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Examining the Factors Influencing Child Stunting Among Rural Households in Zambia: The Case of Sinda District

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Abstract

This study was conducted to assess the factors affecting stunting in young children 6 to 60 months in rural households of Sinda district of Eastern Zambia. Data were collected from a hundred and thirty four (134) mothers and their youngest child using a household questionnaire. The study also implemented qualitative approaches to conduct 4 Focus group discussions and 8 in-depth interviews. The respondents were purposively identified and interviewed. Analytical techniques employed included; descriptive statistics to determine prevalence of stunting and describe household characteristics. A linear regression model was employed to examine the determinants of child stunting among households surveyed.

The study revealed that 50% of children were stunted but at different levels. Therefore, 23.9% of the children surveyed were severely stunted and 26.1% were moderately stunted. Among the variables determining children stunting, household income, maternal education, food insecurity status and mother's participation in nutrition training and child dietary diversity were found to significantly affect child stunting.

Keywords: Stunting, dietary diversity, Sinda, Zambia

1. Introduction

Child stunted growth is one of the forms of malnutrition and is simply defined as a reduced growth rate in human development. . Stunting reflects a child's chronic nutritional status influenced by long-term inadequate food intake and/or frequent illnesses (Svedberg, 2002). This is a major challenge because it affects a country's development and Zambia a country in Southern Africa has not been spared from the challenge of child stunting. Children suffering from this condition have reduced cognitive ability later on in life and their parents and caregivers spend more time in trying to remedy the situation. This is effort and time which could have been used in other activities such as farming, trade or other activities that uplift their standards of living.

Zambia's economy is heavily dependent on the copper mining industry. However, the majority of the population (60%) lives in rural areas and is dependent on subsistence agriculture for its livelihood (CSO, 2010). Malnutrition is widespread among children in Zambia and it is one of the leading contributors to the high burden of disease in the country (Masiye et al., 2010). The most vulnerable are the rural households that highly depend on seasonal food production and survive on diets that are deficient in a variety of micronutrients. Stunting rates are severely high in Zambia almost one in 2 children under 5 years are stunted (40%). Rural children are slightly more likely to be stunted compared to urban children. There are high stunting rates in the northern and eastern provinces (CSO, 2015).

Therefore, this research attempted to assess the factors influencing child stunting among rural households. Specifically, the study attempted:

- To determine the prevalence of child stunting (6 to 60 months) in rural households of Sinda district.
- To assess the influence of household characteristics on child stunting.

2. Theoretical framework

Child nutrition is assumed to be a function of a set of socio-economic factors including household food security, household income, crop and livestock production, parental education, and other demographic characteristics and this is consistent with findings by (Maxwell et al., 2000). This scourge of malnutrition is present all over the world, though the hunger map shows that it is most critical in Asia and Sub-Saharan Africa. Zambia shows critical levels of stunting at 40% which are above the standards set by the World Health Organization. A number of studies have been done to understand the causes of malnutrition and well classified into distal and proximate causes (Alderman, 2006; Manda, 2015). The interest here is the human factor, which has been oversimplified in the conceptualization of factors affecting child nutritional status. The anthropogenic factor is always dynamic and varies with time and place.

Alderman et al. (2006) using panel data from Tanzania establishes that better child nutritional status can be achieved by increasing income and using a complement of nutrition interventions. The problem of child malnutrition is due to poverty and can be resolved by improving the socioeconomic status of the population (Adelekan, 2003). In rural India, a study done by Imai et al. (2014) concludes that mothers education is associated with better child nutritional status and their regression results exhibit strong associations between child nutritional status and women's empowerment status.

Mbithe (2008) argues that nutrition education is a more effective way of fighting malnutrition, hunger, and ill health than the physical provision of food aid. She further stresses that it is much more beneficial to transfer nutrition education, as it is more sustainable than the physical provision of food.

Rutherford et al., (2014) underscores the potential of economic-strengthening activities such as village savings and loans in improving seasonal and transitory food security and highlights the need for additional nutritional interventions in order to overcome chronic nutritional challenges. The study done in Mozambique takes note of an indication of a sex gap between control over resources by men and the role played by women in child nutrition.

Burchi (2010) highlights in his study that mothers' schooling was proved to be a key to improving child nutrition, its marginal influence declining for higher educational levels. The results indicated that a mother's primary education had a direct influence on child stunting,. Makoka and Masibo (2015) in their study concluded that maternal education has a significant influence on child stunting, when the mother has at least a senior secondary level of education.

3. Method

The research was conducted from July 2016 to September 2016.

Study area

With the creation of Sinda district from the old Petauke and Katete districts, Sinda covers 262,288 hectares of land, has 40,000 households, population of 164,382 of which 33,760 are children below 60 months (CSO, 2010). The district is relatively new and information on the child nutritional status is limited hence this study aimed to fill this gap by providing information on the current trends of the prevalence of stunting in the district.

Sampling technique

A multi-stage sampling was employed in the study. Random sampling was used to select 6 camps and 18 villages to end up with 134 households where one mother and child pair was a respondent. In the first stage of sampling two (2) agricultural blocks were identified in the district and were selected by simple random sampling technique for it is not possible to take all of them because of time, financial and other resource limitation.

In the second stage of sampling, from the (2) two selected blocks, 6 camps were selected by simple random sampling and in similar fashion three (3) villages per camp selected, four (4) households per village and finally one (1) mother and child pair per household. The youngest child with age range between 6 months to 60 months was the inclusion criteria.

Data Collection

Data was collected using both qualitative and quantitative methods. Both primary and secondary sources of data were collected. The main method of collecting primary data was through a household survey with smallholder farmers and in-depth interviews with key informants from government and community volunteers.

Quantitative data was collected by administering questionnaires while qualitative data was drawn from focus group discussions, personal observation through transect-walks in the village and interviews with key informants. A combination of these methods allowed the researcher to validate and cross-check the findings from the survey.

Data analysis

The collected data was coded and entered into excel and later exported to SPSS version 20 for analysis. Analysis was done to obtain descriptive statistics (percentages and frequencies) and a multiple linear regression analysis to determine the predictors of poor nutritional status (stunting). Qualitative data was analyzed using thematic interpretation.

Empirical model

The multiple linear regression model was used to investigate the determinants of child stunting among rural households surveyed. The study employed the use of an analytical framework where the household is the starting point for the analysis of child stunting; Behrman and Deolaikar (1988) postulate that nutrition of an individual is normally determined by decisions they make or the household they live in. In this case, it is assumed that decisions on child's nutrition are made predominantly at a household level.

In the model, a household is assumed to have a utility function through which it strives to maximize its preferences subject to a set of constraints. The household's preference function is presented as:

$U=u(X, L, N)$…… (1)

The utility function of a household U is determined by X which represents the consumption of a vector of commodities, L which represents leisure and N which represents the nutritional status of children. Consumption (X) may be acquired through the market or produced at home (Strauss and Thomas, 1995) while the quality of children is indicated by N (Kabubo-Mariara, Ndenge and Kirii, 2006).

N is measured using the anthropometric status of children. The nutritional status of children is constrained by other factors which include child characteristics, household characteristics and community-related characteristics (Kabubo-Mariara, Ndenge and Kirii, 2006). This is shown below:

$Ni=n(C, W, H, Z,\varepsilon)$ ……..……(2)

Where C represents household food consumption, W represents the child-related characteristics, H represents the household related characteristics Z the community-related characteristics and ε is the child disturbance term (Kabubo-Mariara, Ndenge and Kirii, 2006).

The dependent variable in this study is child stunting as HAZ score a continuous variable. The independent variables used in the model were as follows:

X1=child age

X2=child feeding frequency

X3= Household size

X4= Child dietary diversity score

X5= Household income

X6= Maternal education

X7= Farm size

X8= Household food insecurity score

X9= Agricultural production score

X10= Participation in nutrition training

X11= Distance to clinic

Based on the above analysis, the Nutrition production function can be reduced further:

HAZi=f (child-related features, household characteristics, community-level characteristics, εha)

Where, εha is a random term error and i represent the ith group, defined by region, gender or time (Kabubo-Mariara, Ndenge and Kirii, 2006). HAZ, represent Height-for-age. The use of Z scores to determine the anthropometric status of children has been going on for decades and is supported by organizations like World

Health Organisation (WHO). A z-score (also referred to as a standard score) is the deviation of a child's value from the median of a reference population divided by the standard deviation of the reference population (De onis et al, 2006). The z-score indicates how far and which direction a measured value takes from the median.

4. Socioeconomic characteristics of households and prevalence of child stunting in Sinda

Household characteristics

Table 1 presents the socioeconomic characteristics. The results revealed that most (38.8%) were between the ages of 19 – 25 years. 56% of the children where between the ages 6 – 23 months. The majority of households earn K151 – K3, 000 (15 – 300 U.S dollars). The maternal age of respondents revealed that the highest number of 38.8% was in the age range of 19 – 25 years; this finding is consistent with those of the Zambia demographic health survey, 2015.

Table 1: Socioeconomic characteristics of households

Variable	Class	Frequency	Percent
Maternal age	19 – 25	52	38.8
	26 – 35	42	31.3
	36 – 40	19	14.2
	41 - above	20	14.9
Child Age	6 – 23	75	56
	24 – 36	29	21.6
	37 – 59	30	22.4
Household annual income	K 0 - k 150	42	31.3
	K 151- K 3000	78	58.2
	K 3001 - K 10,000	12	9
	K 10,001 - K 15,000	2	1.5
Maternal education	No education	45	33.6
	1 – 4	24	17.9
	5 – 7	42	31.3
	8 -12	22	16.4
Household Size	1 -4	54	40.3
	5 – 8	62	46.3
	9 – 14	18	13.4
Marital Status	Single	9	6.7
	Married	97	72.4
	Widowed	10	7.5
	Divorced	18	13.4
Food insecure	Yes	81	61
	No	53	39

N=134
Source: Fieldwork, 2016

The illiteracy levels among mothers was high at 33.6% and 46.3% of households had 5 – 8 members. The results revealed that 72.4% of mothers were married and 61% of the households were food insecure.

Prevalence of child stunting

The results points to a high prevalence of stunting in rural Sinda with 50% of the children in the survey being found to be stunted. The results reveal that 23.9% of the children surveyed were severely stunted and 26.1% were moderately stunted The stunting prevalence was further cross-tabulated against child gender in table 3-1 and the results revealed that for overall stunting, female children accounted for 25.4% and male children 24.6%. The children that were severely stunted by gender were the female at 10.5% and males 13.4%.

Table 1: Percentage of stunting by child gender cross tabulation

		Percentage of child gender		Total%
		Female	Male	
Stunting	Severe stunting	10.5	13.4	23.9
	Moderate	14.9	11.2	26.1
	At risk	8.2	8.2	16.4
	Normal	21.6	11.9	33.6
Total		55.2	44.7	100

N=134

Source: Fieldwork, 2016

The results on stunting by age in table 3-2 revealed that the highest stunting prevalence was in the age range of 6 months to 23 months accounting for 26.1%. The age range from 24 months to 36 months had 13.4% of children stunted and those children of ages between 37 months to 59 months accounted for 10.4%.

Table 2: Percentage of stunting by child age cross tabulation

		Percentage of categorical child age			Total%
		6 to 23 months	24 to 36 months	37 to 60 months	
Stunting	Severe	11.9	7.5	4.5	23.9
	Moderate	14.2	5.9	5.9	26.1
	At risk	6.7	4.5	5.2	16.4
	Normal	22.4	3.73	7.5	33.6
Total		55.2	21.6	23.1	100

N=134
Source: Fieldwork, 2016

5. Factors that affect child stunting in Sinda district

The research assessed the factors affecting child stunting. A Linear regression model was performed to determine the most influential factors affecting child stunting among households' socio-economic characteristics. The results from the regression model were summarized in Table 3.

Table 3: Summary results of the linear regression of the most influential factors determining stunting.

	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	3.000	.175		17.190	.000
annual household income	-8.529E-005	.000	-.136	-2.941	.004*
child diet score	-.407	.039	-.617	-10.514	.000*
food insecurity status	.006	.002	.116	2.495	.014*
agric production diversity score	-.017	.037	-.022	-.464	.643
Years mothers education	-.062	.020	-.171	-3.075	.003*
participation of mother in nutrition training	-.355	.124	-.147	-2.859	.005*

F= 64.305 R = 0.867, R^2= 0.752, * significant at 0.05 level of significance, N=134

Source: Field data, 2016

Results from table 2 revealed that the risk factors that were found to be significant with the dependent variable, stunting in children, were household income, maternal education (years of formal education), food insecurity status and mother's participation in a nutrition training. Household income, maternal education and mother's participation in nutrition training had an inverse and significant effect on stunting; increasing any of these variables will lead to reduced child stunting. Food insecurity status had a positive and significant effect on child

stunting, food insecure households are more likely to have stunted children. *"The causative factors are quite diverse, though the prominent ones are illiteracy of caregivers, poverty of rural households, monotype of agriculture leading to poor diets and sickness of child". Health worker, Sinda district.*

The health workers and community nutrition workers were generally of the view that the villagers in Sinda mainly suffer from malnutrition because of illiteracy of caregivers, poverty of rural households, and cultivation and consumption of monotype of crops where maize is the dominant crop of production and consumption. Two respondents from focus group discussions conducted in different villages felt that malnutrition is caused by parents not having diverse diet even though some of them cultivate different crops. *"I think it is due to not eating diverse food and some parents lack the knowledge in preparation of nutritious meals while some households cultivate most of the foods such as vegetables and legumes but they may lack the knowledge on how to prepare nutritious meals for our children". Respondent from FGD (focus group discussion)*

Participation in nutrition lessons was reported to improve the well-being of a child where most participants mentioned that the health personnel and community nutrition volunteers do teach mothers and caregivers on how to feed the child a balanced diet.

"The mothers/caregivers that have participated in nutrition lessons at the local clinic have children looking healthy because they apply what they have learnt. Sometimes children get sick when the caregivers are lazy to do what they are taught and give the children cold leftover nshima (maize paste). The doctor told me to feed the child with porridge three times a day, an egg and banana or fruits in a day and also in the morning ensure cooking the porridge with groundnut paste, in the afternoon and evening nshima with vegetables, legumes(beans or cowpea) or meat". Respondent from FGD

Discussion

The research unravels empirical debates that have taken a center stage at discussions in the agriculture sector in Sinda district of Zambia. The research used a localized approach and discovered that the findings challenge the assertion that the district is food secure but supports other findings that claim that the prevalence of stunting (chronic malnutrition) is high especially for moderate stunting. Prevalence results from the descriptive statistics show that the overall stunting in the study area is 50%. When further segregated the results show that children with severe stunting were 23.9% and those with moderate stunting to be 26.1%. Stunting by child gender showed that females accounted for 25.4% and males 24.6%. Stunting by child age showed that children aged between 6 months to 23 months accounted for 26.1%, 24months to 36 months 13.4% and 37 months to 60 months were 10.5%. This is consistent with findings from the central statistical office under the Zambia demographic health survey for the year 2014.

The results from the linear regression reveal that the proximal factor (child dietary diversity) has a significant and negative effect on stunting. This is consistent with findings by (Frison et al., 2006) established that children consuming more diverse diets are more likely to meet their nutritional needs and less likely to be stunted.

Annual household income has a significant and inverse effect on stunting. The higher the household income, predicts a lower chance of children being stunted. This translates into improved child nutritional status. This is consistent with findings by Alderman et al. (2006). From the study it was evident that these households predominantly engage in agriculture but still exhibit a plurality of livelihood activities and income sources such as wage work, trading and artisanal works locally and out of the village.

The Zambian education system from primary to secondary has a total of 12 years. The study shows that the number of years a mother spends in formal education has a significant and inverse effect on stunting. The higher the number of years the mother spends in school acquiring formal education reduces the chances of having stunted children. These findings are in line with the ones found by Makoka and Masibo (2015) who postulate that education status of mother has a significant effect on stunting.

Mother's participation in nutritional trainings has a significant and negative effect on child stunting and this could be the result of a change in attitudes and practices with increased nutrition knowledge. Empirical results from linear regression show that the more knowledge and child feeding practice the mother has and employs the less likely their child will be stunted. This result reiterates the position that mothers who participate in nutrition knowledge training offered by health clinics and local community nutrition volunteers have children with less likelihood of being stunted. These findings are supported by Mbithe (2008) who argues that nutrition education is an effective way of fighting malnutrition, hunger and ill health. Nutrition messaging and education geared towards behavior change at the individual level is a good approach of improving child nutritional outcome

(Fanzo, 2015).

The results empirically show a significant and positive association of food insecurity status and child stunting. These results are consistent with findings found by Sambu (2013) who reveals that food insecurity is positively and significantly affects child stunting. A household with a high coping strategy score is a food insecure household because it is using coping strategies more frequently and/or more severe ones to mediate the food stress situation. The results show that 61% of the households are food insecure in the study area and the study found that food insecurity has a positive and significant effect on stunting.

The study also went ahead and looked into the perceptions of the local people over the stunting problem and it was revealed that to the locals it is caused by poverty, lack of food and lack of knowledge to feed the child. From the perception of the locals they feel they would benefit greatly if nutrition volunteers under the health fraternity collaborated with agricultural volunteers.

Conclusion and Recommendation

The study achieved all its objectives and this has been addressed briefly above and in the summary of findings. We accepted the hypothesis that says that most of the household socio-economic and demographic characteristics significantly influence child stunting. The findings of this study are of great importance because they identify potential recommendation that can be used to improve the nutritional status of children and specifically the immediate interventions targeted to community based management of stunting. Food based strategies, livelihood enhancement programs and behavioral change communication sound like an option and a good start.

To achieve favorable outcomes in child nutritional status there is need for policy makers, analysts, and practitioners in local government and Non-governmental organizations to agree on the following;

There is need for a bottom-up approach inclusive of all stakeholders (community volunteers, NGOs, Government) in using holistic strategies in combating stunting.

There is a need to look into how all the stakeholders can cooperate and collaborate at both government and community level. Community volunteers implementing agriculture and health programs can cooperate where their objective is common.

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