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Assessment of Malnutrition Prevalence and Its Socioeconomic Determinants among Urban Poor Children in Bangladesh

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ABSTRACT

Background: Malnutrition remains a major public health problem in Bangladesh and is one of the prime causes of morbidity and mortality among children from socio-economically underprivileged families. The overall improvements of undernutrition are in contrast to the continued high vulnerability of urban poor children related to poverty, restricted health access, and low maternal education. ***Objective:*** The objective of the study was to determine prevalence of malnutrition and its socioeconomic determinants among urban poor children in Bangladesh. ***Methods:*** A cross-sectional study was carried out in Mugda Medical College and Hospital during January-June 2023. A total of 184 children, aged between 6 months and 5 years, were purposively selected. Structured questionnaires were used to collect sociodemographic, economic and health information. Anthropometry was measured and malnutrition indexes were evaluated based on WHO recommendations. The data was analyzed by using SPSS v29. 0, such as chi-square tests and logistic regression. ***Results:*** The prevalence of underweight, stunting and wasting were 28.3%, 26.1% and 14.1% respectively in the sample of 184 children. Low birth Weight (21.7%) and non-exclusive breastfeeding (28.3%) were major contributors. Malnourishment was more prevalent in children whose parents had lower educational and income level. Logistic regression revealed low parental education (aOR = 2.15, p = 0.036) and low birth weight (aOR = 2.61, p = 0.010) as independent predictors of malnutrition. ***Conclusions:*** The burden of malnutrition in urban poor children in Bangladesh is high with influence of socioeconomic and prenatal factors being pivotal. Programs that target maternal education, poverty reduction, and better neonatal care are needed to achieve sustainable growth promotion.

Keywords: Malnutrition, Stunting, Wasting, Underweight, Urban Poor, Socioeconomic Determinants.

INTRODUCTION

Child malnutrition remains one of the most serious public health problems worldwide, particularly in low- and middle-income countries (LMICs). The World Health Organization (WHO) claims that malnutrition contributes up to 50% of child deaths and exposure to infectious diseases, including pneumonia, diarrhea and malaria among children <5yrs [1]. The global burden continued to be significant, at approximately 45 million wasted and 149 million stunted children in 2020 [2]. Though there have been interventions for the decades; the dimension of malnutrition affecting Sustainable Development Goals (SDGs) especially to Goal 2, aiming to achieve zero hunger and all forms of malnutrition by 2030 are still prevalent. Childhood undernutrition is not only a health problem; it is also a poverty-related social problem that maintains intergenerational cycles of poverty, compromises national productivity and overburden health systems [3]; which can be effectively addressed by interventions.

The largest number of malnourished children in the world is in South Asia and some of the highest rates are reported from Bangladesh, India, Nepal, and Pakistan [4]. Poverty, gender disparity, poor maternal education, and limited access to health care and sanitation are some of the predisposing factors for malnutrition in this region [5]. Bangladesh- in child nutrition and poor nutrition is prevalent with among slum dwellers Although there has been a dramatic reduction in childhood morbidity, mortality and morbidities related to maternal factors between now and the last 20 years zip Up until still exist high rates of stunting wasting/community within the slums [6]. The Bangladesh Demographic and Health Survey (BDHS 2017–18) indicated that 31% of under five children were stunted, 8% wasted, and 22% underweight [7]. These numbers underscore that undernutrition is a daunting impediment to child survival, growth and development. Rapid urbanization has added another layer to the situation, and children from urban slums as well as poor households have specific challenges that set them apart from rural populations [8].

The urban poor in Bangladesh are especially susceptible because of the entangled effects of socioeconomic status, lower housing quality, overcrowding and restricted healthcare access [9]. Families with urban slums have uncertain sources of income (day labor, rickshaw pulling, garment work) and a low food security [10]. Restricted access to pure water, hygiene, and health services also results in a higher prevalence of the infections and aggravates the impact of under-nutrition [11]. Malnutrition in these children is not just a matter of insufficient food consumption, but also due to repeated infections, maternal ignorance about feeding practices and lack of healthcare approaches [12]. In addition, increasing informal urban settlement in Bangladesh has exacerbated inequities that children from slum areas are often excluded from mainstream health and nutrition interventions [13].

In this setting, it is important to evaluate the burden of malnutrition and its determinants among urban poor children from Bangladesh. Although national surveys are helpful, they tend to obscure inequalities faced by subpopulations. Previous studies have also found that parental education, household income, sanitation, and early feeding practices are critical predictors of nutritional statuses [14–16]. Limited studies have been conducted describe the socioeconomic and health related determinants of malnutrition among children of urban poor family in context to Bangladesh where people are exposed with economic vulnerability as well as environmental

hazard. Closing this gap is essential to the design of interventions aimed at minimizing malnutrition in these populations. The current study would, therefore, attempt to estimate the burden and socioeconomic risk factors associated with malnutrition among urban poor children so that it can help policymakers, non-governmental organisations (NGOs) and healthcare professionals to develop context-specific interventions.

OBJECTIVE

The main purpose of this study was to determine the prevalence of malnutrition among children between 6 months and 5 years old from urban poor families in Bangladesh. In particular, the objective of the study was to estimate rates of stunting, wasting, underweight and low birth weight as well as exclusive breastfeeding among children involved in the study. The investigation aimed to reveal evidences on current situation of nutrition among the children in these under-privileged populations so as to gain insight into sheer magnitude of malnutrition and its sustenance despite existence of the national health and nutrition programs. The purpose of this assessment was to generate current data on urban poor that can reflect the current status in these populations which are frequently underrepresented in national surveys.

A second objective was to explore the socioeconomic factors associated with malnutrition among this vulnerable population. These factors are parental education, occupation, household socioeconomic status, sanitation and access to healthcare and feeding history. Associations of perinatal factors with childhood nutritional outcomes were also evaluated. From the analysis of these determinants, the study sought to draw attention to other underlying causes of malnutrition than dietary inadequacy, including structural and behavioural factors. Finally, the intention was to bring-out useful information for policymakers, health professionals and non-governmental organizations (NGO) in planning integrated, focused and sustained nutrition interventions targeting under-five malnourished urban poor children of Bangladesh.

METHODOLOGY & MATERIALS

Study Design and Setting

This study design was adopted in this investigative context, as it was expected to have the ability to measure the prevalence and associated factors of malnutrition at a point in time. This study was conducted from January to June 2023 among patients attending Mugda Medical College and Hospital, Dhaka, Bangladesh. This hospital was chosen because it caters to a significant population of low-income urban slums surrounding the area and, as such, is representative of an appropriate group to study on urban poor malnutrition. The study methodology allowed the collection of both socio-demographic and clinical data; in this way it was possible to identify relationships

between malnutrition and its risk factors. Participants were purposefully sampled by identifying children that met the inclusion criteria to derive a more precise sample representing the urban poor population. The hospital's pediatric and the out-patient department were the main recruitment centres as these areas attend to families looking for low-cost/free health services.

Study Populations, Inclusion and Exclusion Criteria

A total of 184 children between six months and five years, along with their guardians attended the study. Inclusion criteria were 4-14 years of age children belonging to urban poor families (i.e., monthly household income less than BDT 20,000), and their parents or guardians consenting to the participation in the study. This served to skew the sample towards the specifically targeted at risk socioeconomic population group. The exclusion criteria were children with congenital anomalies, chronic pathologies such as thalassemia or cerebral palsy, and any condition that would independently influence growth patterns, in order to avoid potential confounding factors. Furthermore, children admitted for acute life-threatening illnesses were not enrolled since the emergent need for their treatment might affect data collection. Families unwilling to participate or unable to give valid information on socioeconomics and perinatal variables were ruled out. These criteria were carefully designed in order to reduce bias and increase validity of the results.

Data extraction and statistical analysis

Structured questionnaires and clinical assessment guides were used in data collection by trained interviewers and health workers. The tool consisted of questions about socio-demographic characteristics (parental education, occupation, religion and household income), environmental factors (water source, sanitation type and household size) and accessibility to healthcare. Health related factors such as birth weight, breast feeding and prior illness were considered in the model. Anthropometric measurements were recorded in line with WHO standards [12]. Weight was recorded using calibrated digital weighing balances, and height/length using stadiometers or infant meters depending on the age of the child. Mid-upper arm circumference (MUAC) was also measured to supplement the evaluation of acute malnutrition. Information on exclusive breastfeeding and child birth weight was extracted from health cards (if available) or recalled by the mother where records were not available.

Data analysis Data collected was entered in SPSS version 29.0 spreadsheet for further analyses. Frequencies, percentages and means with standard deviation were calculated using descriptive statistics. Rates of stunting, wasting and underweight were estimated based on WHO growth references. Bivariate analysis was done using chi-square test to determine the associations between malnutrition indicators and socioeconomic or demographic variables. Variables with $p < 0.1$ in the univariable analysis were included into a multivariable logistic regression to determine independent factors related to malnutrition. Odds ratios (ORs) were adjusted for age, sex, BMI, and logistic regression analysis was used to obtain the 95%CI; statistical significance was set at $p < 0.05$. This analytic systematic strategy enabled not only the assessment of malnutrition prevalence, but also the identification of significant socioeconomic determinants among these children.

RESULTS

Prevalence of Malnutrition among Children

The study focused on a sample of 184 children between 6 months and 5 years. The findings from the analysis showed that, there were high levels of malnutrition markers in the study population (Table 2). Stunting in children was reported at 26.1%, as a marker of chronic undernutrition, and wasting at 14.1% indicating acute malnutrition. Moreover, 28.3% were underweight due to co-occurrence of stunting and wasting. Twenty-one-point seven percent (21.7%) of the children were born with low birth weight (LBW), seventy-one point seven per cent (71.7%) were exclusively breast fed for 6months' period of their lives. These results highlight the fact that, although there have been declines in under nutrition at a national level, children from low-income urban households continue to experience substantial levels of malnutrition. The bar graph represents the prevalence of stunting, wasting and underweight; it can be seen that hunger (stunted children and underweighted pins) seems to be more predominant over wasting at all levels.

Socioeconomic and Environmental Determinants

Table 1 Socio-demographic and economic characteristics of the study population. Most of the parents were engaged in informal labor activities, with garment workers (35.3%), day laborers (28.3%) and rickshaw pullers (19.6%) comprising the main professions. The monthly income was disproportionately lower as 47% of families were earning

Statistical Associations and Multivariable Analysis

Bivariate analyses (Tables 5 and 6) also showed that malnutrition was significantly related to some of the studied factors. Overall (Table 5), children of parents who had not studied beyond primary education were significantly

more likely to be stunted (p = 0.038) and underweight (p = 0.041). Low birth weight was significantly associated with being underweight (p = 0.008). Low monthly income (less than BDT 15,000) was associated with higher odds of malnutrition; but this association did not reach to the statistical significance for all the cases. Low parental education (aOR = 2.15, CI:95% 1.05–4.39, p = 0.036), and low birth weight (aOR = 2.61, CI:95%1.26–5.42, p = 0.010) were independent predictors of malnutrition in multivariable logistic regression analysis while adjusting for potential confounders (Table 7). There was no statistically significant relationship in adjusted models for other variables including household income and sanitation. These findings emphasize the importance of maternal education and perinatal health in determining child nutritional status among urban poor households.

Table 1: Socio-Demographic and Economic Characteristics of the Study Population (N=184)

Characteristic	Category	Frequency (n)	Percentage (%)
Gender of Child	Female	99	53.8%
	Male	85	46.2%
	Urban	143	77.7

Residence	Rural	41	22.3
Religion	Islam	182	98.9
	Hindu	2	1.1
Parents' Occupation	Garments Worker	65	35.3
	Day Labourer	52	28.3
	Rickshaw Driver	36	19.6
	Agriculture	11	6.0
	Small Business	6	3.3
	Unemployed	7	3.8
	Others	7	3.8
Monthly Income (BDT)	< 7,500	15	8.2
	7,500 - 10,000	32	17.4
	10,000 - 15,000	39	21.2
	15,000 - 20,000	31	16.8
	> 20,000	67	36.4
Source of Water	Municipal Supply	156	85.0%
	Tube Well	20	10.7%
	Others	8	4.3%
Sanitation Type	Septic Tank	155	84.3%
	Pit Latrine	26	14.1%
	Others	3	1.6%
Parental Education	No Formal Education	13	7.1
	Primary	35	19.0
	Secondary	63	34.2
	Higher Secondary	40	21.7
	Graduate	33	17.9
Healthcare Access	Government Hospital	92	50.0
	Private Clinic	73	39.7
	NGO Health Center	3	1.6
	No Access	16	8.7
Family Members (Mean ± SD)	4.43 ± 1.16		
Parents' Age (Mean ± SD)	39.68 ± 9.28		

Table 1: *Socio-demographic and economic characteristics of the study population (n = 184).* This table presents child gender, residence, religion, parental occupation, household income, water and sanitation access, parental education, healthcare utilization, and family size and parental age.

Table 2: Prevalence of Malnutrition Indicators among Children

Malnutrition Indicator	Category	Frequency (n)	Prevalence (%)
	Yes	40	21.7

Low Birth Weight (LBW)	No	144	78.3
Exclusive Breastfeeding (EBF)	Yes	132	71.7
	No	52	28.3
Stunting (Height-for-Age)	Stunted	48	26.1
	Not Stunted	136	73.9
Wasting (Weight-for-Height)	Wasted	26	14.1
	Not Wasted	158	85.9
Underweight (Weight-for-Age)	Underweight	52	28.3
	Normal Weight	132	71.7

Table 2: *Prevalence of malnutrition indicators among children (n = 184).* This table shows rates of low birth weight, exclusive breastfeeding, stunting, wasting, and underweight among the study population.

Table 3: Healthcare Access by Monthly Income

Healthcare Source	**<7500**	**7500-10000**	**10000-15000**	**15000-20000**	**>20000**	**Total**
Government Hospital	8 (57.1%)	16 (53.3%)	17 (47.2%)	17 (54.8%)	35 (47.9%)	93
Private Clinic	4 (28.6%)	10 (33.3%)	15 (41.7%)	12 (38.7%)	29 (39.7%)	70
No Access	2 (14.3%)	3 (10.0%)	3 (8.3%)	2 (6.5%)	1 (1.4%)	11
NGO Health Center	0 (0.0%)	1 (3.3%)	1 (2.8%)	0 (0.0%)	1 (1.4%)	3
Others	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	7 (9.6%)	7
Total	**14**	**30**	**36**	**31**	**73**	**184**

Table 3: *Healthcare access by monthly household income.* This table displays the distribution of healthcare service utilization (government, private, NGO, or no access) according to different monthly income groups among families.

Table 4: Education Level by Residence

Education Level	**Urban (n=144)**	**Rural (n=40)**	**Total**
No Formal Education	5 (3.5%)	5 (12.5%)	10
Primary	23 (16.0%)	9 (22.5%)	32
Secondary	53 (36.8%)	11 (27.5%)	64
Higher Secondary	31 (21.5%)	8 (20.0%)	39
Graduate	27 (18.8%)	6 (15.0%)	33
Others	5 (3.5%)	1 (2.5%)	6
Total	**144**	**40**	**184**

Table 4: *Parental education level by residence (urban vs. rural).* This table compares education levels of parents across urban and rural households, highlighting disparities in literacy among the study population.

Table 5: Bivariate Analysis of Factors Associated with Stunting

Factor	Category	Stunted (n=48)	Not Stunted (n=136)	p-value
Monthly Income	< 15,000 BDT	25 (52.1%)	61 (44.9%)	0.392
	≥ 15,000 BDT	23 (47.9%)	75 (55.1%)	
Parental Education	Primary or less	18 (37.5%)	30 (22.1%)	0.038*
	Secondary or more	30 (62.5%)	106 (77.9%)	
Healthcare Access	Government/NGO	28 (58.3%)	67 (49.3%)	0.283
	Private/No Access	20 (41.7%)	69 (50.7%)	
Sanitation	Improved (Septic)	33 (68.8%)	106 (77.9%)	0.200
	Unimproved (Pit/Other)	15 (31.2%)	30 (22.1%)	

*Statistically significant at $p < 0.05$

Table 5: *Bivariate analysis of factors associated with stunting.* This table shows the relationship between monthly income, parental education, healthcare access, sanitation, and stunting among children. Statistically significant findings are indicated at $p < .05$.

Table 6: Bivariate Analysis of Factors Associated with Underweight

Factor	Category	Underweight (n=52)	Normal (n=132)	p-value
Monthly Income	< 15,000 BDT	28 (53.8%)	58 (43.9%)	0.227
	≥ 15,000 BDT	24 (46.2%)	74 (56.1%)	
Parental Education	Primary or less	19 (36.5%)	29 (22.0%)	**0.041***
	Secondary or more	33 (63.5%)	103 (78.0%)	
Healthcare Access	Government/NGO	23 (44.2%)	72 (54.5%)	0.211
	Private/No Access	29 (55.8%)	60 (45.5%)	
Low Birth Weight (LBW)	Yes	18 (34.6%)	22 (16.7%)	**0.008***
	No	34 (65.4%)	110 (83.3%)	

*Statistically significant at $p < 0.05$

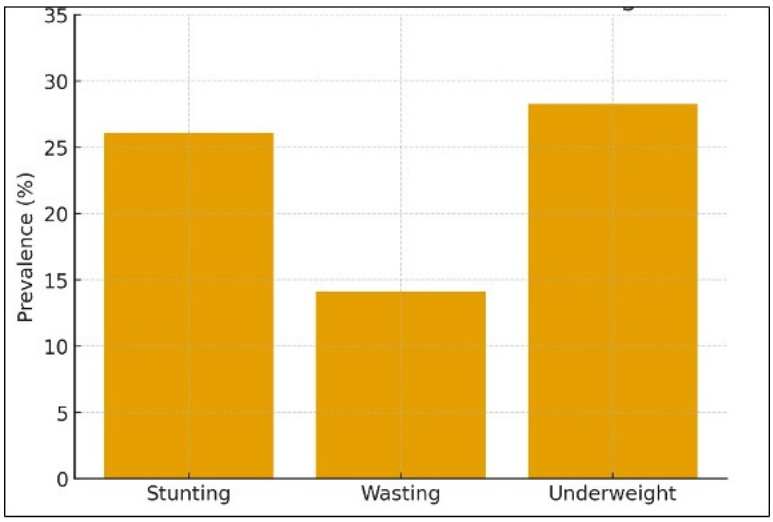
Table 6: *Bivariate analysis of factors associated with underweight.* This table reports associations between monthly income, parental education, healthcare access, birth weight, and underweight status among children. Statistically significant results are indicated at $p < .05$.

Table 7: Determinants of Malnutrition: Adjusted Odds Ratios from Multivariable Logistic Regression

Factor	Category	Adjusted Odds Ratio (aOR)	95% Confidence Interval	p-value
Parental Education	Primary or less	2.15	1.05 - 4.39	**0.036** *
Monthly Income	< 15,000 BDT	1.34	0.68 - 2.62	0.398
Low Birth Weight	Yes	2.61	1.26 - 5.42	**0.010** *

*Statistically significant at $p < 0.05$

Table 7: *Determinants of malnutrition: Adjusted odds ratios from multivariable logistic regression.* This table presents the adjusted odds ratios, 95% confidence intervals, and significance levels for parental education, monthly income, and low birth weight as predictors of malnutrition.



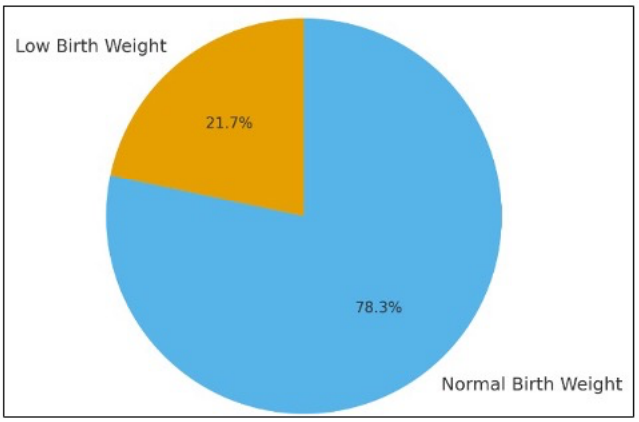


Figure 1: Prevalence of Stunting, Wasting, and Underweight

Figure 1: Prevalence of malnutrition indicators among children from urban poor families in Bangladesh (n = 184). Stunting (26.1%) and underweight (28.3%) were the most common nutritional deficiencies, while wasting was observed in 14.1% of children. These values reflect both chronic and acute forms of malnutrition.

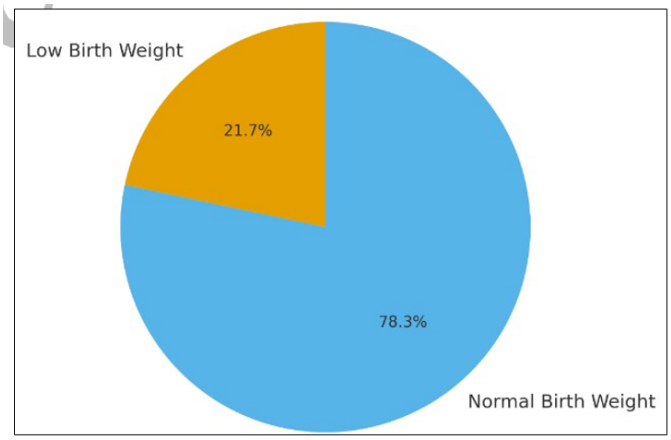


Figure 2: Distribution of Birth Weight (Low vs Normal)

Figure 2: Distribution of birth weight among children from urban poor families in Bangladesh (n = 184). Low birth weight was present in 21.7% of children, while 78.3% were born with normal weight. Low birth weight was a significant determinant of malnutrition in this study, emphasizing the role of maternal and perinatal care.

DISCUSSION

The current study found a high burden of malnutrition among 6 month-5 year-old children in an urban poor area in Bangladesh; 26.1% were stunted, 14.1% wasted and 28.3% underweight. These estimates are in line with previous national surveys, yet they also reveal that the burden of undernutrition remains unacceptably high among disadvantaged communities. For example, the last Bangladesh Demographic and Health Survey (BDHS 2017– 18) showed that the prevalences of stunting, wasting and underweight were respectively 31%, 8% and 22% at national level [5]. The lower stunting, higher wasting and underweight in this study may indicate acute susceptibility of urban poor households who go through irregular income, food shortage and low access to health. Similar results were also recorded for slum dwellers of the Dhaka city where prevalence rates of undernutrition were higher than the national level, because of crowded living conditions, unhygienic environment and inappropriate feeding practice [6,7]. This highlights that health inequalities persist across urban areas and the need for interventions in disadvantaged groups specific to context.

One of the most important determinants found in this report was parental education and children with illiterate parents had more than two times higher odds of being malnourished as compared to those whose parents were educated. This finding is supported by studies in Bangladesh, India and Ethiopia, which have all found maternal education to be a robust predictor of child nutritional status [10,13,16]. Literate mothers are probably better able to appreciate the value of exclusive breastfeeding, appropriate complementary feeding, hygiene and health actions [14]. On the contrary, the low educational level restricts maternal ability to make adequate decisions in childcare- enabling environment if financial resources are present. Low birth weight (LBW)

was yet another significant predictor which independently raised the odds of malnutrition by more than 2.5 times. This is in accordance with a number of earlier studies which have reported an association between LBW and poor physical growth as well as weak immunity, susceptibility to infections among the children [15,25]. Collectively, these results highlight the intersection of intergenerational socioeconomic disadvantage and perinatal conditions in shaping persistent malnutrition among the urban poor.

Notably, household income and sanitation type were significantly correlated with malnutrition in the univariate analyses but not statistically significant in multivariable models. This indicates that only income may incompletely explain malnutrition risks and operates indirectly through maternal education, feeding practices adherence, as well as healthcare utilization. Similar findings have been noted from Nepla and India, where maternal knowledge and household practices were more important than absolute income in shaping child nutrition [17,19]. In addition, most households in this study had access to municipal drinking water and sanitation via septic tanks, yet malnutrition prevalence remained high suggesting that when infrastructure improves beyond the reach of behavior change communication it may have limited affects. There are significant policy implications of these findings. First, programs should emphasize strengthening maternal education in tap attention to those agendas that are particularly LMICs where slum interventions and practices (with a particular focus on literacy campaigns and tailoring nutrition counseling). Second, there is a need for health policies that focus on neonatal care and prevention of low birth weight, maternal nutrition during pregnancy, antenatal care coverage, and institutional delivery. Finally, feeding strategies for children should implement an integrated strategy of structural poverty and behavior elements, adding food supplementation to health education, promotion of breastfeeding, and increased availability of healthcare. In this way, it can help Bangladesh more effectively address the inter-generational malnutrition cycle among its urban poor populations and work towards the Sustainable Development Goals.

LIMITATIONS OF THE STUDY

This work, however, has several limitations although it delivers valuable findings regarding malnutrition in Bangladesh among urban poor children. There are a number of limitations to the use of this cross-sectional data set; firstly, it is not possible to make causal inferences about the relationship between socioeconomic determinants and malnutrition outcomes, these results reflect only associations at one point in time. Second, purposive sampling restricts generalizability as the study was conducted in an urban hospital setting and may not fully reflect all urban poor communities in Bangladesh. Third, certain important variables including exclusive breastfeeding duration and birth weight were based on maternal recall, which might result in recall bias and reporting bias. The number of children could have been doubled and the power remained sufficient to make preliminary conclusions, 60 however this sample size may not encompass the full range across different socioeconomic groups silent intervention for od. In addition, no information on environmental factors (dietary diversity, food security and seasonal variation in nutrition) was collected which would have enabled a more comprehensive assessment of the determinants of malnutrition. Notwithstanding these constraints, the study provides useful evidence base to inform

policy makers, health sector professionals and NGOs involved in addressing the nutritional problems of urban poor children in Bangladesh.

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CONCLUSION

Methods A cross-sectional study to determine the prevalence and socioeconomic determinants of malnutrition among children aged from 6 months to 5 years, belonging to urban poor households in Bangladesh. The results of the study indicated that a high level of children are still being affected by undernutrition (26.1% stunted, 14.1% wasted and 28.3% underweight) despite national progress in nutritional indicators. Low parental education and low birth weight were the significant predictors for malnutrition and, household income, sanitation, access to water sources contributed little but less significantly in adjusted models. These findings emphasize the interaction of socioeconomic adversity and perinatal health in shaping children's nutrition status. The evidence further suggests that in a context of urban poverty, malnutrition is not just the result of food insecurity, but also of wider structural and behavioral constructs such as maternal education and care in early-life.

The findings have profound policy and practice implications. Addressing malnutrition in young urban poor children needs integrated strategies going beyond food distribution, such as maternal education programmes, better antenatal and neonatal care services and functioning health systems being closer to the poorer populations. Nutrition enhancement of mothers and exclusive breastfeeding in the first 6 months of life need special emphasis to reduce the risk for low birth weight. Investment in literacy and health education for mothers from slum communities may have long-term implications on child survival and development at the same time. Further studies based on longitudinal and multi-site design are needed to disentangle the causal effects, regional differences and also considering factors such as dietary diversity, food insecurity and seasonal variations. Indicative Strategic Programming for Accelerating Progress to Reduce Child Undernutrition (2018-2025) 4 If Bangladesh makes strategic investments in holistic and equity -based programming, the country will move further towards meeting the targets for reducing child malnutrition among children under five years of age especially among the most vulnerable groups thus making significant strides towards achievement of national and subnational SDG targets related to health, nutrition and poverty reduction.

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