serious level of hunger also show a high vulnerability to the downturn.

Malnutrition and undernourishment are cumulative or average situations, and not the work of a single day's food intake (or the lack thereof). Various scales of analysis have to be considered in order to determine the socio-political causes of malnutrition. For example, the population of a community may be at risk if it lack health related services, but on a smaller scale certain household or individuals may be at even higher risk due to differences in income levels, access to land or levels of education. Also within the household, there may be differences in levels of malnutrition between men and women, and these differences have been shown to vary significantly from one region to another with problems areas showing relative deprivation of women. Children and elderly tend to be especially susceptible.

Malnutrition causes a great deal of human suffering, and it is a violation of a child's human right. Approximately 27% of children under 5 in developing world are malnourished, and in these developing countries malnutrition claims about half of the 10 million deaths each year of children under 5. (FAO, 2005). People who survived a malnourished childhood are less physically and intellectually productive and suffer from more chronic illness and disability. The costs to the society are enormous; eradicating malnutrition remains a tremendous pubic challenge.

The WHO estimate revealed that only one-third of the world is well fed, the rest are either underfed (one-third) or starving (one third). Malnutrition is by far the biggest contributor to child mortality(WHO). It has been recognized that malnutrition in the first two years of a child is irreversible. Children who are malnourished not only tend to have increased morbidity and mortality but are also more prone to suffer from delayed mental development, poor school performance and reduced intellectual achievement (Pelletier and Frongillo, 1995). It is estimated that 14% of children are born with low birth weight every year, around 45 million preschool

children are malnourished and 192 million Africans of all ages are hungry. In 2009, about 6 million children are said to be malnourished in Nigeria. Malnutrition is a major cause of child mortality, which tends to reduce labor availability for farm work. This in turn leads to low farm output causing higher food prices. The yearly loss of about 6 million children may reduce the number of farmers in our villages, since majority of the rural dwellers in Nigeria are poor and uneducated about their nutritional status. Furthermore, children's under nutrition affects their physical and cognitive development and has implications for their earnings as adults (Hoddinott et al. 2008)

It is widely accepted that children over the world have much the same growth potential, at least to seven years of age. Inadequate diet, environmental factors, diseases, and the handicaps of poverty appear to be far more than genetic predisposition in predicting deviation from this same potential. These conditions, in turn, are closely linked to overall standard of living and the ability of population to meet their basic needs.

Chronic malnutrition is usually measured in terms of growth retardation. Therefore, the assessment of growth not only serves as one of the best global indicators of children's nutritional status, but also provide an indirect measurement of the quality of an entire population (de Onis ; Frongillo & Blossner, 2000; Lavy et al, 1996; Martorell et al, 1992). Large scale development programs such as the Millennium Development Goals (MDGs) have also picked up the importance of the under- fives children nutritional status as indicators for evaluating progress (UNDP, 2005; Bambas et al, 2005,UN millennium project, 2006).

While famines and other episode of severe hunger receives significant press coverage and attract public attention, chronic hunger and malnutrition which are considerably more prevalent in Africa needs more attention.

With the use of Anthropometric indices this study assesses the prevalence of malnutrition among farming households in Central Nigeria using Kabba/Bunu L.G.A of Kogi-State as a case study. Specifically, the study describes the socio-economic characteristics of the farming households, examines the extent and level of malnutrition among the farming households, identifies the determinants of malnutrition among farming households and highlights the policy implications of our findings.

In addition to factors that affect the household access to food, which can affect an individual's own dietary intake, a child's nutritional status will also be affected by the hygienic condition of the household, ease of access to and quality of health care, and mothers care giving practices. Because this survey was meant to primarily collect expenditure and demographic information on the proximal determinants of nutritional status , such as individual dietary intake, nor genetic or biological factors that determine growth such as child's height.

As a result, in some cases we used household level variables to represent the effect of these potential determinants at the individual level, while understanding that intra-household mechanisms mediate the effect of these factors on child nutrition. Factors affecting household access to food, which may also affect the child's access to food, are detailed above in the discussion of calorie availability model. Maternal education attainment is used as a proxy for caring practices. Use of prenatal care is included as a proxy for preventive health care use, and availability of a latrine, source of water, and in house crowding (denoted by number of rooms per capital) are used to capture the environmental conditions of the household. The chart below exemplifies the concept of this research work.

Malnutrition in early childhood is also associated with significant functional impairment in adult life and, reduce work capacity, thereby affecting economic productivity (Mendez & Adair, 1999, Delpeuch et al, 2000).

Although malnutrition affects children, but several studies have shown that the nutritional status of an adult is greatly associated with his nutritional experience from conception through early childhood, of greater concern is the risk that childhood malnutrition will persist into adolescence and adulthood.

The rate of wasting were generally higher than those of overweight in developing countries. Africa and Asia had wasting rate 2.5-3.5 times higher than overweight rate. The high rate of child morbidity and mortality caused by malnutrition is alarming and it is a serious health enigma which may result in reducing the number of farmers in the rural areas and also a decline in farm productivity.

Methodology

This study was carried out in Kabba/Bunu Local Government Area of Kogi State. Kabba/Bunu is a Local Government Area in Kogi State, located on Longitude 6^0 29' and Latitude 5^0 43' in the North Central part of Nigeria. The local government is characterized by warm climate , high rainfall and thick vegetation. The crops grown among others include: cassava, yam, maize, sorghum, vegetables. Cash crops like cocoa, coffee, cashew, are commonly grown. Fruits such as mango, orange, cherry e.t.c. The local government is also located in the Western Senatorial district of kogi state. Its headquarters is located in Kabba town. It has an area of 2,706 km² and a population of 145,446. The state has a population of about 3,595,789 people and a total land area of 29,833 km^2 (NPC,2006). The choice of the area is based on the agrarian nature of the rural communities where over 70% of the residents are farmers. The predominant religion in the area is Christianity, the people have similar culture like the Yoruba people from the Western Nigeria. The local government is made up of ten political wards with (Owe) as the major language. The local government is one of the five L.G.A 's that make up the Okun people of Kogi state. Kabba/Bunu L.G.A shares boundaries with Okene, Ijumu, Lokoja L.G.A's of Kogi state and Omuo-Ekiti in (Ekiti state). Some of the notable communities in Kabba/Bunu L.G.A include: Kabba,Oke-bukun, Iwaa, Apaa-Bunu, Aiyegule-Bunu, Igun-Bunu,Odo-Ape, Iluke-Bunu, Aiyede-Bunu, Ofere-Osomle-Bunu, Illah-Bunu.

A two-stage sampling technique was adopted. The first stage was the random sampling of five villages. These villages include: Oke-bukun, Apaa-Bunu, Aiyegule-Bunu, Igun-Bunu and Odo-Ape. These villages are typical rural communities and the inhabitants are predominantly farmer. The second stage involves the random selection of 30 farming households from each village. A total of 150 farming households were surveyed. An average of one child was sampled per farming households, the children were selected based on their ages and sex usually between one to sixty months.

Data were analyzed using frequencies, means, standard deviation, and percentages. The Probit model was used to examine the determinants of malnutrition among the farming households. The analysis was carried out in a PC using version 6.03 of the EPI-INFO software package.

In this study Z – scores of -2 were used as the nutrition poverty line. The anthropometric indices used for malnutrition in this study are stunting, wasting and underweight. The share of the sample falling below the nutrition poverty line were classified as malnourished.

The Z – scores below was used to measure malnutrition.

1. Height for Age HFA (Stunting)

$$Z = (X - \mu)/\delta$$

Where X = The child's height for age

μ = Median height for reference USDA standard

δ = Standard deviation

2. Weight for Age (Underweight)

$$Z_1 = (X_1 - \mu)/\delta$$

Where X_1 = The child's weight for age

μ = Median height for reference USDA standard

δ = Standard deviation

3. WFH (Wasting)

$$Z_2 = (X_2 - \mu)/\delta$$

Where X_2 = The child's weight for height

μ = Median height for reference USDA standard

δ = Standard deviation

The computed indices were used to classify the children to wasting, underweight and stunted.

Three logit models fitted are stated implicitly as:

$$Y_1 = f(X_1, X_2, X_3, X_4, X_5, X_6, X_7, X_8, X_9, Ui) \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots 2$$

$$Y_2 = f(X_1, X_2, X_3, X_4, X_5, X_6, X_7, X_8, X_9, Ui)$$

$$Y_3 = f(X_1, X_2, X_3, X_4, X_5, X_6, X_7, X_8, X_9, Ui)$$

Where Y_1 = malnutrition index (wasting) , Y_2 = malnutrition index (Underweight) and Y_3 = malnutrition index (Stunting) and

X_1 = Calorie intake of the household (24hrs food recall)

X_2 = Mother's education

X_3 = Household head's education

X_4 = Presence of toilet

X_5 = Access to safe water

X_6 = Age of child

X_7 = Height of child

X_8 = Weight of child

X_9 = Sex of child

The three anthropometric indices were used as dummy variables where a stunted child is coded as 1 and 0 if otherwise. Similarly underweight and wasted child are also coded 1 and 0 if otherwise.

Results and Discusssion

General characteristics of the sample

Table 1 summarises the characteristics of the farming household from the sampled chidren were surveyed.

Table 1: Socio-economic characteristics of the farming households

Variable	Frequency	Percentage
Household size		
>9	5	3.0
7-9	75	50.0
4-6	55	37.0
1-3	15	10.0
Household educational status		
No formal education	26	17.3
Primary education	82	54.7
Secondary education	42	28.0
Household spouse educational status		
No formal education	68	45.1
Primary education	56	37.5
Secondary education	26	17.4
Women marital status		
Married	139	92.7
Divorced	4	2.70
Widow	7	4.60
Children's characteristics		
Gender		
Male	88	58.67
Female	62	41.33
Age		

1	34	22.67
2	26	17.33
3	30	20.00
4	32	21.33
5	28	18.67
Farming household water source		
River	18	12.0
Well	100	66.7
Bore-hole	32	21.3
Farming household toilet status		
Bush	140	93.3
River	4	2.7
Pit	4	2.7
Household food intake (24hrs food recall)		
Cereal and tubers	101	67.3
Legumes	40	26.7
Vegetables	6	4.0
Fruit	3	2.0

Source : Field survey, 2010

Our analysis revealed that that the average household size of the was 7 made up of household. This implies availability of family labor for farm work. The household size indicated above for each farming household is made up of the household heads, their spouses, children and dependants.

Our result reveals that over 60% of the household heads are male. In a traditional setting where most small-scale farming households in the sample belong, both sexes co-exist and engage in

production (Adewumi and Omotesho, 1999).Male headed household is a common phenomenon in the study area. This result conforms with the cultural setting where men have more access to farmland and other farm inputs. The mean age of the household heads is 45.0 years with a standard deviation of 0.67. This implies that the household heads fall within the active age group.

The average farming household in the study area has 7 members with a modal household size of 7 – 9 members. Only 3% of the sample has a family size that is less than this average size. Meeting the average daily food requirement poses a challenge for these small farm holders. Majority of the farming household heads (72%) had no formal education(17.3%) or primary education(54.7%). The educational status of mothers in the households is similar to this with 17.3% with no formal education, 54.7% with primary education and only 17.4% has secondary education. Majority of the mothers (92.7%) are married. Only 2.7% are divorcees and (4.60%) are widowed. The marriage status is likely to have improve the level of malnutrition of the children in the households.

The study further revealed that from their 24 hours food intake recall, majority of the households(67.3%) cereals and tubers which are low calorie foods. Majority of the household heads concluded that their daily food intake depends on the type of food they produce from their farms while minority depends on what food they can afford from the market and on the level of income of the household heads.

The result indicated that majority of the farming households source their water for domestic purpose from sunk well (66.7%) and from flowing rivers (12.0%). Possibility of having access to safe drinking/domestic water is therefore remote. This has the tendency of exposing the farming households to illnesses and infections (disease) like diarrhea, guinea worm e.t.c. Almost all the households have no access to good toilet facilities, with a larger proportion having access to

bush (93.3%), river (2.7%) and pit (2.7%) toilets. This implies that majority of the farming households can easily be infected with cholera disease and other associated infections.

Children's general characteristics

Our sample contains children between the age of 12 – 60 months. The sampled children have an average age of 4 years. Of the 150 children sampled, 88 are boys and 62 are girls. From the result obtained, the average age, weight, height and calorie intake of the children were 4 years, 15kg, 70cm and 710 calories respectively. This result is inconsistent with expected ages of the child at the age of four. The expected weight and height for a year old is 10kg and 60cm respectively while the weight for 2, 3, 4, and 5 years are 12kg, 14kg, 16kg, and 18kg. Their respective heights are 70cm, 80cm, 90cm, and 100cm.

Extent of malnutrition among the farming households

Table 2 : percentage prevalence of malnutrition indices

Malnutrition indices	**%prevalence**
Stunting(Height for age)	-
Underweight(Weight for age)	24.66
Wasting(Weight for height)	3.33
Normal	72.01
Total	**100**

Source: field survey, 2010

The result of our analysis showed that a dominant proportion of the sampled children (72.01%) are normal i.e. not malnourished with no effect of malnutrition visible on them. The result revealed that none of the children was stunted, this may be because the stunting effect of malnutrition is cumulative and could only be visible at the advanced stage of malnutrition. The result also showed that about one-quarter of the children are underweight while a very insignificant number of the sampled children are wasted (3.33%).

Table 3 is the summary of our regression result.

Table 3 Result of the regression analysis (underweight = dependent variable)

Independent variable	Coefficient	Std error	t-value	Level of significance	F-value	Level of significance
Constant	-5.867	0.325	-18.046	0.000		
Age of child	-1.039***	0.049	-20.999	0.000		
Height of child	-0.001	0.004	-0.323	0.747		
Weight of child	0.569***	0.028	20.586	0.000		
Sex of child	0.378***	0.066	5.722	0.000	107.620*	0.000
Calorie intake	0.001**	0.000	2.183	0.031		
Household heads education(yrs)	-0.009	0.010	-0.878	0.382		
Mothers education(yrs)	0.010	0.009	1.119	0.265		
Access to safe water	-0.121**	0.057	-2.102	0.037		
Access to toilet	0.032	0.051	0.618	0.537		

*, **, *** significant at 10%, 5% and 1% levels respectively; $R^2 = 0.874$

Source: Field survey, 2010

Result of our logit regression showed that the age, weight, sex and the calorie intake of the child, are the four significant characteristic variables of the child that determines the malnutrition of the child. The negative signs on the coefficients of age and height of the child implies that the two variables have negative influence on the probability of a child to be underweight. Older children with higher heights are less likely to be underweight. The sex and calorie intake of the child also have positive signs. This implies that male children are more predispose to underweight than their female counterpart. The household access to safe water and education of the household head were also significant variables that explains probability of a child to be underweight. The two variables have negative sign. The better the household's access to safe water and education the less the chances of a child from being underweight.

The overall F-value of 107.62 which is significant at 1% reveals that the regressors combined effect on the changes in the weight for age is about 87% and is significant..

Table 4 Result of the regression analysis (stunting = dependent variable)

Independent variable	**Coefficient**	**Std error**	**t-value**	**Level of significance**	**F-value**	**Level of significance**
Constant	9.858***	0.226	43.616	0.000		
Age of child	-0.025	0.034	-0.716	0.475		
Height of child	0.001	0.003	0.184	0.854		
Weight of child	-0.009	0.019	-0.477	0.634		
Sex of child	0.001	0.046	0.031	0.975		
Calorie intake	0.000**	0.000	2.136	0.034	1.769**	0.079
Household heads education(yrs)	-0.006	0.007	-0.827	0.409		
Mothers education(yrs)	0.005	0.006	0.863	0.389		
Access to safe water	-0.057	0.040	-1.428	0.155		
Access to toilet	0.050	0.036	1.413	0.160		

*,**,*** significant at 10%, 5% and 1% levels respectively;
Source: Field Survey, 2010

The regression result for height for age implies that the combined effect of all explanatory variables explained only about 4% of the changes in height for age of the children. The only significant variable at 5% level in the model is the daily calorie intake per child. This implies that only the daily calorie intake per child determines the height for age of the child. Other included variables were not significant at any reasonable level of probability.

Table 5 Result of the regression analysis (wasting = dependent variable)

Independent variable	**Coefficient**	**Std error**	**t-value**	**Level of significance**	**F-value**	**Level of significance**

Constant	-3.285***	1.031	-3.185	0.002		
Age of child	-0.351**	0.157	-2.235	0.027		
Height of child	0.031)**	0.013	2.382	0.019		
Weight of child	-0.003	0.088	-0.029	0.977		
Sex of child	0.052	0.210	0.246	0.806	4.233***	0.000
Calorie intake	0.002**	0.001	2.576	0.011		
Household heads education(yrs)	0.017	0.032	0.518	0.605		
Mothers education(yrs)	-0.004	0.028	-0.146	0.884		
Access to safe water	-0.203	0.182	-1.113	0.268		
Access to toilet	0.321**	0.162	1.978	0.050		

*,**,*** significant at 10%, 5% and 1% levels respectively; $R^2 = 0.214$
Source: Field survey, 2010

Age of child, height of child, daily calorie intake and access to toilet facilities are significant at 5% level. Access to toilet, height of child and calorie intake of child have positive impact on the variation of weight for age of the children in the study area. The age of the children coefficient has a negative sign. This implies that the older a child becomes the less the probability of wasting. The result implies that sanitation in terms of access to safe water and toilet did not significantly affect malnutrition. This result is similar to studies conducted by Vande et al, 2007,Ukwuani et al, 2003.

The F-value of 4.233 implies that the overall regression is significant at 1% level. The adjusted R^2 value of 0.163 implies 16% of the changes in the weight for height of the children are being influenced by the variables combined. Given that children's under nutrition affects their physical and cognitive development and has implications for their earnings as adults (Hoddinott et al. 2008), the crises will have long-lasting negative implications for people's livelihoods and economic prospects long after prices come down and the financial crisis is resolved. The World Health Organization cites hunger as the gravest single threat to the world's public health. Malnutrition, in the form of iodine deficiency is the most common cause of mental impairment ,

reducing the world 's Intelligent quotient by an estimated billion points. Improving nutrition is widely regarded as the most effective form of aid.

Based on the study the following recommendations would bring about efficient reduction in the number of malnourished children in the study area:

Farming households need to embark on mass production of food so as to make the food available and affordabile. Access to good water is still a mirage. There is a need to to put in place policy that will see to provision of good water source in the area.

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