

Maternal Education and Child Healthcare in Bangladesh

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Abstract Child health is one of the important indicators for describing mortality conditions, health progress and the overall social and economic well being of a country. During the last 15 years, although Bangladesh has achieved a significant reduction in the child mortality rate, the levels still remain very high. The utilization of qualified providers does not lead to the desired level; only a third relies on qualified providers. This study is mainly aimed at investigating the influence of maternal education on health status and the utilization of child healthcare services in Bangladesh. This study is based on the data of the Household Income Expenditure Survey (HIES) conducted by the Bangladesh Bureau of Statistics (BBS) during 2000. The analysis of the findings reveals that 19.4% of the children under five reported sickness during 30 days prior to the survey date. Moreover, approximately one out of every thirteen children suffers from diarrhoea in the country. It is striking to note that a significant portion of the parents relied on unqualified or traditional providers for the children's healthcare because of low cost, easy accessibility and familiarity of the services. The study suggests that maternal education is a powerful and significant determinant of child health status in Bangladesh. Maternal education also positively affects the number of children receiving vaccination. In order to improve the health condition of children in Bangladesh maternal education should

be given top priority. The public policies should not just focus on education alone, but also consider other factors, such as access to health facilities and quality of services. Health awareness campaign should be strengthened as part of the public health promotion efforts. More emphasis should also be given to government-NGO (Non Government Organization) partnerships that make vaccination programs successful and, thereby, reduce the incidence of preventable diseases.

Keywords Child health · Health seeking behaviour · Maternal education · Odds ratio · Qualified providers

Introduction

Background

Bangladesh is one of the most densely populated countries in the world with a total population of about 143.8 million people [1] and a population density of 878 persons per square kilometer [2]. The adult literacy rate (population aged 15 years and above) is 48% with males at 54% and females at 41% [2]. The country is predominantly rural and 49.8% of the total population live below the national poverty line [3]. The Gross Domestic Product (GDP) per capita of Bangladesh (in US\$) is \$351 as compared to \$408 in Pakistan, \$487 in India, \$873 in Sri Lanka and \$989 in China in 2002 [1]. In the poor country like Bangladesh where a half of the inhabitants subsist below the poverty line, health and environmental problems and high mortality rates are the major challenges. Moreover, poverty, malnutrition, low birth weight and environmental degradation remain the major factors behind children's health vulnerability.

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During the last 15 years, Bangladesh has achieved significant reduction in the child mortality rate. The Under Five Mortality Rate (U5MR) in Bangladesh declined from 151 per thousand live births in 1990 to 77 per thousand live births in 2001 compared to the United Nations (UN) goal of 70 per thousand live births [4]. Although the last two decades have shown a substantial decline in Bangladesh's child mortality rate, the levels are still high by any standard [5]. Considering the poor health situation, the government of Bangladesh is committed to provide health care services for all, giving special attention to the vast population living in the rural areas [6]. The NGOs and international communities are also giving considerable effort along with the government. In Bangladesh's health care system, NGOs play an important role by providing healthcare at the grass root level and complementing the government efforts through their countrywide network [7].

In order to improve the health of the poor, the government provides free/subsidized healthcare services at various levels. In spite of such services, the utilization of public healthcare services by the poor has not attained the desired level; almost a half of the population rely on unqualified or traditional providers. As the poor often do not use public facilities or even seek health care at all the resulting utilization rates of government facilities are quite low [8]. Private providers play an important role in the healthcare sector of Bangladesh. Nevertheless, the poor people of the country are less likely than the rich to select any modern medical provider when reporting sickness, and when they select a provider, they are more likely to choose unqualified or traditional providers, especially in the rural areas. Even among the urban poor, when accessing private healthcare, the majority of patients opt for unqualified practitioners because they are cheaper, easier to access and they are more familiar with these services [9].

Utilization of child healthcare services has been identified as an important factor affecting child mortality [10]. The utilization of healthcare services is a complex behavioral phenomenon. Empirical studies of preventive and curative

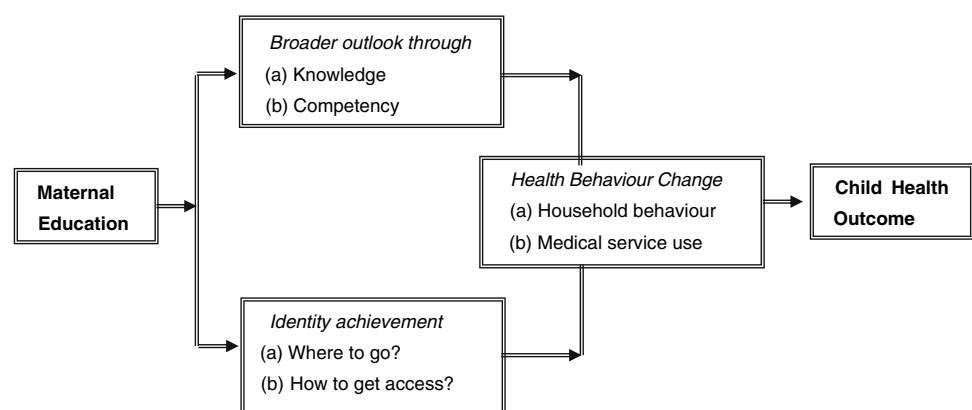
services have often found that the utilization of healthcare services is related to the availability, quality, cost and comprehensiveness of services as well as socio-cultural structure, health beliefs and personal characteristics of the users [11]. Moreover, mother's education also has a great impact on health and survival of children through curative means, whether the mother uses modern facilities or traditional practices [12]. Nonetheless, child health has been considered as one of the important indicators for describing mortality conditions, health progress and indeed the overall social and economic well being of a country [13]. As a result, the study is aimed at investigating the potential role of maternal education on the child health status by utilizing the qualified healthcare services in Bangladesh.

Linkage between Maternal Education and Child Health Outcomes

Educated women are better able to break away from tradition to utilize modern means of safeguarding their children [14] as well as making independent decisions regarding children's health leading to greater utilization of modern healthcare facilities [15]. This study provides a possible linkage between maternal education and health status of their children based on Joshi A R, 1994 [16]. Figure 1, however, presents a simple diagrammatic approach regarding the relationship between maternal education and utilization of child healthcare services that influence the health outcome.

Women with greater education have the literacy and language capabilities that enable them to more easily acquire knowledge and a broader outlook on health [17]. It has, therefore, been hypothesized that individuals with more schooling are more educated about healthcare and are inclined to learn more [18]. Education also enhances the awareness and competency of women enabling the participation in modern healthcare environments and other bureaucracies, thereby facilitating the use of the modern

Fig. 1 Maternal education and child health outcome: possible pathways



healthcare system [19]. Furthermore, women with schooling have a greater understanding of where the health services are located and how to gain access to them [20]. In contrast, women without schooling feel incompetent in modern interactive settings [21].

Methodology

The data analyses are based on the Household Income Expenditure Survey (HIES) 2000. The survey was conducted by Bangladesh Bureau of Statistics during 1999–2000 based on a two-stage random sample technique. A group of trained enumerators collected information on both the household and individual levels through a structured questionnaire technique. The survey covered 7,440 households composed of 38,515 individuals with a 100% response rate in which the sample was made nationally representative through appropriate sampling weights [3]. HIES collected information on health status, provider selection, place of residence, age and sex of children, and both working and income status. Poverty status is measured according to BBS defined lower and upper poverty lines [3]. This study concentrated on healthcare utilization of all children under the age of five along with the percentage of children suffering from any type of illness including diarrhoea who were taken to a health facility for treatment, the percentage of children treated with a qualified provider, and the percentage of children aged 12–23 months who were fully vaccinated. Children are considered to be fully vaccinated if they have received the tuberculosis (BCG) and measles vaccinations and all three doses of the DPT (diphtheria, pertussis, tetanus) and polio vaccines. Moreover mothers’ education is classified into three categories—below primary (below grade 5), secondary (grades 5–10) and higher secondary (grades 11–12).

This study defines qualified providers as all government owned services and facilities, private hospitals, clinics, NGO health facilities as well as private practitioners with Bachelor of Medicine and Surgery (MBBS) degree. On the other hand, unqualified providers are defined as

pharmacists, village doctors, traditional/unqualified healers, untrained homeopaths and herbal practitioners.

Bivariate analyses as well as multivariate logistic regression models are estimated to determine how maternal education affects the choice of healthcare services for children’s health, controlling for selected socioeconomic and demographic variables. The logistic model considers the relationship between a binary dependent variable and a set of independent variables. The logistic model for ‘k’ independent variables ($x_1, x_2, x_3, \dots, x_k$) is given by:

$$\text{Logit } P(x) = \alpha + \sum_{i=1}^k \beta_i x_i$$

Exp (β_i) indicates the odds ratio for a person having characteristic i versus not having characteristic i , β is the regression coefficient, and α is a constant. An odds ratio equal to 1 implies that there is no effect of the factor under consideration; otherwise, there is an effect of that variable. The study selects the multivariate logistic regression model to assess the impact of maternal education on the utilization of child healthcare services, controlling for selected variables. The model is analyzed using STATA version 8.1 accounting for the sampling weights.

Results

Child Health and Treatment Status

Child health is one of the important indicators of the level of health in a society and its living standards. Table 1 presents the health and treatment status of the children under five. Health status, which is approximated by reported illness during 30 days prior to the survey date, varies among the urban and rural children. The analysis of the findings reveals that overall, one out of every five children reported sickness. The incidence of sickness is significantly higher (P -value 0.03) for the rural children (19.9%) as compared to their urban counterpart (16.8%). But, when they reported illness, the tendency to consult with a qualified provider is still very low—it was only 37.5% among the children who

Table 1 Reported illness and treatment for children age under five

	Number of children under five years of age in sample	Percent of reported illness	P -value	Among ill children			
				Percent taken to any healthcare facility	P -value	Percent taken to a qualified provider	P -value
Bangladesh	4,387	19.4		77.1		37.5	
Urban	739	16.8	0.03	73.7	0.17	43.7	0.08
Rural	3,648	19.9		77.7		36.5	
Boy	2,240	18.7	0.15	74.3	0.03	37.1	0.44
Girl	2,147	20.0		79.8		37.9	

Table 2 Incidence of diarrhoea and its treatment for children age under five

	Incidence of diarrhoea	<i>P</i> -value	Among children with diarrhoea			
			Percent taken to any type of facility	<i>P</i> -value	Percent taken to a qualified provider	<i>P</i> -value
Bangladesh	7.7		79.6		30.2	
Urban	2.9	0.02	85.0	0.62	55.6	0.35
Rural	8.6		79.3		28.8	
Boy	7.1	0.29	82.7	0.42	34.5	0.38
Girl	8.3		77.1		26.7	

Table 3 Vaccination coverage for children age 12–23 months

	Number of children aged 12–23 months	Percent fully vaccinated among children aged 12–23 months ^a	<i>P</i> -value
Bangladesh	755	68.4	
Urban	137	80.3	0.00
Rural	618	65.8	
Boy	411	69.1	0.34
Girl	344	67.4	

Note ^aChildren who have received BCG, measles vaccines, three doses of DPT and three doses of polio vaccines

reported sickness. The incidence of sickness is more or less the same for both boys and girls.

Nevertheless, approximately one out of every 13 children suffers from diarrhoea in the country (Table 2). The incidence of diarrhoea is significantly higher in rural areas (8.6%) as compared to urban areas (2.9%). Moreover, the urban parents seem to be more conscientious about selecting a qualified provider for their children especially for their boys when they reported diarrhoea. Table 3 reveals that 68.4% of the children aged 12–23 months completed their full course of vaccination. The percentage of children fully vaccinated is significantly higher at less than one percent level of significance (*P*-value 0.00) in urban areas as compared to rural areas. In addition, 69.1% of the boys completed the full course of vaccination while the same is slightly lower (67.4 %) for girls.

It is noteworthy that a majority of parents sought healthcare for their children when they reported sickness (Fig. 2). Still, the frequency of not choosing any provider is quite high (22.9%). A significant portion of the mothers relied on unqualified or traditional providers (pharmacy—28.5% and traditional—3.6%). Furthermore, the proportion of ill children going to public providers is significantly lower (10.2%) than that going to private providers (31.1%).

Mother's Education and Child Healthcare

Mother's education is largely related to the child health and health seeking behaviour. The relationship between

maternal schooling and child health with utilization of healthcare services are shown in Table 4. The children of mothers with less than primary education are more vulnerable to illness. One out of five children reported sickness when their mothers had less than primary education, while the same is 14.6% for the mothers with at least a higher secondary examination. This relationship is even sharper in urban areas. However, the educational difference in utilization of child healthcare services especially the utilization of qualified providers is noteworthy when comparing mothers having no or less than primary education with those who have secondary education. The difference between educational groups for selecting qualified providers is more pronounced in urban areas. On the other hand, maternal education has no remarkable influence on the selection of qualified providers in the rural areas.

Mothers' education also influences the incidence of diarrhoea at a higher rate in rural areas. No children were reported as having diarrhea when their mothers had at least higher secondary education while 9% of the children whose mothers had less than a primary education were reported with diarrhea. But, the same picture is quite unusual in urban areas where the incidence of diarrhoea is more profound among the children of the mothers who have secondary education.

Furthermore, educational differences are particularly obvious when comparing the percentage of children fully immunized (Table 5). Children of mothers with higher education are as much as two times more likely to be fully vaccinated than children of mothers who have no education or below a primary education. Urban–rural differences are also remarkable for childhood vaccination.

Multivariate Analysis of Mother's Schooling and Child Health

The risk of child morbidity and mortality decreases as the mother's level of education increases. It is assumed that maternal education inculcates modern health knowledge, beliefs and practices which improve the effectiveness of health behavior (feeding practices, child care etc.); and

Fig. 2 Health seeking behaviour for children reported III

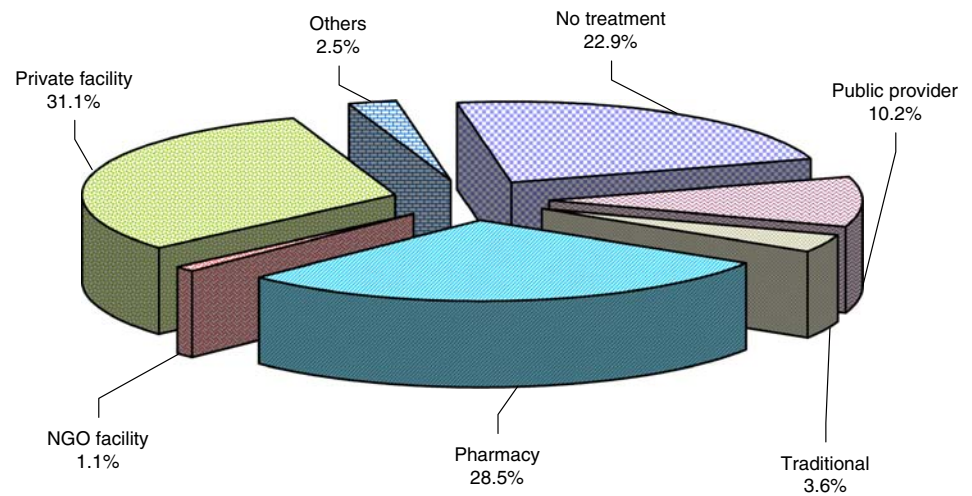


Table 4 Reported illness and treatment for children age under five by mother’s education and location

	Number of children under five years of age in sample	Reported illness		Taken to any healthcare facility		Taken to a qualified provider		Incidence of diarrhoea	
		Percent	<i>P</i> -value	Percent	<i>P</i> -value	Percent	<i>P</i> -value	Percent	<i>P</i> -value
Bangladesh	4,387	19.4		77.1		37.5		7.7	
Below primary	2,986	19.9	0.11	73.8	0.00	32.2	0.00	9.0	0.05
Secondary	1,147	19.0		86.1		51.6		5.5	
Higher secondary	254	14.6		76.3		40.9		0.0	
Urban	739	16.8		73.7		43.7		2.9	
Below primary	398	21.2	0.00	68.6	0.11	39.5	0.04	2.1	0.37
Secondary	233	12.1		81.4		49.7		6.3	
Higher secondary	108	10.8		92.4		59.7		0.0	
Rural	3,648	19.9		77.7		36.5		8.6	0.04
Below primary	2,588	19.7	0.58	74.7	0.00	31.0	0.00	10.2	
Secondary	914	20.7		86.8		51.8		5.4	
Higher secondary	146	17.4		68.9		32.3		0.0	

changes the mother’s role within the family, enabling her to take necessary measures to promote child health, including effective use of modern healthcare services [14]. In order to examine the impact of mother’s education on child health more systematically, it is essential to carry out multivariate estimation so that the effect of the same can be examined with all other factors statistically controlled. As a result, a multivariate logistic regression is considered for each of the three dependent dichotomized variables: (a) health status of child, (b) utilization of qualified provider both public and private for child healthcare and (c) children aged 12–23 months fully vaccinated.

When background variables such as residence, poverty status, mother’s work status, sex and age of child are taken into account, the mother’s education continues to be a powerful, positive, and significant determinant of the child

health status in Bangladesh (Table 6). Children of mothers with at least a higher secondary education are two times more likely to be healthy than children of mothers with below primary education. On the other hand, poverty status and mothers working status surprisingly have a negative impact on child health status. Children of working mothers are less likely to report good health than the children whose mothers are not working outside home.

The educational impact on the utilization of modern qualified providers is not statistically significant when children of mothers with below primary education are compared with children of mothers who have at least higher secondary education. Only the poverty status has significant impact on the selection process of the healthcare providers for their children. The rich are three times more likely to consult with qualified providers for their children than the extremely poor.

Table 5 Vaccination coverage for children age 12–23 months by mother's education and location

	Number of children aged 12–23 months	Percent fully vaccinated	P-value
Bangladesh	755	68.4	0.00
Below primary	485	63.3	
Secondary	221	74.2	
Higher secondary	49	93.9	
Urban	137	80.3	0.03
Below primary	58	70.7	
Secondary	57	83.9	
Higher secondary	22	95.5	
Rural	618	65.8	0.00
Below primary	427	62.3	
Secondary	164	70.7	
Higher secondary	27	88.9	

The impact of education is significantly positive variable pointing full vaccination of children (Table 7). The analysis shows that children of mothers with at least higher secondary education are 6 times more likely to complete the full course of vaccination than children of mothers having below primary education. Residences also have significant impact on childhood vaccination. Although

Table 7 Odds ratios of vaccination coverage for children age 12–23 months by maternal education, controlling for selected variables

Category	Children age 12–23 months fully vaccinated	
	Odds ratio	95% confidence interval
Education (rc: below primary)		
Secondary	1.4*	(1.0, 2.2)
Higher secondary	6.3**	(2.2, 17.8)
Work status (rc: not working)		
Working	1.2	(0.63, 2.2)
Poverty (rc: extremely poor)		
Poor	1.4	(0.86, 2.3)
Non-poor	1.2	(0.83, 1.8)
Location (rc: rural)		
Urban	1.6**	(1.1, 2.5)
Sex (rc: girl)		
Boy	1.1	(0.81, 1.6)
Number of observations	755	
Wald chi-square	33.5	
Probability > chi-square	0.00	

Note rc = reference category; ** significant at <1% level of significance; * significant at <5% level of significance

Table 6 Odds ratios of child health status and receiving child healthcare services, by maternal education, controlling for selected variables

Category	Health status (not ill)		Taken to a qualified provider for any type of illness	
	Odds ratio	95% confidence interval	Odds ratio	95% confidence interval
Education (rc: below primary)				
Secondary	1.3**	(1.1, 1.6)	1.4	(0.96, 2.0)
Higher secondary	2.1**	(1.4, 3.0)	0.8	(0.35, 1.5)
Work status (rc: not working)				
Working	0.6**	(0.47, 0.79)	0.9	(0.54, 1.5)
Poverty (rc: extremely poor)				
Poor	0.9	(0.75, 1.2)	1.6	(1.0, 2.5)
Non-poor	0.5**	(0.45, 0.65)	3.5**	(2.4, 5.0)
Location (rc: rural)				
Urban	1.3*	(1.1, 1.5)	1.3	(0.90, 1.8)
Sex (rc: girl)				
Boy	1.1	(0.92, 1.3)	1	(0.73, 1.3)
Child's age (rc: below 1 year)				
1–2 years	1.3	(0.97, 1.6)	0.8	(0.50, 1.4)
2–3 years	1.2	(0.96, 1.6)	0.9	(0.55, 1.4)
3–4 years	1.2	(0.94, 1.5)	1	(0.63, 1.7)
4–5 years	1.1	(0.87, 1.4)	1	(0.60, 1.6)
Number of observations	4,387		851	
Wald chi-square	72.7		68.7	
Probability > chi-square	0.00		0.00	

Note rc = reference category; ** significant at <1% level of significance; * significant at <5% level of significance

residence of the respondents does not have any significant impact on the utilization of qualified providers, urban children are 1.6 times more likely to complete the full course of vaccinations during the ages of 12–23 months despite the introduction of various nationwide interventions.

Conclusions and Discussions

Utilization of child healthcare services has been considered to be an important factor determining child mortality. Although the Government of Bangladesh is committed to provide health for all, its efforts to provide healthcare services at the various levels however, have not led to the desired level of utilization of services. In discussing child health, maternal education is considered as an important determinant of the utilization of child healthcare services. Moreover, it is hypothesized that educated women are better able to break away from tradition to utilize modern means of safeguarding their children and may be able to make independent decisions regarding their children's health leading to greater utilization of modern qualified providers. Accordingly, this study is aimed at investigating influence of maternal education on the child health as well as the utilization of child healthcare services, controlling for other explanatory determinants.

The analysis of the findings shows that in Bangladesh one out of every five children reported sickness. The incidence of sickness during the period of 30 days prior to the survey date was higher for the rural children as compared to their urban counterparts. But, when they reported illness, the tendency to consult with a qualified provider was still very low. The incidence of sickness is more or less same for both the boys and girls. However, one out of every 13 children suffers from diarrhoea in the country. The incidence of diarrhoea is significantly higher in rural areas. The urban parents seem to be more conscientious in selecting a qualified provider for their children, especially for their boys, when they reported diarrhoea. Nevertheless, the proportion of ill children going to public facilities was significantly lower than the proportion going to private providers. It is striking that, while accessing private healthcare, a majority of patients opt for unqualified traditional providers. The reasons behind such behaviour are that unqualified traditional providers are cheaper, easier to access and more familiar to the people seeking these services [9]. Moreover, the accessibility, as well as the quality of the services, shortage of medicine and long waiting time at public provisions are also responsible for such behaviour. Long distance as well as long waiting time for treatment are noticeable in rural areas [22]. On the other hand, private qualified providers are typically located in the

major cities of the country and the treatments are more expensive in these facilities.

The mother's education is largely related to the health status of the children aged under five. When background variables such as residence, poverty status, mother's work status, sex, and age of the child are taken into account, the mother's education continues to be a powerful, positive, and significant predictor of the child health status in Bangladesh. Children of mothers with at least a secondary education are more likely to be healthy than children of mothers having below primary education. The poverty status and the mother's working status have adverse impact on the health status of their children. This is due to the fact that poor are less likely to report sickness [9] and the working mothers could possibly get less time to care for their children. Consequently, more safe and sound daycare centers should be established to ensure proper care for the children of working mothers. This would ensure good health of the children of working mothers.

Educational impact on utilization of modern qualified providers is not statistically significant when children of mothers having below primary education are compared with children of mothers who have at least higher secondary education. In contrast, the poverty status is found to be the only significant predictor for selecting qualified providers for childhood illness. From the study it is not possible to explain why maternal education has an insignificant impact on the utilization of qualified providers for their children's healthcare. The availability of the qualified providers in the respective localities, as well as the quality of the same in terms of treatment cost and customers' satisfaction might be responsible for such health seeking behaviour of the mothers. However, it was not possible to analyze these factors in this study due to unavailability of the requisite information from the HIES database. As a result, opportunities exist to conduct further research on the health seeking behaviour that would explain the scenario.

The major causes of death for children under age five are diarrhoea, acute respiratory infection (ARI), injury and drowning [23]. Among these, diarrhoea and ARI—the major communicable diseases, account for more than one third of children's deaths in Bangladesh [4]. In this study, we considered only diarrhoea due to the fact that HIES did not collect information on the other type of sickness that also causes child deaths in Bangladesh. The mothers' education also influences the incidence of diarrhoea at a higher rate in rural areas. Among the children in rural areas, none reported diarrhea if their mothers had at least a higher secondary education. But, the same is quite unusual in urban areas where the incidence of diarrhoea is more profound among the children of the mothers who have secondary education.

The impact of education continues to be a positive, strong, and significant variable leading to full vaccination of children. Residences also have significant positive impact on vaccination. Although, residence of the respondents does not have any significant impact on the utilization of qualified providers, urban children are significantly more likely to complete the full course of vaccination during their age of 12–23 months despite the introduction of various nationwide interventions. The access and quality of the services in rural areas are possibly the major explanations of the lower rate of vaccinations in these areas.

Diseases, which could be prevented by vaccination, kill tens of thousands of children under the age of five each year. These include: diphtheria, pertussis (whooping cough), tetanus, tuberculosis and measles [23]. Ensuring the universal coverage of vaccinations could reduce these deaths. As a result, massive attempts should be given by all the concerned agencies including government as well as NGOs. More emphasis should be given to government–NGO partnership for making the vaccination program successful.

These findings of the study substantiate the facts that economic status exerts a dominating control on child healthcare in Bangladesh. Although mothers' education plays a dominating role in their children's health status, poverty status plays a more vital role in the selection of qualified providers. The reason for such a situation is that qualified providers are more expensive than the unqualified traditional providers. Such expensive treatments would also impose a burden on the poor. Moreover, the lack of availability and accessibility of the qualified providers impedes their selection.

In order to improve the health condition of children in Bangladesh, it is suggested that the educational status of the population in general, and mothers in particular, should be improved. Nevertheless, public policies should not focus on education alone, as there are other factors, such as access to health facilities and quality of services, which also affect the health seeking behaviour. At the same time, special attention should also be given to encouraging people to utilize modern qualified providers for healthcare. Moreover, the availability and accessibility of the qualified providers should be ensured by both the government and other concerned agencies. Children's prospects of survival improve if mothers are provided with the chance to enhance the understanding of disease processes, the health needs of their children and the significance of precautionary health practices e.g., suitable hygiene practices and children's complete vaccination. Finally, for improving child health and utilization of healthcare services in Bangladesh, public health awareness programs should be strengthened as a part of its health promotion efforts.

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