Research Application Summary

Prevalence and factors asssociated with 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 at early age has been associated with diminished survival, impaired cognitive development and may be irreversible after the second year of life. This study was carried out to establish the prevalence and determinants of stunting among children aged below two years in Migori County, Kenya. A cross-sectional study design was used with 91 children aged less than two years being recruited into the study. Child's age and height were collected, and stunting indices computed based on WHO height-for-age Z-scores. The results showed 25% of the children were stunted with girls recording higher prevalence at 28% and those aged between 12 and 18 months recording highest prevalence at 31%. Of children whose mothers were married, 28% were stunted. with 34% from families that pay less than Ksh 3,000 per month in house rent. Children whose fathers earned less than Ksh 3,000 per month and paid less than Ksh 3,000 per month on house rent had each four times higher odds of their children being stunted [OR: 4.48: 95% CI: 1.05-19.04; p=0.042] and [OR: 4.48: 95% CI: 0.0.95-21.00; p=0.049] respectively. In conclusion, increase in father's level of income should decrease stunting levels among children aged below two years.

Keywords: Height-for-Age, Kenya, World Health Organisation, Z-score

Résumé

À l'échelle mondiale, environ 139 millions d'enfants souffrent d'un retard de croissance, la majorité vivant dans des pays à revenu faible ou intermédiaire. Le retard de croissance à un âge précoce a été associé à une diminution de la survie, à une altération du développement cognitif et peut être irréversible après la deuxième année de vie. Cette étude a été réalisée pour établir la prévalence et les déterminants du retard de croissance chez les enfants de moins de deux ans dans le comté de Migori, au Kenya. Un plan d'étude transversal a été utilisé avec 91 enfants âgés de moins de deux ans recrutés pour l'étude. L'âge et la taille de l'enfant ont été collectés et des indices de retard de croissance calculés sur la base des scores Z taille-pour-âge de l'OMS. Les résultats ont montré que 25% des enfants avaient un retard de croissance, les filles enregistrant une prévalence plus élevée à 28% et celles âgées entre 12 et 18 mois enregistrant la prévalence la plus élevée à 31%. Parmi les enfants dont les mères étaient mariées, 28% avaient un retard de croissance ; dont 34% de familles qui paient un loyer de moins de 3 000 Ksh par mois. Les enfants dont le père gagnait moins

de 3 000 Ksh par mois et payaient moins de 3 000 Ksh par mois pour le loyer avaient chacun quatre fois plus de chances que leurs enfants souffrent d'un retard de croissance [OR: 4,48: IC à 95%: 1,05-19,04; p = 0,042] et [OR: 4,48: IC 95%: 0, 0,95-21,00; p = 0,049] respectivement. En conclusion, l'augmentation du niveau de revenu du père devrait faire baisser le retard de croissance chez les enfants de moins de deux ans.

Mots-clés: Taille pour l'âge, Kenya, Organisation mondiale de la santé, Z-score

Introduction

Stunting is defined as being low height for age and affects over 151 million children in the world. An estimated 83 million children from Asia and 58 million from Africa are stunted. Compared to underweight and wasting, stunting is a problem of higher degree because it denotes a state of nutritional deficit that have occurred during the most critical phase of growth, i.e., early life (UNICEF, 2009)   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 occurs during early childhood (first 1,000 days of life). Children with with recurrent episodes of malnutrition and or are from poor households are at higher risk of stunting (Llanos and Ronco, 2009; UNICEF, 2013; Mercedes and Francesco, 2016). Its negative effects on the brain and cognitive development have been found to be irreversible after the second year of life and have led to subsequent growth failure later in adulthood (Pelletier *et al.,* 1995; Mercedes and Francesco, 2016). Because of these negative effects, World Health Organisation (WHO) in collaboration with other researchers have a target to reduce stunting by at least 40% by 2025 (Onis *et al.,* 2013). Unfortunately, stuntedness in Africa is still increasing. According to UNICEF (2017), stuntedness increased from 50% in 2000 to 59% in 2017 (UNICEF, 2017). Trends in Uganda are promising with prevalence decreasing to 29% in 2016 from 33% in 2011 though records showed that over 2 million children were still stunted creating a cost implication and dragging the country's economic development (Stunting, 2017). According to KDHS data, there was a decline from 35% in 2008/09 survey to 26% in 2014 survey among Kenyan children with higher prevalence in rural areas (29%) compared to urban areas (20%). This study was done to assess the prevalence and determinants of stunting among children aged less than two years in Migori County, Kenya.

Material and Methods

The study employed a quantitative cross-sectional design and recruited children aged below two years. Those who were critically sick during the time of data collection were excluded from the study.

Sampling procedures. Approximately 20,000 children aged less than two years are in Migori County in the proportion of 2:3:3:2 for ages 1 to 6 months, 6 to 12 months, 12 to 18 months and 18 to 24 months, respectively. In each age strata, children were randomly selected into the study. This was done to ensure that all children got an equal chance of being selected to participate in the study. Therefore, for each of the sites, for ages 0 to 6 months and 18 to 24

months, 18 children were selected in each set and 26 children in each of the 6 to 12 months and 12 to 18 months age sets.

Data collection procedures. Ethical clearance and approval was obtained from Moi University Institutional Research and Ethical Committee (Approval No. 0001567). After explaining the purpose of the study to the mother, the research assistants requested them to assent on behalf of their children. Quantitative data on demographics, and socio-economic status were obtained through interviews. Information collected included mothers' and fathers' level of income and education; mother's marital status, type of house they were living in, size and total number of house members in child's house.

Child's age was obtained from the child's health vaccination card or birth certificate (World Health Organization, 2010). For children who were able to stand and with a height equal or greater than 87 cm, their height measurements were taken using a height board while those who were not able to stand and with a length less than 87 cm, length measurement were taken while lying down using length board. All children were measured without shoes (World Health Organization, 2010). Height measurements were recorded to the nearest 0.1 centimeter. Close supervision of research assistants and principal investigator on data collection and management was done to ensure data were valid and reliable for smooth analysis and interpretation.

Data management and analysis. Data were entered in an EPI INFO version 6.0 spreadsheet for editing, cleaning, coding, examine completeness and consistency (Dean *et al.,* 2000). Data were then exported to STATA version 13 and summarized using descriptive statistics. A stunting index (Height-for-Age) was computed based on the Z-Scores derived from WHO reference standards(World Health Organization, 2006). A Z-score above >-2 was categorized as stunted and those >2 categorized as not stunted (World Health Organization, 2006) using ENA for SMART. Chi- square tests were carried out to analyze the association between stunting and the independent variables while logistic regression was used to determine the effect of stunting on the independent variables. The level of significance was set at $P<0.05$.

Results

Demographic characteristics. A total of 91 children were included in the study with 51% of their mothers reporting to be married and 49% having attained secondary school education. For total amount earned per month, 59% of fathers were earning less than Ksh 3000 with 71% of mothers earning more than Ksh 3,000. Considering the nature of houses, 73% of the children lived in semi-permanent structures. Forty two (42%) percent lived in houses with more than three rooms. In terms of ownership, 45% lived in their own houses, thus did not pay monthly house rent. A total of 36% of children whose mothers had primary education as the highest level of education were found to be stunted. Of those stunted, 21% had mothers who were single, divorced or widowed (Table 1).

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Table 1. Demographic and socio-economic characteristics in Nigori County, Kenya

Characteristic	Frequency	Stunted (%)	Not stunted (%)
Marital status	42.86	20.51	79.49
Single/divorce/widow	57.14	28.85	71.15
Married			
Mother income(Ksh)	28.57	19.23	80.77
<2,999	71.43	27.69	72.31
>3,000			
Father income (Ksh)	59.34	20.37	79.63
<2,999	40.66	32.43	67.57
>3,000			
Mother Education	15.38	35.71	64.29
≤Primary	49.45	24.44	75.56
Secondary	34.16	21.88	78.13
Tertiary			
Type of housing	72.53	24.24	75.76
Semi-permanent	27.47	28.00	72.00
Permanent			
Size of housing	29.70	28.00	72.00
Single	28.71	25.00	75.00
Double	41.58	23.33	76.67
≥3 rooms			
Rent amount (Ksh)	45.05	21.95	78.05
None	28.57	34.62	65.38
<3000	26.37	20.83	79.17
>3001			

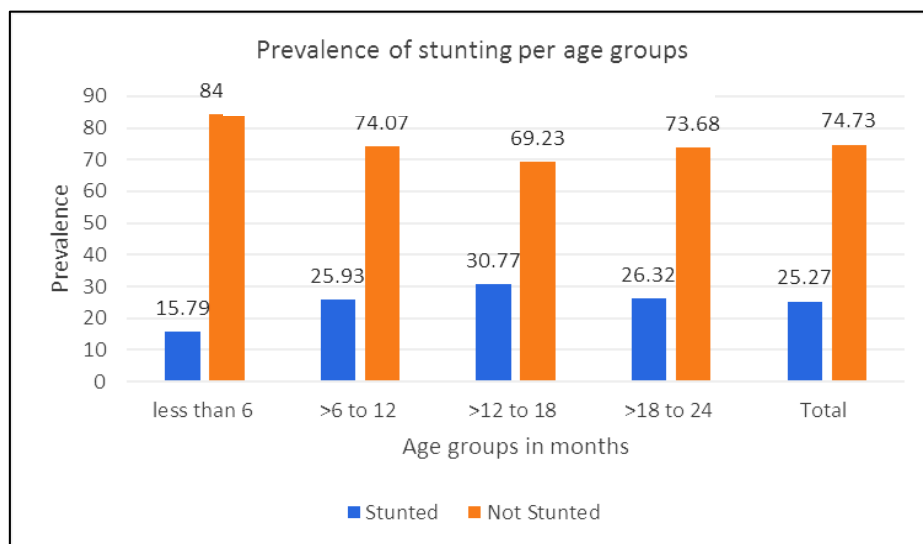Prevalence of stunting among the children

Figure 1 shows the prevalence of stunting among children according to sex. It revealed a disparity between girls and boys. Of the girls, 28% were stunted while for boys, 22% were stunted. Figure 2 indicates the prevalence of stunting among different age groups. It shows that children aged between 12 and 18 months recorded the highest prevalence of stunting at 31% with those aged less than 6 months recording the lowest prevalence at 16%.

Determinants of stunting in Migori County. Table 2 below shows the factors that are associated with child stunting in Migori County. Children whose fathers were earning less than Ksh 3,000 per month had a four times higher odds of being stunted compared to those whose parents were earning more than Ksh 3,000 [OR: 4.48: 95% CI: 1.05-19.04; P= 0.042]. Children whose parents lived in rental house and paying less than Ksh 3,000 per month also had four times higher odds of being stunted compared to those who were living in their own houses [OR: 4.48: 95% CI: 0.0.95-21.00; P = 0.049].
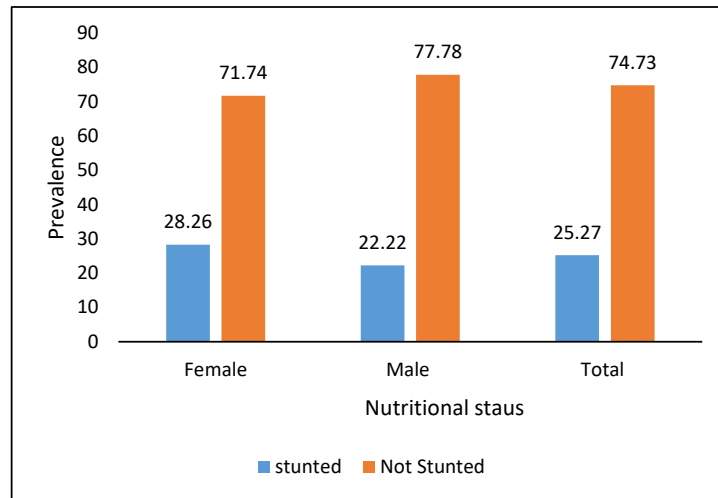
chi^2=0.4392, p= 0.508

Figure 1. Prevalence of stunting by child's sex

Pearson chi ^{2}=1.3377, p=0.720

Figure 2. Prevalence of stunting by age group

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 less than 2 SD were considered stunted. The prevalence of stunting in this County was 25%. With respect to gender, more girls were stunted. This could be explained by the local community perception that girls were poor feeders and breastfed less compared to boys thus predisposing them to malnutrition (Horrell and Oxley, 2015). This contradicted other studies that have revealed that boys were more vulnerable to stunting (Darteh *et al.,* 2014). The 38% stuntedness of children aged between 12 and 18 months could be attributed to inadequate care by their mothers. Many

mothers consider children at this age to be independent and thus leave them to feed themselves with less supervision (Darteh *et al.,* 2014). Prevalence of stuntedness in this study was slightly lower compared to the national level that was reported at 26% (KDHS, 2014).

The KDHS (2014) report also put stuntedness prevalence in rural areas at 29%, slightly higher than found in this study. Determinants of stunting were found to be father income and amount of rent paid by the family. A study done in Tanzania among children in 2005 concurred with this study findings that father's level of income was associated with child stunting (Alderman *et al.,* 2005). In Bangladesh, Indonesia and Ethiopia parental education status had a strong influence on child's stunting. However, results of this study were contradictory (Semba *et al.,* 2008; Musbah and Worku, 2016). This study findings were also contrary to other studies that associated child stunting with other factors like child's sex, parent's educational status and mother's marital status.

Table 2. Association of stunting with demographic and socio-economic characteristics

Characteristic	Stunted	P value	OR (95% CI)
Mother's Marital status			
Single/divorce/widow	20.51		1
Married	28.85	0.592	1.52 (0.29, 8.71)
Total	25.27		
Mother's income level (Ksh)			
<2,999	19.23		1
>3,00	27.69	0.352	2 (0.46, 8.59)
Total	25.27		
Father's income level (Ksh)			
<2,999	20.37		1
>3,000	32.43	0.042	4.48 (1.05, 19.04)
Total	25.27		
Mother's Education			
≤Primary	35,71		1
Secondary	24.44	0.642	0.68 (0.13, 3.44)
Tertiary	21.88	0.252	0.37 (0.06, 2.04)
Total	25.27		
Type of housing			
Semi-permanent	24.24		1
Permanent	28.00	0.829	0.83 (0.17, 4.10)
Total	25.27		
Size of housing			
Single	28.00		1
Double	25.00	0.636	0.71 (0.17, 2.92)
≥3 rooms	23.33	0.295	0.47 (0.12, 1.92)
Total	25.27		
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		

Conclusion

Child stunting is a public health issue of importance. For the study area, the prevalence was 25% with the father's level of income and amount of rent paid recognized as determinant of child stunting in Migori County. This shows that increase in father's income and housing schemes can contribute to reduction in stunting prevalence.

Acknowledgment

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