J. Biosoc. Sci., (2012) **44**, 525–535, © Cambridge University Press, 2011
doi:10.1017/S0021932012000181 First published online 24 Apr 2012

NUTRITIONAL STATUS OF UNDER-FIVE CHILDREN IN BANGLADESH: A MULTILEVEL ANALYSIS

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Summary. The nutritional status of under-five children is a sensitive sign of a country's health status as well as economic condition. This study investigated the differential impact of some demographic, socioeconomic, environmental and health-related factors on the nutritional status among under-five children in Bangladesh using Bangladesh Demographic and Health Survey 2007 data. Two-level random intercept binary logistic regression models were used to identify the determinants of under-five malnutrition. The analyses revealed that 16% of the children were severely stunted and 25% were moderately stunted. Among the children under five years of age 3% were severely wasted and 14% were moderately wasted. Furthermore, 11% of the children were severely underweight and 28% were moderately underweight. The main contributing factors for under-five malnutrition were found to be child's age, mother's education, father's education, father's occupation, family wealth index, currently breast-feeding, place of delivery and division. Significant community-level variations were found in the analyses.

Introduction

Malnutrition is one of the main causes of morbidity and mortality among children under five years of age in many developing countries (Martorell *et al.*, 1992). Malnutrition is an important root of infant and young child mortality. It reduces life span and is associated with more than half of all deaths of children worldwide (UNDP, 2008). Bangladesh is a developing country experiencing an alarming level of child nutritional deficiency. A recent study by NIPORT *et al.* (2009) revealed that among under-five children 43% were stunted (chronic malnutrition), 17% were wasted (acute malnutrition) and 41% were underweight (undernutrition).

There are numerous studies covering almost every country of the globe on the status and determinants of child malnutrition (for example, Islam *et al.*, 1994; Tharakan & Suchindran, 1999; Rajaretnam & Hallad, 2000; Smith & Haddad, 2000; Shrimpton & Yongyout, 2003; Hong *et al.*, 2006; Rayhan & Khan, 2006; Omigbodun *et al.*, 2010; Bose, 2011; Khanam *et al.*, 2011).

Tharakan & Suchindran (1999) studied the status and determinants of child malnutrition on the basis of stunting, wasting and underweight using national cross-sectional data from Botswana. Their study revealed several biological, social, cultural, economic and morbidity factors such as age of child, birth weight, duration of breast-feeding, gender of household head, residence, type of house, toilet facility, parents' education, child caretaker, milk and dairy products, staple food, and incidence of cough and diarrhoea, as correlates of child malnutrition.

A study on adolescents in south-western Nigeria revealed that males were more likely to be stunted and underweight than females (Omigbodun *et al.*, 2010). It also revealed that children from rural schools were more likely to be stunted and underweight than those from urban areas. However, female children in India were more likely to be malnourished compared with male children (Bose, 2011). The study further indicated that the higher a mother's status in the community the higher the nutritional status of her daughters. Another study by Rajaretnam & Hallad (2000) using the NFHS-II data of India reported that Indian children aged 12–47 months become less and less underweight but more and more stunted after reaching 2 years of age. Sex of child, birth weight, birth order, birth interval, regional setting, mother's education, mother's age, antenatal and natal care and incidence of diarrhoea were identified as important predictors of child underweight in India.

Rayhan & Khan (2006) investigated the impact of some demographic, socioeconomic, environmental and health-related factors on child nutritional status using the nationwide data of the Bangladesh Demographic and Health Survey (BDHS) 1999–2000. They observed that previous birth interval, size at birth and mother's education had a significant influence on chronic malnutrition. Size at birth and mother's nutritional status had a significant influence on both wasting and underweight. A strong and significant association between household wealth inequality and chronic childhood undernutrition in Bangladesh was identified in a study by Hong *et al.* (2006) using data from the BDHS 2004. Furthermore, the study revealed that children from the poorest households had a higher risk of being chronically malnourished than those of wealthiest households.

Using data from the BDHS 1996–97, Kiess *et al.* (2000) studied the factors associated with low height-for-age (HAZ) and weight-for-height (WHZ), and found that parents' illiteracy and insufficient antenatal care visits were significant factors of lower HAZ. The incidence of diarrhoea and fever in the last two weeks, and receiving no BCG and measles vaccines, were found to be significant predictors of lower WHZ. On the other hand, birth interval, mother's body mass index (BMI) and regional setting (division) were found to be significant factors of both lower HAZ and WHZ. Pryer *et al.* (2003) conducted a panel survey between 1995 and 1997 in a Dhaka slum population to identify socioeconomic, demographic and environmental factors that predict better HAZ for children under five years of age. They observed that 31% children had HAZ greater than -2. Using logistic regression analysis, they found that better nourished children were more likely to have taller mothers, and belong to households with female household heads, higher income, hygienic latrines and more floor place.

For developing countries like Bangladesh, prevalence of malnutrition is one of the indicators of child health. Factors influencing malnutrition status may lead to policy formulation for the governments in these countries. Combating the problem of poor nutritional status is an ongoing process and frequent survey of the prevalence of malnutrition is a pre-requisite in this process. Furthermore, with the presence of differences in regional settings and other contextual differences the study of malnutrition becomes complicated. Children cluster within a family and then within the community they live in. Unfortunately, none of the previous studies in the existing literature has highlighted the possibility of a community effect on malnutrition. In developing countries, the likelihood of the presence of a community effect is high (Islam, 2010). This study aims to explore the malnutrition status of under-five children in Bangladesh and identify the significant factors influencing the malnutrition status, including any community variations in the data.

Methods

Data

The study utilizes nationwide data from the BDHS 2007 (NIPORT *et al*., 2009). Information was collected from 10,996 women aged 15–49 years and 3771 men aged 15–54 years covering 10,400 households from 361 sample points (clusters) throughout Bangladesh (134 clusters from urban areas and 227 clusters from rural areas). A child dataset ($N = 6150$) was then generated from the women sample forming the basis of this research article. The BDHS data constitute a nationally representative two-stage sample. Bangladesh is divided into six administrative divisions, 64 districts and 483 *upazillas*. In urban strata the primary sampling units (PSUs) are *mahalla* and in rural strata these are *mauza*. The BDHS data are hierarchical in nature, with individuals being nested into PSUs, and PSUs into divisions. The BDHS 2007 was conducted under the authority of the National Institute for Population Research and Training (NIPORT) of the Ministry of Health and Family Welfare. Mitra and Associates executed the survey with the technical assistance of Macro International and financial support from USAID/Bangladesh.

Construction of Z-scores

The best way of measuring child nutritional status using anthropometric indices is the *Z*-score method (WHO, 1986; Cogill, 2003). The *Z*-score is a measure of an individual's value with respect to the distribution of the reference population. The formula for the calculation of *Z*-scores is as follows:

$$Z\text{-value} = \frac{\text{Individual value (height or weight)} - \text{(median value of the reference population)}}{\text{(standard deviation of the reference population)}}$$

The WHO Child Growth Standards were used to calculate *Z*-scores (WHO, 2006), and stunting, wasting and underweight were calculated as given in the BDHS 2007 dataset (NIPORT *et al*., 2009). Height-for-age (HAZ) is a measure of stunting, weight-for-height (WHZ) is a measure of wasting and weight-for-age (WAZ) is a measure of underweight.

Regression analyses

To determine the factors associated with the response variables (e.g. stunting, wasting and underweight) Cox's (Cox, 1970) logistic regression model (single level) was

https://doi.org/10.1017/S0021932012000181 Published online by Cambridge University Press

fitted for different independent variables using SPSS-16. The dependent variable of the study is child nutritional status, which can be categorized into three groups according to the Z-score: (i) severely malnourished (Z-score < -3.0), (ii) moderately malnourished (Z-score -3.0 to -2.01) and (iii) healthy (Z-score ≥ -2.0). However, as some of the extreme categories had few observations for the convenience of the analysis the dependent variable was re-categorized into two groups (dichotomous) as: (i) malnourished (Z-score < -2.00) and (ii) healthy (Z-score ≥ -2.00) (reference category) in binary logistic regression analysis. In the regression modelling the response variables were coded as: child malnourished = 1, child not malnourished = 0. Once a single-level model was identified, a two-level random intercept binary logistic regression model (discussed in the section below) was fitted using MLwiN 2.0 software considering the same set of independent variables. The independent variables considered were child age, sex of child, birth order, birth interval, residence, division, religion, mother's education, father's education, mother's working status, mother's occupation, father's occupation, wealth index, sources of drinking water, sanitation facilities, number of usual members in the family, mother's age, listens to radio, reads newspaper, watches TV, received vitamin A, place of delivery, child had fever, child had diarrhoea and currently breast-feeding. Only the independent variables found to be significant in the bivariate analyses were considered in the regression analyses and variables found significant at this stage were retained in the final models. The possibility of multicollinearity and confounding was also explored. Interaction effects were tested and are reported in the Results section where found.

Two-level random intercept binary logistic regression model

When there is hierarchy in the dataset observations cluster within communities/groups (for example, PSUs in BDHS dataset). Ignoring the clustering will generally cause the standard error of regression coefficients to be underestimated, which might lead to significance of a coefficient that could be ascribed to chance. Multilevel modelling helps overcome this problem by isolating the community-specific effect from the effects of other covariates (Goldstein, 2003). The estimates of regression coefficients measured by multilevel models are efficient and the policies based on these are reliable. Furthermore, the significance and magnitude of the community effect helps identify if there is any community that is performing poorly.

The two-level random intercept binary logistic regression model is the extension of the single-level binary logistic regression model (for details, see Goldstein, 2003). Let a binary response be Y_{ij} which equals 1 if individual i in community j is malnourished (for example) and 0 otherwise. Then the probability that the individual is malnourished is $P_{ij} = \Pr(Y_{ij} = 1)$. If k independent variables $X_{ij1}, X_{ij2}, \ldots, X_{ijk}$ are measured at the individual level, then a two-level random intercept binary logistic regression model can be written as follows:

$$\text{logit}(P_{ij}) = \beta_{0j} + \sum_{l=1}^{K} \beta_l X_{ijl}$$

$$\text{with} \quad \beta_{0j} = \beta_0 + u_{0j},$$

https://doi.org/10.1017/S0021932012000181 Published online by Cambridge University Press

where β_0 is a fixed component and u_{0j} is a community-specific component, the random effect which is assumed to follow a normal distribution with mean zero and variance σ^2_{u0}. When σ^2_{u0} is found to be significant in the model, it is concluded that there is a community effect in the model, which means that two individuals from different communities with the same set of characteristics will show different values on the response variable (malnutrition). Furthermore, due to the additive nature of the model the effects of the community-specific component on the response variable can be explored in relation to other independent predictors by assuming different values for u_{0j}. Note that communities refer to primary sampling units (PSUs).

Results and Discussions

The data revealed that among the study children 16% were severely stunted and another 25% were moderately stunted. For wasting, 3% belonged to the severe category and 14% were moderately wasted. About 11% of the children were found to be severely underweight, while 28% fell into the moderately underweight category.

Determinants of stunting (child chronic malnutrition)

The two-level random intercept binary logistic regression model for stunting identified some significant predictors of stunting (child chronic malnutrition) (Table 1). The results indicate that children aged 12–23, 24–35 and 36–47 months had 3.23, 5.78 and 5.66 times higher odds of being stunted, respectively, in comparison with children aged $\leq$6 months. The reason may be a deficiency in proper supplementary food for children after 6 months of age since breast milk only is not sufficient to maintain adequate nutrition beyond 6 months (Mishra & Retherford, 2000). However, there is a tendency for the odds ratio to decrease as age increases. For example, the odds ratio of being stunted for children aged 48–59 months was 4.10. The reason may be that after four years children gradually adopt supplementary food.

A significant regional (division) difference was observed in child chronic malnutrition (stunting). The likelihood of a child being chronically malnourished was significantly lower in Khulna in comparison with Barisal division.

Father's education is one of the most important determinants of child malnutrition (Smith & Haddad, 2000). From the model it is observed that the likelihood of children being stunted decreased with increasing father's educational status. The findings support the reality that educated fathers were more conscious of their children's health than uneducated fathers. Literate fathers are more likely to introduce new feeding practices, which helps to improve the nutritional status of their children. Father's occupation is another important determinant of stunting. The regression results suggest that children were more likely to be stunted if their father's occupation was agriculture compared with business and service.

Household income factors are strong indicators of child nutrition status. Usually, children belonging to higher income households have better nutritional status than those of lower income households (Vella *et al.*, 1994). The results obtained from the analysis indicate that the odds of being stunted for children decreased with an increase in household wealth index. The children of households with middle, richer and richest

Table 1. Multiple logistic regression model for stunting

Independent variable	Categories	β (SE)	Odds ratio [95% CI]
Intercept		−0.99*** (0.17)	0.37[a] [0.27, 0.51]
Child's age in months (ref. ≤6)	7–9	0.37** (0.18)	1.45 [1.02, 2.07]
	10–11	0.49** (0.22)	1.62 [1.05, 2.51]
	12–23	1.17*** (0.13)	3.23 [2.52, 4.16]
	24–35	1.75*** (0.13)	5.78 [4.50, 7.43]
	36–47	1.73*** (0.13)	5.66 [4.41, 7.28]
	48–59	1.41*** (0.13)	4.10 [3.18, 5.27]
Birth order (ref. 1st birth)	2nd birth	−0.07 (0.08)	0.94 [0.80, 1.09]
	3rd birth	−0.03 (0.09)	0.97 [0.82, 1.16]
	4th birth	0.16* (0.11)	1.17 [0.95, 1.44]
	5th birth	0.20 (0.13)	1.22 [0.94, 1.58]
	6th birth	0.17 (0.12)	1.18 [0.93, 1.50]
Division (ref. Barisal)	Chittagong	0.11 (0.12)	1.12 [0.89, 1.41]
	Dhaka	0.04 (0.12)	1.04 [0.83, 1.31]
	Khulna	−0.38*** (0.13)	0.68 [0.52, 0.89]
	Rajshahi	−0.21* (0.12)	0.81 [0.64, 1.03]
	Sylhet	−0.07 (0.12)	0.93 [0.73, 1.19]
Father's education (ref. no education)	Primary	−0.08 (0.08)	0.92 [0.79, 1.07]
	Secondary	−0.40*** (0.07)	0.67 [0.57, 0.79]
	Higher	−0.83*** (0.14)	0.44 [0.33, 0.57]
Father's occupation (ref. agriculture)	Labourer	−0.11 (0.08)	0.89 [0.77, 1.04]
	Business	−0.19** (0.09)	0.83 [0.69, 1.00]
	Service	−0.61*** (0.22)	0.54 [0.35, 0.85]
	Others	−0.61*** (0.20)	0.54 [0.37, 0.80]
Wealth index (ref. poorest)	Poorer	−0.74 (0.93)	0.48 [0.08, 0.95]
	Middle	−0.29*** (0.10)	0.75 [0.62, 0.91]
	Richer	−0.30*** (0.11)	0.74 [0.60, 0.91]
	Richest	−0.69*** (0.12)	0.50 [0.40, 0.63]
Random effect variance		0.07** (0.03)	

SE denotes standard error; CI denotes confidence interval; [a]odds.
*$p < 0.10$; **$p < 0.05$; ***$p < 0.01$.

wealth index were 0.75, 0.74 and 0.50 times less likely, respectively, to be stunted than those of households with poorest wealth index.

Determinants of wasting (child acute malnutrition)

The results indicate that children belonging to the age groups 10–11 and 12–23 months had higher odds of being wasted (acutely malnourished) than those aged ≤6 months. For children belonging to the age groups 10–11 and 12–23 months of age, the likelihood of being wasted was found to be about 1.74 and 1.51 times higher, respectively, than those in the reference group (≤6 months) (Table 2).

The odds of being wasted decreased with increasing mother's education level. The children of secondary and higher educated mothers were 0.68 and 0.65 times less likely,

Table 2. Multiple logistic regression model for wasting

Independent variable	Categories	β (SE)	Odds ratio [95% CI]
Intercept		−1.83 (0.19)	0.16[a] [0.11, 0.23]
Child's age in months (ref. ≤6)	7–9	0.02 (0.20)	1.02 [0.69, 1.49]
	10–11	0.56** (0.22)	1.74 [1.14, 2.67]
	12–23	0.41*** (0.14)	1.51 [1.16, 1.97]
	24–35	0.07 (0.14)	1.07 [0.81, 1.42]
	36–47	−0.10 (0.15)	0.91 [0.67, 1.22]
	48–59	0.03 (0.16)	1.03 [0.76, 1.40]
Religion (ref. Muslim)	Non-Muslim	0.25* (0.13)	1.28 [0.99, 1.66]
Mother's education (ref. no education)	Primary	−0.09 (0.10)	0.91 [0.75, 1.10]
	Secondary	−0.39*** (0.10)	0.68 [0.56, 0.83]
	Higher	−0.43** (0.19)	0.65 [0.45, 0.98]
Father's occupation (ref. agriculture)	Labourer	−0.28*** (0.09)	0.76 [0.63, 0.91]
	Business	−0.18 (0.11)	0.84 [0.67, 1.04]
	Service	−0.09 (0.24)	0.91 [0.58, 1.45]
	Others	−0.54* (0.28)	0.59 [0.34, 1.00]
Sanitation facility (ref. septic tank/ modern toilet)	Pit latrine	0.18* (0.10)	1.19 [0.99, 1.44]
	Unhygienic	0.20* (0.12)	1.22 [0.97, 1.53]
Currently breast-feeding (ref. no)	Yes	0.36*** (0.11)	1.44 [1.17, 1.77]
Random effect variance		0.13*** (0.05)	

SE denotes standard error; CI denotes confidence interval; [a]odds.
*$p < 0.10$; **$p < 0.05$; ***$p < 0.01$.

respectively, to be wasted compared with those of uneducated mothers. This may be due to the fact that educated mothers can ensure proper treatment for recurrent diseases such as diarrhoea and fever. Father's occupation had a significant influence on child wasting (acute malnutrition); children were more likely to be wasted if their fathers were involved in agriculture compared with manual labour.

The findings show that the incidence of currently breast-feeding preceding the survey had a significant influence on wasting. Children who were being breast-fed had 1.44 times higher odds of being wasted compared with their non-breast-fed counterparts. This may be due to currently breast-fed children being given less supplementary foods where needed.

Determinants of underweight (child undernutrition)

The results of the logistic regression model for underweight show that the likelihood of being underweight increased with increasing child's age. Compared with the reference group (age ≤6 months), children aged 12–23 months were 1.88 times more likely to be underweight. Furthermore, the odds of being underweight for children in the age groups 24–35, 36–47 and 48–59 months were found to be 2.59, 2.70 and 2.94 times higher, respectively, compared with the reference group.

A significant regional difference was observed in child underweight. The likelihood of a child being underweight was significantly lower in Khulna division compared with Barisal division.

From previous research it is obvious that father's education is one of the most important factors for child malnutrition (Smith & Haddad, 2000). Uneducated fathers do not have enough knowledge about their children's health and nutrition. As a result, the children of uneducated fathers have a higher likelihood of being underweight due to a lack of proper care. This study's analysis also reveals that children of secondary and higher educated fathers had 0.79 and 0.51 times lower odds of being underweight than those of fathers who had no education.

Father's occupation is also one of the important factors for child underweight. The children of households with higher income have better nutritional status than those of lower income households (Vella *et al*., 1994). The results also indicate that the better the households' wealth condition the lower the risk of a child being underweight. The children of households with richer and richest wealth index were 0.77 and 0.56 times less likely, respectively, of being underweight than those of households with poorest wealth index.

The findings also show that the incidence of currently breast-feeding preceding the survey had a significant influence on underweight. Children who were currently breast-fed had 1.40 times higher risk of being underweight compared with their non-breast-fed counterparts. Place of delivery is an important factor for child underweight. Table 3 reveals that children whose place of delivery was a hospital were less likely to be underweight than those who were delivered at home.

The variances of the community effects were found to be significant in the analyses for all the measures of malnourishment (stunting, wasting and underweight). These indicate that children from different communities with the same set of characteristics (same values/levels of independent variables) will exhibit different influences on the response variable (stunting, wasting and underweight). Hence, the significant community effects need proper investigation and demand appropriate policy interventions as in some cases the community effects are greater (in magnitude) than the effects of some important independent variables in the models. For example, the standard deviation of the random effect for stunting is $0.26 = \sqrt{0.07}$. The additive nature of the model suggests that a one standard deviation change in the community random effect has a greater influence on stunting than the children's fathers being involved in business ($\beta = -0.19$) compared with agriculture. In such a situation policy planners can achieve more improvement in the stunting of the children of that community by addressing community-specific characteristics (e.g. food habits, frequency of food consumed and nutritional composition of food) than encouraging a change in profession of the fathers from agriculture to business.

Conclusions

This study examined the nutritional status of the children under five years of age using data from the BDHS 2007 in terms of stunting, wasting and underweight. The anthropometric indices HAZ, WHZ and WAZ were constructed using the WHO Child Growth Standards (2006) (WHO, 2006) and provided by BDHS 2007 (NIPORT *et al*.,

Table 3. Multiple logistic regression model for underweight

Independent variable	Categories	β (SE)	Odds ratio [95% CI]
Intercept		−0.80*** (0.17)	0.45[a] [0.32, 0.62]
Child's age in months (ref. ≤6)	7–9	−0.01 (0.17)	0.99 [0.72, 1.38]
	10–11	0.28 (0.20)	1.32 [0.88, 1.97]
	12–23	0.63*** (0.12)	1.88 [1.49, 2.35]
	24–35	0.95*** (0.12)	2.59 [2.06, 3.25]
	36–47	0.99*** (0.12)	2.70 [2.13, 3.43]
	48–59	1.08*** (0.12)	2.94 [2.31, 3.75]
Division (ref. Barisal)	Chittagong	0.04 (0.11)	1.04 [0.83, 1.30]
	Dhaka	−0.07 (0.11)	0.93 [0.75, 1.17]
	Khulna	−0.35*** (0.13)	0.70 [0.55, 0.91]
	Rajshahi	−0.07 (0.12)	0.93 [0.74, 1.17]
	Sylhet	−0.09 (0.12)	0.92 [0.73, 1.16]
Father's education (ref. no education)	Primary	0.03 (0.07)	1.03 [0.89, 1.20]
	Secondary	−0.24*** (0.08)	0.79 [0.67, 0.93]
	Higher	−0.67*** (0.14)	0.51 [0.39, 0.68]
Father's occupation (ref. agriculture)	Labourer	−0.13* (0.07)	0.87 [0.76, 1.01]
	Business	−0.22** (0.09)	0.81 [0.67, 0.96]
	Service	−0.19 (0.22)	0.83 [0.54, 1.27]
	Others	−0.61*** (0.20)	0.54 [0.37, 0.80]
Wealth index (ref. poorest)	Poorer	−0.16 (0.90)	0.85 [0.15, 4.97]
	Middle	−0.19** (0.10)	0.82 [0.68, 1.00]
	Richer	−0.26** (0.10)	0.77 [0.63, 0.95]
	Richest	−0.58*** (0.12)	0.56 [0.45, 0.70]
Currently breast-feeding (ref. no)	Yes	0.34*** (0.08)	1.40 [1.20, 1.63]
Place of delivery (ref. home)	Govt. hospital	−0.55*** (0.13)	0.58 [0.45, 0.75]
	Pvt. hospital	−0.46*** (0.14)	0.63 [0.48, 0.82]
	Others	−0.68 (0.43)	0.51 [0.22, 1.17]
Random effect variance		0.05** (0.03)	

SE denotes standard error; CI denotes confidence interval; [a]odds.
*$p < 0.10$; **$p < 0.05$; ***$p < 0.01$.

2009). These were utilized to assess the nutritional status of Bangladeshi children. The levels of stunting (HAZ ≤ −2.0), wasting (WHZ ≤ −2.0) and underweight (WAZ ≤ −2.0) among the study population were found to be above the threshold for 'very high' prevalence (2.28%; see Cogill, 2003), which is a matter of great concern for the country. If compared with under-five children from other developed countries, children from Bangladesh are experiencing a more severe level of malnutrition, which is a matter for immediate policy intervention.

The logistic regression model indicates that child's age in months, division, father's education, father's occupation and wealth index are significant determinants of stunting. For wasting, child's age in months, mother's education, father's occupation, and currently breast-feeding were found to be significant determinants in the logistic regression model. Furthermore, the logistic regression model indicates that child's age in months, division, father's education, father's occupation, wealth index, currently breast-feeding and place of delivery are significant determinants of underweight. One important finding of this study is that there were significant community variations in the data. The paper suggests that different communities may require different strategies to overcome the problem of malnutrition.

Child malnutrition may be reduced by improving the education level of fathers and mothers, mother's nutritional status and improving access to health services. Appropriate efforts are needed to reduce hunger and malnutrition in areas where the prevalence of underweight was found to be highest (Barisal), and especially among lower socio-economic groups. Poor-performing communities should be given special attention.

Parents should monitor the growth of their children in terms of height and weight for the first five years since in this period children may suffer from malnutrition and fail to grow properly in the absence of proper care and nutrition. Government and non-government institutions related to the health and nutrition sector should generate long-term programmes to increase awareness of parents about the standard height and weight according to age and sex of the child.

It is necessary to make women aware of the hazardous effects of having a large number of children. To improve overall childhood health and nutrition, it is necessary to reduce household wealth inequality since most of the children belonging to poor households had a higher odds of being malnourished of any form. This study advocates for interventions to reduce poverty and make health services more available to poor households in order to improve the nutritional status of children in Bangladesh (Hong *et al*., 2006).

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