

# Chronic stunting among under-5 children in Bangladesh: A situation analysis

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## Abstract

Malnutrition is a major problem in many developing countries, including Bangladesh. Chronic malnutrition is a major cause of mortality and morbidity among children under the age of five years. Although Bangladesh has made remarkable progress in reducing mortality in the under-fives, chronic stunting remains a formidable challenge for the country. Based on an analysis of available secondary data, this paper illustrates the current status of chronic stunting in Bangladesh. Data on selected relevant indicators such as gender, urban/rural residence, level of mother's education, and income by wealth quintiles were extracted from the Bangladesh Health and Demography Surveys from 2004, 2007, and 2011. The data clearly suggest a strong relationship between selected socio-economic variables and stunting among children under the age of five. In rural areas, stunting prevalence rate was found to be more than six times higher than in urban areas. Income inequality was also a significant predictor of stunting. Children from the lowest wealth quintile are twice as likely to be stunted as children from the highest wealth quintile (54% of children under five in the lowest quintile compared to 27% of their counterparts in the highest wealth quintile). Similarly, the level of mother's education is strongly related to stunting: the higher the level of mothers' education, the lower the prevalence rate of stunting among children under five. Since wealth or income is a strong predictor of place of residence (urban/rural) as well as mothers' level of education, it can be generally concluded that inequity is the primary determinant of stunting among children under five. Bangladesh must forcefully address inequity in order to tackle the overwhelming prevalence of stunting among children under five. Despite making impressive gains to improve major health and development indicators at the macro level, Bangladesh has so far failed to adequately address the underlying issue of inequity.

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## Introduction

As the eighth most populous country in the world with approximately 153 million people, Bangladesh is also one of the poorest [1]. Nevertheless, it has made significant gains in health, education and other aspects of socioeconomic development [2]. Its performance in the health sector has received wide recognition from the World Health Organization (WHO), the World Bank and the United Nations [3].

Improvements made in terms of the survival of infants and children under five years of age and pregnant women, life expectancy, immunization coverage, and tuberculosis control are part of a remarkable success story for health in this South Asian country [4–8]. It is interesting to note that these improvements have taken place despite a relatively low level of spending on health care, a weak health system, widespread poverty and income inequality. Despite these macro-level achievements, Bangladesh

still faces considerable problems, including deep-rooted poverty and malnutrition, and these seem to be exacerbated by an evolving set of 21<sup>st</sup> Century challenges [9].

Over the years Bangladesh has made substantial progress in terms of reducing malnutrition. For example, the proportion of underweight children declined from 66% to 51% between 1990 and 2004 [10]. During the same period, the level of child stunting decreased from 66% to 49% [11]. Nevertheless, prevalence rates of child stunting and underweight children are still “very high” according to criteria including those set by the WHO. In Bangladesh, chronic energy deficiency in non-pregnant women declined from 52% in 1996–97 to 45% in 1999–2000 [12]. On the other hand, 30–50% of newborn babies are estimated to be affected by low birth weight [13]. These prevalence rates are also regarded as “very high”.

Good health and adequate nutrition are fundamental human rights. Bangladesh [1] asserts that raising the nutrition level and improving public health are among the state’s primary responsibilities. Although Bangladesh has made significant progress in some health and nutrition indicators over the past few decades, chronic malnutrition rates among children under the age of five (“under-5 children”) continue to be very high. It is alarming to note that two out of every five children below five years of age in Bangladesh have stunted growth. In 2013, the Bangladeshi government developed a Bangladesh National Nutrition Policy to address the problem of malnutrition affecting the country [14]. However, if Bangladesh is to achieve the Millennium Development Goal (MDG) targets, and progress towards achieving post-MDG social development goals, it is apparent that the implementation of this policy needs to be further coordinated and strengthened.

Although chronic malnutrition or “stunting” takes a relatively long time to develop, its adverse effects have life-long consequences, seriously affecting cognitive development and productivity, and ultimately having a negative impact on the economy of the whole country [15, 16]. Several factors are thought to be responsible for the situation, including chronic nutrition deficiency in the child and/or their

mother, food insecurity, repeated infections, low birth weight, poverty, unhygienic living conditions, unhealthy behaviors and practices, and a lack of access to health care [17]. Chronic malnutrition severely affects the health of an individual (both during and after childhood), as well as their family, society and the nation as a whole [18]. It significantly increases the risk of developing a number of chronic short and long-term health problems including cardiovascular disease, diabetes, kidney diseases, and neurological deficits. This also has a significant impact on increased morbidity and premature death. A stunted child fails to grow normally and suffers from cognitive deficits, resulting in poor physical capacity and insufficient energy as an adult to carry out work [19]. Major long-term negative impacts on brain and neurological development and functions may lead to handicap, physical and mental disability. This, in turn, becomes a burden on the child’s parents, and has subsequent health and economic consequences for the nation as a whole.

The present study carried out a situation analysis of chronic stunting in Bangladesh using data from a nationally representative survey called National Demographic Health Survey (DHS), conducted periodically by the Dhaka-based National Institute of Population Research and Training (NIPORT).

## Methods

The study is based on three sets of data from the Bangladesh Demographic and Health Surveys (DHS), which were carried out in 2004, 2007 and 2011 by the National Institute of Population Research and Training, with financial and technical support from the United States Agency for International Development (USAID). The study design, informed consent form, and methods of data collection have been described in detail in year-specific reports [20–22]. USAID funds and carries out these surveys in many developing countries in Asia, Africa and the Middle East every four years; they follow uniform and internationally recognized research methods. In each country, the surveys are conducted by competent, nationally acclaimed research organizations with technical skills and operational transparency. All surveys have samples that are nationally representative in terms of size and

composition of critical variables such as gender, urban-rural residency and income. At the country level, the host organizations often seek and receive technical support from the relevant United Nations agencies (such as the United Nations Development Program and WHO) and the World Bank. Since these surveys apply common methodologies and statistical techniques across countries, the results can be used for intra and inter-country comparisons. The reliability and validity of these data are accepted without reservation.

### Definitions of key variables

**Stunting:** Height-for-age measures linear growth. A child who is more than two standard deviations (-2 SD) below the median of the WHO reference population in terms of height-for-age is considered short for his or her age, or ‘stunted’. This condition reflects the cumulative effect of chronic malnutrition.

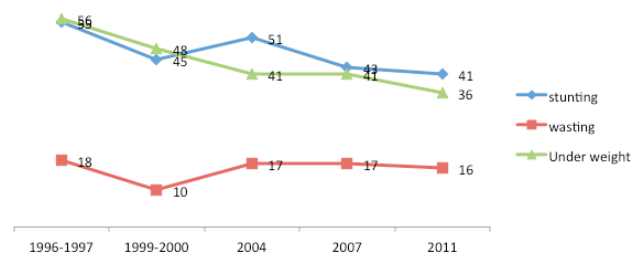
**Wasting:** Weight-for-height describes current nutritional status. A child who is more than two standard deviations (-2 SD) below the reference median for weight-for-height is considered to be too thin for his or her height, or ‘wasted’. This condition reflects acute or recent nutritional deficit.

It should be recognized that a child might be stunted but not wasted; while stunting is the result of chronic malnutrition (nutrition deficiency since birth or very early childhood), wasting reflects a more recent nutritional deficit (usually two years or less). In short, while all wasted children are likely to also be stunted, stunted children may not be wasted. Since nutritional deficiency primarily reflects poverty, stunting and or wasting could be considered to be strongly associated with poverty.

## Results

Fig. 1 presents the prevalence rate of stunting in under-5 children between 1997 and 2011. According to trend analysis it seems that the prevalence rate dropped from 59% in 1997 to 40% in 2011: a 19% drop over a 14-year period (or about 1.4% a year). On the other hand, underweight, wasting and stunting

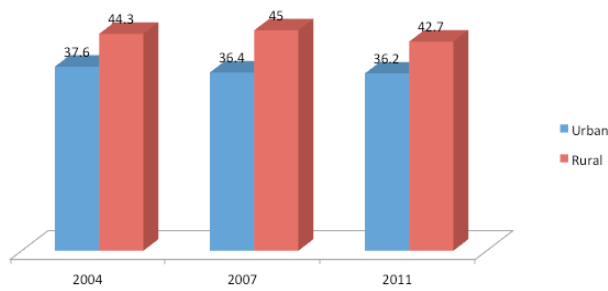
still affected 36%, 16% and 41% of children respectively in Bangladesh. In recent years, the country has made considerable gains in terms of reducing the numbers of underweight and wasted children; however, reducing the prevalence of stunting among under-5 children continues to pose a critical challenge. An analysis of the pattern of distribution of the prevalence of stunting across the country also highlights some of the critical underlying issues.



**Figure 1.** Trend of nutritional status of under-five children (1997-2011). Source DHS 2004, 2007 and 2011

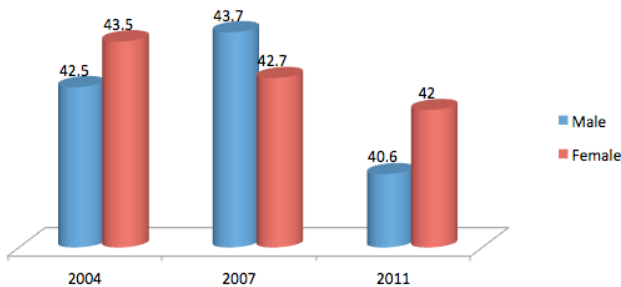
It is interesting to note that the prevalence rate of stunting among under-5 children is much higher in rural areas where, according the World Bank, 67% of the population of Bangladesh live (World Bank, 2011) [23]. The rural-urban disparity in the prevalence of stunting was 6.7% in 2004 and 6.5% in 2011 – a decrease of only 0.2% over a six-year period (Fig. 2).

In a conservative country like Bangladesh, gender typically plays a critical role in influencing health and socio-economic status. Key indicators vary, often greatly, across the gender divide. Figure 3 illustrates such gender differences in terms of prevalence of chronic stunting. In 2004, prevalence rates of chronic stunting among male and female under-5 children were 42.5% and 43.5% respectively. The corresponding figures for chronic stunting among under-5 males and females were 40.6% and 42% respectively.



**Figure 2.** Urban rural disparities of chronic stunting  
Source: BDHS 2004, 2007 and 2011

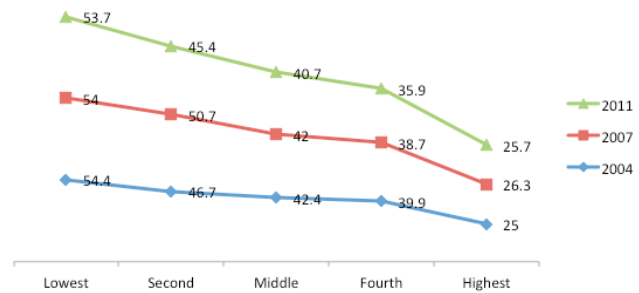
These figures clearly demonstrate that the prevalence rate of chronic stunting is not only slightly higher among female children, but that the gender-divide also seems to be increasing. It is interesting to note that the slight gain made by female children in 2007 in this regard had disappeared by 2011 (Fig. 3).



**Figure 3.** Prevalence of chronic stunting among male and female under-five children  
Source: BDHS 2004, 2007 and 2011

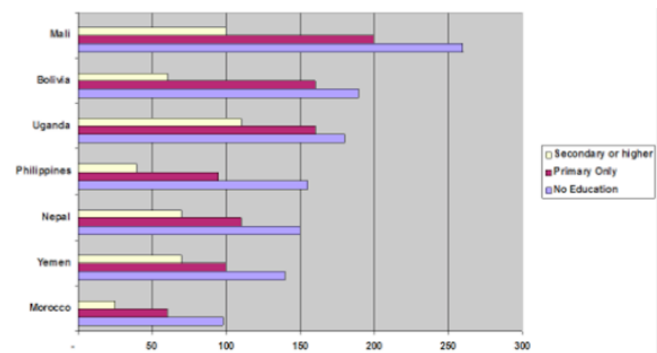
On the other hand, the data clearly demonstrate a disturbingly significant relationship between household income and chronic stunting among under-5 children (Fig. 4). In 2004, approximately 55% of under-5 children from the lowest household income quintile were stunted, compared to only 25% of their counterparts in the highest household income quintile. In other words: the lower the household income, the higher the prevalence of chronic stunting. This relationship between household income and chronic stunting seems to have continued for several years despite efforts to reduce poverty. In 2011, for example, the prevalence rate of chronic stunting

among under-5 children was only 25.3% in households with the highest income quintile; the corresponding rate was almost 54% for under-5 children from the lowest household income.



**Figure 4.** Household Income and Chronic Stunting  
Source: BDHS 2004, 2007 and 2011

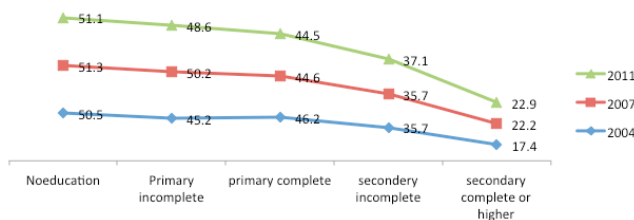
It is a universal truth that a child's health and wellbeing is linked to his or her mother's level of education. For example, the Micro International data presented below (Fig. 5) clearly show that mothers' education is strongly related to child mortality in countries and cultures such as Mali, Bolivia, the Philippines and Nepal.



**Figure 5.** Child Mortality by Educational Attainment of the Mother. Source: Macro International Various years

The DHS data also strongly substantiated this universal trend. In each year of the survey (2004, 2007 and 2011), more than 50% of under-5 children in families where the mother had no education were stunted. However, the prevalence rates of stunting in under-5 children whose mothers had completed

secondary or higher education were 17.4%, 22.2% and 22.9% in 2004, 2007 and 2011 respectively (Fig. 6). Bangladesh is no exception to these universal phenomena: here too a mother's level of education is highly correlated with her children's health and wellbeing. However, the DHS data also show a disturbing trend of rising prevalence rates of stunting in children whose mothers have secondary or higher education – the rate increased from 17.4% in 2004 to 22.9% in 2011. Clearly this needs to be more carefully examined.



**Figure 6.** Level of Mother's Education and Chronic Stunting  
Source: BDHS 2004, 2007 and 2011

Although Bangladesh is a small country (154,000 square miles of territory), it is divided into seven administrative divisions, each with a population of more than 20 million people. These geographical regions of Bangladesh vary, often substantially, in terms of their population size, composition (ethnic, religious and linguistic) and health, education and other socio-economic variables. Under-nutrition is quite common among adults and adolescents, especially women and girls, with marked regional variations. In the 2011 BDHS, the Sylhet division, located in the north-western part of Bangladesh, emerged as the worst performing division in the country in all three anthropometric indicators of under-nutrition. In Bangladesh, malnutrition is caused by a combination of factors including inadequate or inappropriate food consumption, poor sanitation, illness, illiteracy and lack of access to quality health care. Other factors such as rapid population growth, unplanned and increasing urbanization, climate change, deteriorating access to increasingly scarce natural resources, and vulnerability to price shocks exacerbate the situation. The poor status of women, epitomized by their lack of access to resources and decision-making power, and a continued high level of

violence against women, are also key determinants of under-nutrition in Bangladesh.

## Discussion

Bangladesh has surpassed many neighboring countries in South Asia and other developing nations in terms of its progress in achieving the health-related MDGs, and in improving the overall health status of its people [24]. Over the last four decades, the average life expectancy of Bangladeshis increased from 44 to 66 years. Moreover, the gender disparity in average life expectancy that Bangladesh had in the 1970s (females had a considerably lower average life expectancy than males) slowly disappeared as women's health status improved [25]. Bangladesh has already met the MDG target of reducing its under-5 mortality rate. Data provided by the Sample Vital Registration System (SVRS) 2011 show that the mortality rate for children under five was 44 per 1,000 live births in 2011, compared to 146 in 1991. The MDG target to reduce the infant mortality rate is also on track. However, despite making substantial progress in reducing the maternal mortality ratio – from over 400 in the 1980s to a little over 200 per 100,000 live births – Bangladesh is unlikely to fully achieve the MDG target in this regard [26].

Chronic stunting has become a new challenge for Bangladesh. In the last two years, the rate of child malnutrition has increased. In 2011, 16% of Bangladeshi children faced severe malnutrition. In 2013 this increased to 18%. National Food Policy Plan of Action and the Country Investment Review Report (2014) state that the risk of malnutrition has increased due to the increasing rate of malnutrition among mothers, unemployed or low-income parents, the relatively low rate of fully breastfeeding babies and food insecurity [27]. There is a high incidence of malnutrition among adult Bangladeshis too. The daily intake of an adult Bangladeshi, on average, is 240 kilocalories fewer than is generally required. This problem is particularly acute among people from the poorer and the wealthier income brackets. It is surprising to note that according to the Food Ministry's review report, while 21.1% of children from the poorest segment of the society were suffering from malnutrition; more than 15% of children from the wealthier classes were also



suffering from malnutrition [27]. However, while poverty and resultant food insecurity is the cause of malnutrition among children from the poorest classes, for children from the wealthier classes the underlying factors for malnutrition are lack of knowledge about proper diet and consumption of so-called “junk” food. Nevertheless, it must be noted that two out of five children under the age of five in Bangladesh are shorter than they should be at their age. In short, chronic malnutrition among under-5 children remains alarmingly high.

The Food Ministry report states that while an adult Bangladeshi, on average, needs an intake of 2,430 kilocalories per day, their actual intake is only 2190 kilocalories: a deficit of 240 kilocalories per day. Moreover, about 70% of the energy comes from rice or similar staple foods. In short, while coordinated efforts must be made to reduce poverty and strengthen food security, similar efforts must also be directed at enhancing people’s knowledge and practice of a balanced diet. At the same time, further research must be undertaken to better understand the dynamics of breastfeeding so as to promote full breastfeeding among women.

According to the Global Nutrition Report 2012 published by the International Food Policy Research Institute (IFPRI), a total of 2.3 billion people in the world suffer from malnutrition. For some, this results in stunted growth, and for others, wasting [28]. A large number of these people suffer micronutrient deficiency, while some suffer from obesity. The report says that in order to attain a better and more equitable world, then by the year 2025 the number of children with stunted growth must be reduced by 40%, women with anemia by 50%, infants with low birth weight by 30%, and the number of emaciated infants by 5% [28]. At the same time, children who are fed only breast milk for the first six months must also be increased by 50%, and the number of obese children must be significantly reduced. The IFPRI report has used stunted growth, anemia, underweight and obesity as indicators of ill health and societal problems. Bangladesh has not yet met any of these goals [28], but it is not alone in this regard. Out of a total of 179 developing countries, 31 countries – including Bangladesh – failed to achieve these targets. The report states that stunted growth in Bangladesh is being reduced by only 2.7% per year,

whereas the 2025 target is to reduce it by 3.3%. The report does, however, say that although Bangladesh has not yet reached this goal, it has made progress in this regard. So far, Bangladesh’s performance in terms of reducing stunted growth is twice as good as India

A large number of women of reproductive age in Bangladesh suffer from anemia. The rate of anemia has gone down annually by only 0.6%. The goal for 2025 is an annual reduction of 5.2% [29]. A total of 15.7% of under-5 children are underweight, and Bangladesh is not on target to adequately reduce this rate. The number of obese children under the age of five is also increasing, and Bangladesh also looks set to fail to meet its target to reduce this.

## Conclusions

Within the context of the overall socioeconomic situation in Bangladesh, the high level of stunting is very much unexpected. However, the high level of stunting may reflect the drawbacks and problems associated with poverty, inequity and their resultant impact on child health. The fact that stunting is more pronounced in rural areas, where poverty is widespread, underscores the link between poverty and stunting. At the same time, DHS data clearly demonstrate a strong relationship between poverty, inequality and stunting. Now is the time for the Bangladeshi government to pay attention to the nutrition gap that must be tackled in order to successfully prevent chronic stunting in Bangladesh.

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