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Risk Factors for Child Stunting in Migori County, Kenya

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Abstract

Globally, an estimated 139 million children are stunted with majority living in low and middle-income countries. Stunting in early age has been associated with diminished survival and impaired cognitive development; its effects are irreversible after second year of life. This study established the prevalence and determinants of stunting among children aged below two years in Migori County, Kenya. A quantitative cross-sectional study design was used on 208 children. Child's age and height were obtained, with stunting indices computed based on WHO Height-for-Age Z-scores with those with HAZ <-2 SD categorized as stunted. The mean age and height was found to be 11.8 months and 72 centimeters respectively. A total of 25% of the children were stunted with boys recording a higher prevalence of 27.23%. Of children from single or widowed or separated mothers, 28% of them were stunted. As per age groups, 44.2% and 9.7% of those aged between 18 and 24; and below 6 months were found to be stunted respectively. Bivariate analysis results showed that there was a significant relationship between child stunting and type of housing (chi^2=4.694, p=0.03). Further logistic regression analysis revealed that children aged between 6 and 12; and 18 and 24 months had 3 times and 9 times higher odds of being stunted compared to those aged less than 6 months [OR: 3.49: 95% CI: 1.03-11.84; p=0.044] and [OR: 9.04: 95% CI: 2.61-31.36; p=0.001] respectively. In conclusion, child's age was found to be a key determinant of child stunting in Migori County. It is recommended that future interventions should focus on this critical age since it is the window period of opportunity to cub stunting.

Keywords: Stunting; Z-score; Height-for-age; Cross-sectional study

Introduction

Stunting is defined as being low height for age (HAZ) index that is less than -2 Standard Deviation based on WHO growth standards median for same age and sex [1-4]. Stunting affects over 151 million children in the world with an estimated 83 million living in Asia and 58 million in Africa [5]. Compared to underweight and wasting, stunting is problem of higher degree because it denotes a state of nutritional deficit that has occurred during the most critical phase of growth (early life) [6]. It is of public health priority as it reflects a state of chronic malnutrition that can lead to adverse effects on child survival, cognitive development and health. In most developing countries, it crops during early childhood (first 1,000 days of life). Those with recurrent episodes of infections and/or are from poor households are at greater risk of stunting [7-9]. Its negative effects on brain and cognitive development; low IQ and immunity have been found to be irreversible after the second year of life and have led to subsequent growth failure and higher risks of non-communicable diseases later in adulthood [10]. Because of these negative effects that have led to vicious generational stunting especially in low income countries that has been difficult to break, WHO in collaboration with other research agencies have targeted to reduce stunting by at least 40% by 2025 [11,12]. Even though this is being achieved, Africa is recorded an increase in the prevalence from 50% in 2000 to 59% in 2017 from 50% [13]. Uganda recorded a decrease from 33% in 2011 to 29% in 2016 though records revealed that over 2 million children were still stunted which resulted to cost implications that dragged the economic development of the county [14]. According to Kenya Demographic and Health Survey (KDHS) data, there was a decline from 35% in 2008/09 survey to 26% in 2014 survey with rural areas recording higher prevalence of 29% compared to urban areas at 20%. This study was there to assess the prevalence and the determinants of stunting among children aged less than two years in Migori County, Kenya.

Methods

Study design

The study used quantitative cross-sectional study design that recruited children aged less than two years with an aim of establishing the prevalence and determinants child stunting in Migori County, Kenya. The study excluded children who were critically sick during the time of data collection since sickness influence the nutritional status of the children.

Sampling procedures

An approximate 20,000 children aged less than two years are in Migori County in the proportion of 2: 3: 3: 2 for ages 1-6 months, 6-12 months, 12-18 months and 18-24 months respectively. In each age strata, children were randomly selected into the study. This was to ensure that all children got an equal chance of participating into the study. Therefore, a set of 42 children each from each of the ages below 6 months and those between 18-24 months were recruited while those from ages between 6 and 12 months; and 12-18 months had a set of 62 each recruited. By selecting a child, the mother was purposely selected into the study.

Data collection procedures

After explaining the purpose of the study to the mother, the research assistants requested them to assent on behalf of their children. Ethical clearance and approval was obtained from Moi University institutional research and ethical committee approval No. 0001567. Quantitative data on demographic and socio-economic status was obtained through interviews. Information collected included; mothers' and fathers' level of income and education; mother's marital status, type and size of house they were living in.

Child's age was obtaining by recording the date of birth of child. This was gotten from the mother and verified from the child's health vaccination card or birth certificate [15]. The exact age was then computed by entering the date of birth and date of survey into ENA for SMART software [16-18]. Children who were able to stand had their height measurements were take using a height board while those who were not able to stand had length measurements taken while lying on length board. All children were measured without shoes [15]. Height measurements were recorded to the nearest 0.1 cm. Close supervision of Research Assistants by principal investigator on data collection and management was done to ensure data was valid and reliable for smooth analysis.

Data management and analysis

Data was entered on EPI INFO software version 6.0 for editing, cleaning, coding, examine completeness and consistency [19]. Data was then exported to STATA version 13 and summarized using descriptive statistics. Stunting indices (Height-for-Age) was computed based on the Z-Scores derived from WHO reference standards [20]. A Z-score above ≤ -2 was categorized as stunted and those >-2 categorized as not stunted [20]. Chi- square tests analyzed the association between stunting and independent variables while logistic regression determined the effect of stunting on the independent variables. The level of significance was set at $P<0.05$.

Results

Demographic characteristics

A total of 208 children were included in the study with 68% of their mothers reporting to be married and 38% having secondary school as their highest level of education. For total amount earned per month, 62% of fathers were earning less than Ksh 3000 while 55% of mothers were earning more than Ksh 3,000. Only 47% of children were living in semi-permanent, 25% lived in houses with more than 3 rooms and 45% lived in their own parents houses where they were not paying monthly house rent. A total of 30% of children from mothers with primary school as the highest level of education were found to be stunted while 28% were from married mothers. This is as summarized on Table 1.

Characteristic	Frequency	Nutritional status		Statistics	
		Stunted	Not stunted	Chi value	p-value
Marital status					
Single/divorce/widow	32.21	17.91	82.09	2.649	0.104
Married	67.75	28.37	71.63	-	-
Mother income (Ksh)					
≤ 3,000	55.29	27.83	72.17	1.0956	0.295
>3,000	44.71	21.51	78.49	-	-
Father income (Ksh)					
≤ 3,000	61.54	25.00	75.00	0	-
>3,000	38.46	25.00	75.00	1.0000	-
Mother education					
≤ Primary	37.98	30.38	69.62	2.2929	0.318
Secondary	38.46	20.00	80.00	-	-
Tertiary	23.56	24.49	75.51	-	-
Type of housing					
Semi-permanent	46.63	31.96	68.04	4.6943	0.030
Permanent	53.37	18.92	81.08	-	-
Size of housing					
Single	36.06	22.67	77.33	0.6831	0.711
Double	39.42	28.05	71.95	-	-
≥ 3 rooms	24.52	23.53	76.47	-	-
Rent amount (Ksh)					
None	45.05	21.95	78.05	-	-
<3000	28.57	34.62	65.38	0.3420	-
>3001	26.37	20.83	79.17	0.843	-

Table 1: Demographic and socio-economic characteristics.

Mean estimates

Variable	N	Mean std	Std, dev.	Min	Max
Age (months)	208	11.82678	6.145255	0.53	23.82
Height	208	72.09471	8.933475	49	96

Height-for- Age Z scores	208	-0.68594	2.013154	-4.704	5.586

Table 2: Mean estimates for Age, Height and HAZ.

It was found that the mean age was 11.8 months, height 72.1 cm and HAZ score -0.68 for the children. The youngest child was 0.53 months and tallest was 96 cm. This is as summarized below in Table 2.

Prevalence of stunting among the children

Figure 1 below showed the prevalence of stunting among children according to sex. It revealed that a total of 25% of children were stunted with boys recording a higher prevalence of 27% compared to girls.

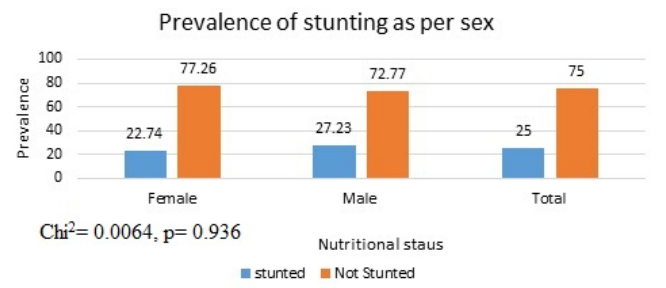

Figure 1: Prevalence of stunting per child's sex.

Prevalence of stunting per age group

Figure 2 below summarized the prevalence of stunting among different age groups. It showed that children aged between 18 and 24 months had the highest prevalence at 44% with those aged less than 6 months recording the lowest prevalence at 10%. There was a significant relationship between stunting and age categories [Chi^2=14.1181, p=0.003].

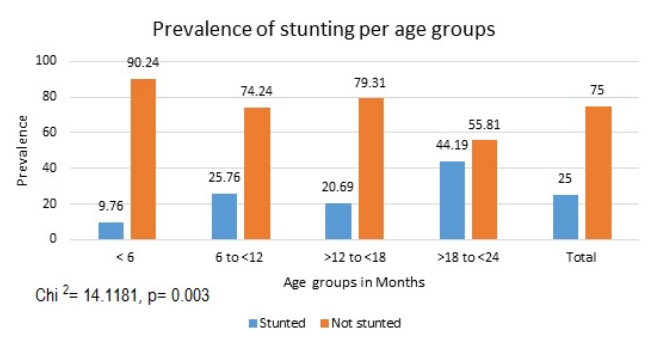

Figure 2: Prevalence of stunting per age group.

Determinants of stunting in Migori County

Table 3 below showed that child's age was associated with child stunting. Children aged between 6 and 12 months; and 18 and 24 months had 3 times and 9 times higher odds of being stunted compared to those aged less than six months [OR: 3.49: 95% CI: 1.03-11.84; p=0.044] and [OR: 9.04: 95% CI: 2.61-31.36; p=0.001] respectively.

Characteristic	Stunted	P value	OR (95% CI)
Sex			
Female	22.7	-	1
Male	27.3	0.92	0.966 (0.471, 1.942)
Age group (months)			
< 6	9.79	-	1
>6 to <12	25.76	0.044	3.499(1.037, 11.849)
>12 to <18	20.69	0.165	2.411 (0.695, 8.368)
>18 to <24	44.19	0.001	9.043 (2.608, 31.360)
Mother's marital status			
Single/divorce/widow	17.91	-	1
Married	28.37	0.182	1.832 (0.752, 4.459)
Total	25.00	-	-
Mother's income level (Ksh)			
<2,999	27.83	-	1
>3,00	21.51	0.579	0.800 (0.365,1.753)
Total	25.00	-	-
Father's income level (Ksh)			
<2,999	25.00	-	1
>3,000	25.00	0.697	0.851 (0.380, 1.908)
Total	25.00	-	-
Mother's education			
≤Primary	30.38	-	1
Secondary	20.00	0.178	0.582 (0.265, 1.279)
Tertiary	24.49	0.687	0.811 (0.294, 2.233)
Total	25.00	-	-
Type of housing			
Semi-permanent	18.92	-	1
Permanent	31.96	0.141	1.750 (0.831, 3.685)
Total	25.00	-	-
Size of housing			
Single	22.67	-	1
Double	28.05	0.476	1.346 (0.594, 3.051)

≥3 rooms	23.53	0.837	0.904 (0.348, 2.346)
Total	25.00	-	-
Rent amount (Ksh)			
None	21.95	-	1
<3000	34.62	0.049	4.46 (0.95, 21.00)
>3001	20.83	0.699	0.75 (0.18, 3.13)
Total	25.27	-	-

Table 3: Regression analysis of stunting with demographic and socio-economic characteristics.

Discussion

This study examined the prevalence and determinants of stunting among children aged less than two years in Migori County. Stunting was analyzed by Z scores based on WHO standards. Children whose Height-for-Age Z score were ≤-2 were categorized as stunted. The mean age and height for the children was 11.8 months and 72 centimeters respectively. The prevalence of stunting in this county was found to be 25%. This study's prevalence was slightly lower compared to the national stunting levels from KDHS 2014 report that had found the levels to be at 26%. The survey further reported that prevalence at rural areas were at 29% and were slightly higher compared to these study results [21]. In this study, a total of 27.2% of the boys were found to be stunted compared to 22.7% of the girls. This was in consistent with other findings of studies that had been conducted in Nairobi and Senegal [22-26]. This could be due to the local community perception that boys are stronger sex from the time of delivery and that breast feeding alone is never sufficient diet for them which makes the caregivers to introduce them to complementary feeds at an early age. This deprives them of the nutritional benefits of exclusive breast feeding thus predisposing them to malnutrition and stunting at an early age [27]. Research findings have also shown that boys' immune system is lower compared to that of girls hence are more vulnerable to frequent infections and malnutrition [28,29]. The study also found that 44.2% and 9.7% of those aged between 18 and 24; and below 6 months were stunted respectively. Further analysis revealed that children aged between 6 and 12; and 18 and 24 months had 3 times and 9 times higher odds of being stunted compared to those aged less than 6 months [OR: 3.49: 95% CI: 1.03-11.84; p=0.044] and [OR: 9.04: 95% CI: 2.61-31.36; p=0.001] respectively. It revealed that as children grow, their chances of being stunted become high. In most of low income families, complementary feeds that are introduced to children are usually of low quality and are prepared in unhygienic conditions. These significantly contribute to frequent diarrheal infections and stunting [30,31]. Neglect by caregivers to children aged above 18 months is a common community practice since they perceive children of this age as independent enough to feed themselves with less supervision [32]. WHO recommends women to for at least 2 to 3 years before next pregnancy two but in poor settings, this may not be practiced and mothers conceive even before their child are hardly two years old [33]. A study conducted in Bolivia revealed that untimed pregnancies increased the prevalence for of child stunting [34]. This study did not find other factors like marital status, fathers' and mother's income and education; type and size of housing; and amount of rent paid as determinants of stunting and it challenged other studies them as determinants. A literature review analysis indicated that mothers' occupation and schooling status were related to child stunting in Sab Sharan Africa while a Tanzanian study conducted in 2005 revealed father's level of income as a determinant of stunting [26,35]. Other studies done in Bangladesh, Indonesia and Ethiopia revealed that parental education status had a strong influence on child's stunting.

Conclusion

Child stunting is public health issue of importance. A total of 25% of the in Migori County were stunted. Child's age was recognized as the determinant of child stunting and it showed that as children grow, their chances of stunting increased. Therefore, interventions aimed at reducing stunting to focus this age of window period of opportunity. Further research on the relationship between child stunting and other socio-economic factors is recommended.

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