



Sociodemographic Factors Influencing Stunting in Young Children in Low Socioeconomic Areas of Mumbai City

KEYWORDS

stunting, father's education, gender, income, birth weight

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ABSTRACT *Stunting is an indicator of health and nutritional status. Reduction in stunting is imperative for economic growth. Understanding the factors influencing stunting is crucial in formulating intervention strategies. We therefore, studied the factors influencing stunting in young children aged 2 to 4 (n = 1205) years in low socioeconomic areas of Mumbai city. Height was measured and height-for-age Z scores were computed. Information regarding the parent's education, income, child's birth weight, birth order and exclusive breastfeeding were collected. Bivariate logistic regression was carried to determine the factors influencing stunting. In all, 24.4% were moderately and 10.8% were severely stunted. Father's illiteracy, low per capita income and low birth weight significantly increased the odds of stunting while male gender and lower birth order reduced it. Improvement in father's education might balance the intra-household power equations and have a cascading effect on the other factors that elevate the risk of stunting.*

Introduction: Stunting is a reflection of long-term under-nutrition. Stunting in early life is associated with poor cognition and lower academic performance (Kar et al, 2008; Sokolovic et al, 2014). It may also lead early adiposity and increase the risk of non-communicable diseases (Martins et al, 2004; Clemante et al, 2011).

According to the Joint Report by UNICEF, World Bank and WHO (2013), in 2012, 162 million children under five years of age were found to be stunted globally. It was estimated that 56% of the stunted children reside in South Asia while 36% in Africa. According to UNICEF (2013), the prevalence of stunting in India has been reported to be 48%. Within the country, the prevalence varies in the urban, rural and tribal areas.

Among the eight Indian cities studied, Mumbai has the highest number (45.4%) of stunted children (Agarwal, 2011). Mumbai is a culturally and economically diverse city. About 54% of the population the city resides in slums. Poverty is an important factor that influences the nutritional status of children. Besides, many sociodemographic factors also influence the nutritional status. Understanding these factors can help devise simple interventions to reduce the prevalence of stunting. We therefore, studied the factors influencing stunting in young children belonging to low socioeconomic areas in Mumbai.

Materials and Methods

The study was approved by Independent Ethics Committee (IEC no 09122), Navi Mumbai, Maharashtra, India.

Study Design: This cross-sectional study was carried out from July, 2013 to August, 2014 in the low socioeconomic localities of five areas of Mumbai city, Maharashtra, India. Children were recruited from anganwadis, the child-care and mother-care centres under Integrated Child Development Scheme (ICDS). We obtained a list of anganwadis from the five areas and 25 anganwadis were selected from each area by simple random sampling.

Participants: Twelve hundred and five children aged

between 24 to 48 months on the day of the survey and those who had authentic birth weight records were recruited from the selected anganwadis. Any child suffering from chronic illness or born with congenital anomalies or extremely premature (< 28 weeks of gestational age) was excluded from the study. The parents and/or the guardian of the child were informed about the study in the local language and a written informed consent was obtained from them.

Variables:

Birth Weight and Age - Birth weight and date of birth were noted from either the hospital discharge card or the records of the anganwadi.

Measurements - Height was measured using a non-extensible, flexible and accurate measuring tape. The tape was calibrated against the stadiometer. The measurement was taken as per standard procedure (Fidanza & Keller, 1991).

Sociodemographic Variables: Information regarding the total number of family members, parent's education, income, index child's birth order and exclusive breastfeeding (EBF) were collected from the parent/caregiver via personal interview using a structured interview schedule. The per capita income was calculated by dividing the total family income by the total number of family members.

Statistical Analysis: WHO Anthro software version 3.2.2 was used to compute the Z scores for birth weight and height-for-age (HAZ). A value of < -2.0 SD for HAZ scores was classified as stunted. Statistical analysis was carried out using Statistical Package for Social Sciences (SPSS) version 20.0. Frequency distribution was carried out for all the potential factors influencing stunting. Bivariate logistic regression was carried out and odds ratio (OR) with 95% confidence interval (CI) were computed to study the factors that modify the risk of stunting in children.

Results: Of the 1205 children, 51.8% were boys and 48.2% girls. There were 550 (45.6%) children aged 2 to 3 years and 655 (54.4%) aged 3 to 4 years.

Sociodemographic Characteristics – The sociodemographic details of the sample are given in Table 1. Around 13% mothers and 7% fathers were illiterate. Over 35% of the parents had dropped out of school. The mean per capita income per month was Rs 2518.7 ± 1613.1. The per capita income of almost 40% of the families ranged between Rs 1000 to 2000 whereas that for 10.7% was less than Rs 1000 per month.

The mean birth weight of the children was 2.7 ± 0.5 kg. In all, 20.5% had low birth weight (LBW) and 79.5% had normal birth weight (NBW). Ninety seven percent children (n=1173) were breastfed. The mean duration of EBF was 3.78 ± 2.2 months. Most of the participants were exclusively breastfed for three to six months.

Table 1: Sociodemographic Characteristics of the Sample

Variable	Categories	N	Percentage (%)
Sex	Boys	624	51.8
	Girls	581	48.2
Mother's Education	Illiterate	161	13.3
	Class I to IV	66	5.5
	Class V to IX	484	40.1
	Matriculation	296	24.5
	Higher Secondary Certificate/ Diploma	134	11.1
	Graduation or above	64	5.2
Father's Education	Illiterate	85	7.1
	Class I to IV	41	3.4
	Class V to IX	382	31.7
	Matriculation	427	35.4
	Higher Secondary Certificate/ Diploma	173	14.4
	Graduation or above	89	7.3
Per Capita Income	< Rs 1000	129	10.7
	Rs 1001-2000	479	39.8
	Rs 2001-3000	305	25.3
	Rs 3001-4000	155	12.9
	Rs 4001-5000	77	6.4
	> Rs 5001	60	6.0
Birth Weight	LBW (< 2.5 kg)	247	20.5
	NBW (> 2.5 kg)	948	79.5
Birth Order	First-born	545	45.2
	Second-born	413	34.3
	Third-born	174	14.4
	Later-born	73	6.1
Duration of EBF	< 3 months	462	41.8
	3-6 months	642	51.9
	> 6 months	69	6.3

Stunting - The mean height of the children was 89.98 ± 7.0 cm (95% CI: 89.58 – 90.37 cm). The mean HAZ was -1.55 ± 1.2 (95% CI: -1.62 to -1.42 SD) with 64.8% having normal HAZ while 24.4% and 10.8% being moderately and severely stunted respectively.

Risk Factors for Stunting – According to bivariate logistic regression (Table 2), father's illiteracy and per capita income < Rs 2000/month significantly increased the risk of stunting by 1.7 and 1.3 times respectively. LBW children (< 2.5 kg) were twice more likely to be stunted in their childhood than the NBW ones. Factors that decreased the risk of stunting significantly were male gender and lower birth order.

Table 2: Bivariate Logistic Regression for Risk Factors of Stunting

Variable	Categories	Stunted	Non-stunted	OR	95% CI	P
Sex	Boys	47.2 (200)	54.3 (424)	0.777	0.609 – 0.991	0.042
	Girls	52.8 (224)	45.7 (357)			
Mother's Education	Illiterate	17.9 (76)	10.9 (85)	1.359	0.940 – 1.964	0.103
	Literate	82.1 (348)	89.1 (696)			
Father's Education	Illiterate	10.6 (45)	5.1 (40)	1.752	1.080 – 2.843	0.023
	Literate	89.4 (379)	94.9 (741)			
Per Capita Income	< Rs 2000	57.5 (244)	46.6 (364)	1.364	1.601 – 1.754	0.016
	> Rs 2000	42.5 (180)	53.4 (417)			
Birth Weight	LBW	28.3 (120)	16.3 (127)	2.031	1.519 – 2.715	0.000
	NBW	71.7 (304)	83.7 (654)			
Birth Order	First-born	37.5 (159)	49.4 (386)	0.660	0.512 – 0.850	0.003
	Later-born	62.5 (265)	50.6 (395)			
Duration of EBF	< 3 mo	45.5 (193)	47.2 (369)	0.806	0.629 – 1.033	0.088
	> 3 mo	54.5 (231)	52.8 (412)			

Discussion: In our study, 24.4% children were moderately stunted and 10.8% were severely stunted. Poverty has been identified as a main determinant of undernutrition in developing countries (Kanjiyal et al, 2010). Based on the National Family and Health Survey - 3 (NFHS – 3) data, Kanjiyal et al (2010) and Martorell et al (2012) observed that children from poorer households experienced higher burden of chronic undernutrition. Other studies from India also support this association (Mandal et al, 2014; Sonkaria et al, 2014). The relationship of socioeconomic status (SES) and undernutrition appears to be mediated by a host of factors such as – availability and accessibility of health care, choice of foods, food preparation practices and intra-household food distribution (De Heanaw et al, 2003).

In a patriarchal society like India, most of the decisions regarding the household expenditure, health care of the female members and children are taken by the head of the family or the father. Women have little or no decision-making powers. They have weaker control over household resources, tighter time constraints, less access to information and health services leading to lower self-esteem (Ahmed et al, 2012). These intra-household power equations are passed on from one generation to another and are deeply imbedded in the minds of people.

Further, gender disparities have been noted in intra-household distribution of food. The distribution of expensive foods (first class protein foods or fruits) is skewed towards the male gender (Ramchandran, 2006). In a study in Punjab, it was seen that the boys were served with milk and fats along with the cereals while girls were given only cereals (Bose, 2003). Such disparity exists in provision of health care too. These differences are not economically driven but are strongly influenced by cultural factors (Ramchandran, 2006). This disparity against females is predominant among the economically and educationally backward sections.

Education is one of the ways to dilute this mindset and enable women to share an equal role in decision-making. However, gender disparity exists in the literacy levels too. Since independence, the literacy levels of men and women have improved. However, the gender gap in the literacy levels (21%) continues to exist (Antony & Laxmaiah, 2008). Female illiteracy, poverty and lack of women empowerment are factors that determine the maternal nutritional status. Maternal undernutrition is predictor of LBW which further increases the risk of stunting (Ahmed et al, 2012).

Mothers who are well-educated are more aware about issues regarding – nutrition, hygiene and health. Several reports from India and other nations suggest that mother's illiteracy is strongly related to chronic undernutrition (Svedberg, 2007; Som et al, 2007; Misra et al, 2008; Mustaq et al, 2011; Basit et al, 2012; Bhavsar et al, 2012). Further, improvement in mother's education decreased the prevalence of stunting in Cambodia and China in the past two decades (Svedberg, 2007; Ikeda et al, 2013). However, in South Asia, malnutrition is seen to rise irrespective of mother's education mainly because of the gender-based rules that restrict the woman's autonomy and her role in decision-making (Shroff et al, 2011).

In line with this, we found that father's illiteracy and not mother's increases the risk of stunting. Similar finding was reported in Maharashtra, India (Deshmukh et al, 2014). An educated father may probably make decisions keeping in mind the welfare of all the family members and also give adequate opportunity to women in decision-making process. This might reduce the gender disparity observed in intra-household food distribution and education opportunities. Adequate nutrition and health care can ensure optimal maternal nutritional status. Education will empower the women, enable them to make informed decisions and also alleviate poverty. Education thus, appears to be a key factor that can help reduce gender disparity, poverty and the prevalence of LBW. All these can potentially decrease the burden of stunting.

We also found that the first-born children had lower odds of being stunted than the later born ones. More the children, lesser is the care and attention the child with higher birth order receives. This affects the time dedicated to feeding the child and seeking healthcare thus, increasing undernutrition.

Stunting is a multifactorial problem. The root causes of stunting are embedded in poverty, illiteracy and unemployment. Low birth weight and higher number of children are consequences of these root causes. Thus, efforts to reduce the prevalence of stunting should aim at these root causes. For long, mother's education has been the centre of discussion of scientific literature. Father's education is as important as that of mother's if not more. Adult literacy programmes should be encouraged so that both men and women are better informed about issues regarding food, nutrition and health care. Alongside, efforts to improve child nutritional status that primarily focus on the mother-child pair need to widen the programmes to include family and community particularly the male members.

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