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Original Research Article

Demographic and socio-economic factors associated with stunting among children aged 0-23 months attending Sub-County Hospitals, Meru County, Kenya

Beatrice K. Mutiga*, Eunice W. Njogu, Juliana N. Kiio

Department of Food, Nutrition and Dietetics, Kenyatta University, Nairobi, Kenya

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***Correspondence:**
Dr. Beatrice K. Mutiga,
E-mail: beatricekanario@yahoo.com

ABSTRACT

Background: Kenya has achieved a significant reduction in the levels of stunting over the years. However, stunting prevalence remains high in Meru County (25%) compared to the national level (18%). This study has explored the demographic and socio-economic factors associated with stunting among children aged 0-23 months attending the Sub-County Hospitals, Meru County, Kenya.
Methods: A cross-sectional analytical study design was adopted. A total of 9 sub-county hospitals were purposively sampled. The number of study participants per each Sub- County hospital was determined proportionate to population size. A total of 318 study participants were sampled using systematic random sampling by selecting the first participant randomly and the rest at every 9th interval. Data was analyzed using statistical package for social sciences version 25 software and ENA for SMART. A p value of <0.05 was statistically significant. Chi-Square test was used to establish relationships between the study variables and adjusted odds ratio (AOR) with 95% confidence intervals quantified the associations.
Results: Child sex (AOR=2.364; 95% CI (0.884-6.325); p=0.047), child age category (AOR=0.255; 95% CI (0.084-0.769); p=0.015) & (AOR=0.126; 95% CI (0.030-0.526); p=0.015), birth weight (AOR=10.197; 95% CI (3.327-31.252); p=0), household monthly income (AOR=5.211; 95% CI (0.793-34.262); and spouse occupation (AOR=0.094; 95% CI (0.010-0.893); p=0.040 were associated with stunting.
Conclusion: Child sex, child age, birth weight, household monthly income and spouse occupation were associated with stunting.

Keywords: Demographic, Socio-economic, Stunting, Children, Hospitals, Meru County

INTRODUCTION

Malnutrition remains worldwide issue that serves as a useful indicator in assessment of a populations overall health, notably contributing to the world's morbidity and mortality levels.[1,2] Globally, 149.2 Million (22%) children aged below 5 years are stunted.[3] In Kenya, the stunting prevalence is 18% with Meru County having a prevalence of 25% stunting.[4] Nearly, 70% of the stunting occur during the initial 1000 days of life and continue worsening if predisposing factors are not modified.[5] A study in Kawangware in Nairobi, Kenya documented a higher stunting prevalence amongst boys compared to girls.[6] This was also reported in other studies, that is, in Sub Saharan Africa and Rwanda.[7,8] The increasing age of a child and birth weight also significantly impacts on stunting.[8] Children born with low birth weight are more predisposed to stunting compared to those born with a normal weight.[9] In addition, primary caregiver demographic and socio-economic characteristics influence child's nutrition status. Studies have shown an inverse association between the mother's education level

and stunting whereby children of mothers without basic education are prone to higher incidences of stunting.[10,11] Household size is another factor associated with stunting. A study in Kwale in Kenya stated that under nutrition was more prevalent among children from large households.[12] It's also been documented that household income and possessions are inversely associated with stunting since they influence households' ability to buy enough quantity of nutritious food, access to other basic needs and health services.[11,9] A research done in Sri Lanka found out that mothers without employment had better nourished children compared to their counterparts who were employed.[13] This was echoed by an inverse relationship between work status and good growth of the child with non-working mothers having children with better growth in Democratic Republic of Congo.[14] Congrous to this, a study in Nigeria also stated that working mothers' children are prone to stunting compared to those of non-working mothers.[5]

This study explored the demographic and socio-economic characteristics associated with stunting among 0-23 months old children that attended Sub-County Hospitals, Meru County.

METHODS

Study design and setting

Cross-sectional analytical research designs was used to establish the demographic and socio-economic characteristics and stunting prevalence of among children aged 0-23 months attending Sub-county hospitals Meru County, Kenya. The dependent variable was stunting and independent variables were the demographic and socio-economic characteristics of the primary caregiver-child pairs.

Study population and selection

Study population encompassed children aged 0-23 month's old and their primary caregivers attending MCH clinic at the Sub County hospitals, Meru County who consented to participate in the study. Children aged 0-23 month's old with history of chronic illnesses such as congenital heart diseases, cerebral palsy, congenital genetic disorders (downs syndrome) and those that declined to participate were excluded from the study. A sample size of 289 participants was calculated using fisher et al., (1998) formula. A total of 29 participants were added to cater for non-response thus adopting a sample size of 318 participants.

Nine sub-county hospitals were purposively sampled from the nine Meru County Sub-Counties while in the sub-counties with more than one sub-county hospital, one hospital was sampled using population size simple random sampling. The sample size per sub-county hospital was proportionately determined. A total of 318 study participants (primary caregiver-child pair) were systematically sampled by picking the first participant randomly and the remaining at every ninth interval.

Methods and tool

Data was collected using pretested and validated researcher administered questionnaires and anthropometric measurements were taken.

Data analysis

Data was analyzed using SPSS version 25 and ENA for SMART. Relationships between the various variables were determined using Chi-Square tests after which adjusted logistic regression for the factors that shown a relationship with stunting were established.

Ethical considerations

The research was approved by the Kenyatta University graduate school and Kenyatta University Ethical Review Committee (PKU/2732/11856) while the research permit was issued by NACOSTI (NACOSTI/P/23/27521). Other approvals were sought from the director of medical services Meru County, County director of education and the various hospital administrators. Informed consent was obtained from all the study participants and confidentiality was observed.

RESULTS

Socio-demographic characteristics of the child

Most (52.9%) of the children were 0-6 months old and the mean age was 6.69±5.53. Majority of them were males (53.2%) and 95.5% of the children were delivered in hospitals. Their mean birth weight was 3.04±0.49 with majority (86.1%) having a normal birth weight (Table 1).

Socio-demographic and socio-economic characteristics of the primary caregiver

Nearly half (56.5%) of the caregivers were aged 21-30 years, most of them (83.2%) were married and 62.9% employed. More than half of the primary caregivers' spouses (60.9%) were self-employed. Nearly half (47.1%) of the caregivers had attained secondary school education and majority were Christians (98.7%). The main source of income for majority the caregivers was business (33.9%) followed by farming (30%). In majority of the households, the breadwinners were both the spouse and respondent (44.8%) and the monthly income for most of the households (54.5%) ranged between KES 10,000-30,000 (Table 2).

Stunting prevalence in the children based on age category

Overall, 3.9% of the children 0-23months old were severely stunted and 6.8% moderately stunted. Severely

stunting was more predominant (11.7%) in children aged 12-23 months and least (1.8%) in those aged 0-6 months. Moderate stunting was also more (10%) in children aged 12-23 months compared to other age categories (Table 3).

Prevalence of stunting based on sex

The prevalence of stunting (<-2 HAZ scores) was 10.6% and boys were the most affected (13.9%) compared to girls (6.9%) (Table 4).

Relationship between demographic and socio-economic characteristics and stunting levels

There was a significant association between the child sex and stunting $\chi 2$ (1, n=310) =4.025, p value =0.045 and child birth weight and stunting $\chi 2$ (1, n=298)=13.518, p value <0.001 (Table 5).

Factors associated with stunting status among the children

Child characteristics such as sex (AOR=2.364; 95% CI (0.884-6.325); p=0.047), child age category (AOR=0.255; 95% CI (0.084-0.769); p=0.015) & (AOR =0.126; 95% CI (0.030-0.526); p=0.015) child birth weight (AOR=10.197; 95% CI (3.327-31.252); household monthly income AOR=5.211; 95% CI (0.793-34.262); p=0.046], and spouse occupation [AOR=0.094; 95% CI (0.010-0.893), p=0.040 depicted an association with stunting (Table 6).

Table 1: Socio-demographic characteristics of the child.

Variable	Characteristic	N	%
Gender of the child	Male	165	53.2
	Female	145	46.8
Place of birth	Hospital	296	95.5
	Home	14	4.5
Age of child in months			
Child age category	<6 months	164	52.9
	6-11 months	86	27.7
	12-23 months	60	19.4
	Mean (SD) age 6.69 ±5.53		
Birth weight category	Low birth weight	31	10
	Normal birth weight	267	86.1
	Deliveries without birth weight recordings	12	3.9
	Mean (SD) birth weight 3.04±0.49		

SD-standard deviation.

Table 2: Demographic and socio-economic characteristics of the primary caregiver (n=310).

Characteristics	Characteristic	N	%
Caregivers age (in years)	≤ 20	56	18.1
	21-30	175	56.5
	≥30	79	25
Marital status	Not married	52	16.8
	Married	258	83.2
Occupation	Unemployed	115	37.1
	Employed	195	62.9
Spouse occupation n=258	Casual worker	49	19
	Unemployed	8	3.1
	Formal employment	44	17.1
	Self-employed	157	60.9
Education level	Primary	115	37.1
	Secondary	146	47.1
	Tertiary	49	15.8
Religion	Christian	306	98.7
	Muslim	2	0.6
	Hindu	2	0.6
Main income source	Employment	57	18.4

Continued.

Characteristics	Characteristic	N	%
	Farming	93	30
	Business	105	33.9
	Casual wages	39	12.6
	Family	16	5.2
H/H breadwinner	Self	28	9
	Spouse	111	35.8
	Parent	32	10.3
	Spouse and self	139	44.8
Monthly income	Below KES 10,000	95	30.6
	KES 10001-30,000	169	54.5
	>KES 30,000	46	14.8
Household size	1-2 persons	12	3.9
	3-4 persons	203	65.5
	>4 persons	95	30.6

H/H; household, KES; Kenya Shillings.

Table 3: Stunting prevalence in the children based on age category

Age category	Stunting level	N	%
0-6 months n=164	Severe	3	1.8
	Moderate	12	7.3
	Normal	149	90.9
>6-11 months n=86	Severe	2	2.3
	Modorate	3	3.5
	Normal	81	94.2
12-23 months n=60	Severe	7	11.7
	Moderate	6	10
	Normal	47	78.3
0-23 months n=310	Severe	12	3.9
	Moderate	21	6.8
	Normal	277	89.4

Table 4: Prevalence of various forms of malnutrition based on sex.

Stunting level	All (n=310)	Boys (n=165)	Girls (n=145)
Stunting (<-2 z-score)	(33) 10.6 % *(7.7,14.6)	(23) 13.9 % *(9.5,20.0)	(10) 6.9 % *(3.8,12.2)
moderate stunting (<-2 z-score and >=-3 z-score)	(21) 6.8 % *(4.5,10.1)	(14) 8.5 % *(5.1, 13.7)	(7) 4.8 % *(2.4,9.6)
severe stunting (<-3 z-score)	(12) 3.9 % *(2.2,6.6)	(9) 5.5 % *(2.9,10.0)	(3) 2.1 % *(0.7,5.9)

*95% C.I

Table 5: Relationships between socio-economic, socio-demographic and stunting among 0-23 months children old attending Sub-County Hospitals in Meru County.

Variable	Chi-Square tests		
Stunting vs	**χ2**	**Df**	**P value**
Child gender (n=310)	4.025	1	*0.045
Place of birth (n=310)	1.450	1	0.228
Child age (n=310)	10.16	2	0.06
Birth weight (n=298)	13.518	1	*<0.001
Caregiver age (n=310)	1.561	1	0.458
Caregiver marital status (n=310)	0.070	1	0.792
Caregiver occupation (n=310)	0.730	1	0.393
Caregiver spouse occupation (n=258)	7.533	1	0.057

Continued.

Variable	Chi-Square tests		
Level of education (n=310)	1.201	2	0.549
Caregiver religion (n=310)	0.907	2	0.636
Income source (n=310)	1.767	4	0.779
Household breadwinner(n=310)	1.285	3	0.733
Monthly income (n=310)	3.266	2	0.195
Household size (n=310)	3.130	2	0.209

*;significant, P value <0.05.

Table 6: Demographic and socio-economic factors associated with stunting.

Variable	Nutrition status		COR (95% CI)	AOR (95% CI)
	Stunted, N (%)	Normal, N (%)		
Child gender				
Male*	23 (7.4)	142 (45.8)	2.19 (1,4.77)	2.36 (0.88,6.33)
Female	10 (3.2)	135 (43.5)	1	1
Age in months				
<6*	15 (4.8)	149 (48.1)	2.75 (1.22,6.19)	0.26 (0.08,0.77)
6-11*	5 (1.6)	81 (26.1)	4.48 (1.5,13.36)	0.13 (0.30,0.53)
12-23	13 (4.2)	47 (15.2)	1	1
Birth weight category				
Low*	10 (3.4)	21 (7)	5.88 (2.44,14.18)	10.2 (3.33,31.25)
Normal	20 (6.7)	247 (82.9)	1	1
HH monthly income				
<10,000 KES*	13 (4.2)	82 (26.5)	3.49 (0.73,16.16)	5.21 (0.79,34.26)
10,001-30,000 KES	18 (5.8)	151 (48.7)	2.62 (0.59,11.74)	3.64 (0.62,21.33)
>30,000 KES	2 (0.6)	44 (14.2)	1	1
Spouse occupation				
Casual worker*	1 (0.1)	48 (18.6)	0.14 (0.19,1.09)	0.09 (0.01,0.89)
Unemployed	2 (0.8)	6 (2.3)	2.28 (0.43,12.10)	1.58 (0.23,10.92)
Formally employed	5 (1.9)	39 (15.1)	0.88 (0.31,2.49)	1.24 (0.35,4.45)
Self employed	20(7.8)	137(53.1)	1	1

HH; household, * factors with p value of less than 0.2 at bivariate level (these are the variables that were controlled for), COR; crude odds ratio, AOR; Adjusted Odds Ratio, KES; Kenya Shillings

DISCUSSION

Majority of the children who participated in the study were 0-6 months of age (52.9%), followed by 6-11 months and12-23 months at 27.7% and 19.4% respectively. Children aged 0-6 months were 2.7 times more likely to have a normal height for age compared to those aged 12-23 months. Additionally, those aged 6-11 months were 4.5 times more likely to have a normal height for age compared to those aged 12-23 months. This means that stunting was more likely during the second year of life. This agreed with a study done in Eastern Kenya that stated stunting was four times more prevalent in children aged more than 11 months.[15]

Males were 2.2 times likely to be stunted compared to females agreeing with several other studies done in Yemen, Nigeria, Rwanda and Kenya.[5,15-17] Most of the children (95.5%) were delivered at a health facility compared to 88% that was reported by Kenya demographic health survey of 2022.[4] This was probably due to the difference in the study settings with the latter being a community survey and the former hospital based study. The prevalence of low birth weight was 10.4% among the study children whereby those affected were 10.197 times likely to be stunted compared to those with normal birth weight. This resonated with study done far in India that associated low birth weight with higher possibility of stunting in children compared to normal birth weight (44.3% vs. 33.8%).[18] Most of the primary caregivers were aged between 21 and 30years (56.5%) with majority of them being married. The study findings did not find any significant association between the caregivers' marital status and stunting status of their children. Majority 62.9% of the primary caregivers were employed nearly half, had attained high school education (47.1%) and few had tertiary education (15.8%). The high number of respondents who had achieved secondary level of education and beyond explains the high number of employed respondents. This is in agreement with a study in North East, Ethiopia that educated parents have better economic opportunities and income.[19] Majority (60.9%) of the respondents had spouses who were self-employed.

On data analysis, there was an association between spouse occupation and stunting (AOR=0.094) where the

caregivers whose spouses were casual workers were 0.094 times less likely to have stunted children compared to those who were self -employed. In this study most families derived their income from business (33.9%) followed by farming (30%) and most households (54.5%) earned between KES 10000 and 30000 per month. There was a significant association between household monthly income and stunting (AOR=5.211). Households with a monthly income of KES <10,000 were 5.21 1times more likely to have stunted children compared to those with income above KES 30,000. Studies done elsewhere, for instance, in Bangladesh, also demonstrated that stunting risk was high in socio-economically poor families.[20] Additionally, a study in South Africa had positively correlated family income with the children's nutrition status.[21] Notable, is the prevalence of stunting in the current study which was 10.6% with 3.9% of the children having severe stunting and 6.8% moderate stunting. This differed with the stunting prevalence of 18% in Kenya Demographic Health Survey report.4 The difference could be due to the fact that this study was carried out in the health facilities and not in the community as it happens during the survey as well as the differences in time of data collection.

The family source of income, household breadwinner, and household size showed no association with stunting.

CONCLUSION

Child sex, age, birth weight, household monthly income, knowledge and spouse occupation were associated with stunting. The most significant predictor of stunting was low birth weight which had a prevalence of 10% and a 10.2 times likelihood of stunting followed by household monthly income (AOR=5.211).

Recommendations

Policy makers need to ratify new and bolster up existing policies on low-birth-weight prevention and management so as to curb stunting that may set in early in utero as well as improve health outcomes for those that inadvertently develop faltering growth and are diagnosed at birth. Secondly, improvement of household monthly income through helping communities diversify their economic activities and creation of job opportunities is necessary. The study was conducted in a hospital set-up and mainly reflects information of the clients that visited the hospitals, a community-based survey is recommended to explore other demographic and social economic factors associated with stunting.

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