

Differentials of the Immunization Programme in Rural Bangladesh and the Issue of User Fee

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Abstract

This study investigated some aspects of the sustainability of the immunization programme by exploring the association between immunization coverage and price affordability with some selected socioeconomic variables in rural Bangladesh. It was conducted in 75 villages in 10 districts. Eligible interviewees were 1 145 resident mothers having a child of age 12 to 23 months. Both paternal and maternal education were found to have a significant influence on immunization. There was no significant association between immunization coverage and the child's sex, household's cultivable land, labour sale and NGO involvement. Exposure to media like radio increases predictability of immunization by about two folds. Most people wish to pay none or minimal user fee; therefore restrict the financial sustainability of the programme on its own. An increase in parental education enhances the willingness to pay user fees

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Introduction

IN TERMS of cost, efficacy and efficiency, immunization presents one of the most important means to improve the health status of whole population.¹ In recognition of its importance, immunization has always been a cornerstone of various child survival programmes in recent decades. Of all global indicators on PHC services, immunization coverage (IMC) is the most reliable and comparable since its definition and calculation methods are clear, standardized and widely available in almost all developing countries.² Some have already suggested it as a proxy indicator for the availability of PHC services³. In Bangladesh, although other development efforts suffer from setbacks, stagnation or reversals, IMC has shown a significant increase. Its Expanded Programme on Immunization (EPI) is heavily subsidized by foreign donors with the national exchequer bearing only 30% of the expenditure. If the donor funds are withdrawn or reduced, the government will have to make the difference either through diversion of funds from other activities or through service charges to the community or individual. The major problem areas for research are the socioeconomic determinants of IMC in the rural perspectives of Bangladesh and the financial sustainability of the programme. Whatever success has been achieved

so far is largely due to highly infused supply side initiatives. The demand side responsiveness still requires much study as people's self-inspired participation is the key to political, social, organizational and financial sustainability of the programme. This present study correlates selected socioeconomic indicators with childhood immunization and examines the prospect of introducing service charges on immunization coverage.

Methods and materials

The sample population included 75 villages from 10 districts of Bangladesh. However, the study itself did not select these study areas; rather the study was conducted in those specific villages that had previously been chosen for the health, demographic and socioeconomic surveillance project of the Bangladesh Rural Advancement Committee (BRAC), one of the world's largest indigenous nongovernmental organizations (NGO)⁴. As core elements of the project, data were being routinely collected on demographic, health and development indicators to monitor the outcomes of various health and non-health interventions that were being implemented for more than a decade in the rural areas. The surveillance villages are dispersed over diverse geographic terrain and socioeconomic enclaves. The selection was not random, rather purposive to comprise villages from the flood-free highland, the famine-prone northern areas, the less accessible marshy land, the 'close to the capital' central districts and the cyclone-prone coastal areas. Placement of BRAC programmes, provision of residence to the field staff and easy accessibility of these villages to the supervisory staff were other important criteria for the selection. In these villages, BRAC operates its micro-credit, education, training, health and population interventions for the landless rural poor. Households belonging to both members and non-members of BRAC were included in the study. First, a census of all households was done in the sample villages, and all mothers having a child of age 12 to 23 months were listed as units of the analysis. The total eligible mothers were 1 145. Data were collected in January 1995 through household visits through a pre-tested, structured questionnaire. The interviewers were BRAC's field staff working as data collectors for its surveillance programme known as 'Watch project'. The interviewers were mostly college graduates with 12 to 14 years of education. Their field experience ranged from 6 to 12 years. The interviewees were usually the mothers of the children or other caretakers in the households. No incidence of failure in obtaining the data was noted. To validate consistency with the responses, immunization cards were checked, the mothers asked about the procedural specifics of various vaccination and the children examined for BCG scar. Children who had received all the required doses of BCG, DPT, polio and measles were labelled as fully immunized; those who had received even a single dose less than the required doses were categorized as partial; and those who had not received any vaccine at all were categorized as "none".

Regarding user fee, the respondents were simply asked whether they were willing to pay any fees for the immunization services that were being made available to their communities. If the answer was in the affirmative, then they were asked how much they were ready to pay for it. The study also collected data on various household assets, including radio. It tried to explore whether there existed any correlation between the possession of a radio in the household and the vaccination of children. The study did not collect any data on whether the respondents received any particular message on immunization from radio or not. Since the government-owned radio disseminates a lot of health messages, it was assumed that such transmission

would promote immunization among the recipient households. The association between immunization coverage and socioeconomic factors were examined through bi-variate tables and Chi-square test. A multivariate analysis was done with polio (third dose received), DPT (third dose received), both DPT and polio (third doses of both polio and DPT received), and the full coverage (BCG, polio, DPT and measles are received in full doses) as dichotomous variable (yes or no). Odd ratios were calculated for children's sex, parents' religion and education, NGO membership, household's cultivable land, labour sale and possession of radio in households

Results

Table 1 shows that of 1 145 children, 52.1% were males. The sex ratio of the study children is comparable to the national estimate. Ninety per cent of the children were Muslims and the rest Hindu. A majority of the children (51.9%) belonged to poor households having no cultivable land. About 14% of the households had land up to 50 decimals. Forty five per cent of the families had at least one member who sells labour for at least 100 days a year. About 20% of the households had at least one member associated with BRAC. Of mothers, 59.3% had no education, 8.5% had 1-3 years of schooling, and 19.3% had been to school for 4-5 years. Only 12.9% of the mothers had more than five years of schooling. Of fathers, 57.6% had no education, 7.9% had 1-3 years and 12.6% had 4-5 years of schooling. About 22% of the fathers had been to school for more than five years.

Table 1. Socioeconomic characteristics of study population

Variable	Number	Percentage
Children (age 12 to 23 months)		
Total	1145	100
Male	59	52.1
Female	548	47.9
Religion		
Muslim	1031	90.0
Hindu	114	10.0
Land		
0	598	51.9
1- 50 decimals	159	13.8
51 – 200	234	20.3
201 or above	154	13.4
Labour		
Sells labour	520	45.4
Do not sell	624	54.5
BRAC membership		
BRAC member	227	19.8
BRAC non-member	918	80.2
Mother's education (in years of schooling)		
0	679	59.3
1-3	97	8.5
4-5	221	19.3
5+	148	12.9
Father's education (in years of schooling)		

0	660	57.6
1-3	91	7.9
4-5	144	12.6
5+	250	21.8

Table 2 shows the immunization coverage. The coverage rate (94.7%) for BCG was the highest among all components of the government's immunization programme (EPI). It was the lowest for measles (79.5%). For DPT (three doses) and polio (three doses), the coverage rates were 86.9% and 87.6% respectively. Those who received both DPT and polio (three doses) were 86.6% of the children. Of all 12-23 month old children, about 78% had completed the immunization schedule.

Table 2. Immunization coverage of children 12 to 23 months

Immunization	Number	Percentage (n=1145)
	1084	94.7
DPT (3 doses)	993	86.7
Polio (3 or 4 doses)	1001	87.4
Polio and DPT (full doses)	991	86.6
Measles	906	79.1
Complete	890	77.7

Table 3 shows that the immunization coverage increases with years of schooling of mothers: 86.5% of children of mothers with more than five years of education were fully covered, and about 92% had received the third dose of both polio and DPT. In respect of mothers with no schooling, the full coverage rate was 74.1%. Among children of mothers who had received education up to the third standard, 78.4% had full immunization and about 92% received third dose of both polio and DPT. Compared to maternal education, the impact of paternal education is less pronounced; 83.6% of children of fathers with more than five years of schooling had full immunization, and 90% had received the third dose of both polio and DPT. Among children of fathers who had had no schooling, 74.2% had received full immunization and 83.6% had received the third dose of polio and DPT. Among children of mothers with education up to the third standard, 79.1% had full immunization, and about 90% had received the third dose of both polio and DPT. Such group-wise difference in coverage formalities was statistically very significant ($p < 0.01$). But for paternal education, the group-wise difference is very significant ($p < 0.01$) only in regard to the third doses of polio and DPT, and less significant ($p < 0.05$) for the whole schedule.

Household's cultivable land has no discernible impact on immunization coverage. Table 4 shows that the immunization status of children does not improve with the increase in household's land; even children of families with more than 200 decimals had a lower immunization coverage than the landless. However, such variation is not statistically significant.

Table 3. Immunization coverage of children, by years of schooling of parents (percentages)

Year of schooling	Immunization coverage (in percentage)		
	None	Polio and DPT	Complete
Mother			
None	6.4	83.6	74.1
1-3	1.0	91.8	78.4
4-5	4.5	89.7	83.4
5+	2.7	91.9	86.5
Significance level	p<.01	p<.01	p<.01
Father			
None	6.4	83.6	74.2
1-3	5.5	90.1	79.1
4-5	1.4	92.4	83.4
5+	3.6	90.0	83.6
Significance level	p<.05	p<.01	p<.05

Table 4. Immunization coverage status of children by household land (percentages)

Immunization status	Land in decimal			
	None	1-50	51-200	201 and above
Complete (p>0.1)	76.6	84.3	77.8	75.3
Polio and DPT (p>0.1)	85.8	91.2	88.0	82.7
None (p>0.1)	5.2	3.8	5.1	6.5

Most people, irrespective of schooling, can afford only a very minimal service charge. Of mothers with no schooling, 44.1% said that they would pay not more than Taka 10 (Taka 45 = US\$1). Surprisingly, even fewer mothers with 1-3 years of schooling were willing to pay more than Taka 10. However, with more than third standard of maternal schooling, the situation significantly improves. With 4-5 years of schooling, about 63% of the mothers became ready to pay more than Taka 10, and with more than five years of schooling, such willingness was found among 70% of the mothers. It is noteworthy that willingness to pay more than Taka 20 consistently improves with the year of maternal schooling after third standard. On the other hand, 46.2% of respondents with no paternal schooling wish to pay fees up to Taka 10. Unlike mothers, even 1-3 years of paternal schooling significantly enhances affordability of paying more than Taka 10. The effect of paternal schooling on affordability of fees more than Taka 20 is comparatively less pronounced than maternal education. Such differences between various education groups vis-à-vis affordability of user fees are statistically very significant (p<0.001).

Table 5. Percentage distribution of affordability of charges for immunization by years of schooling of parents

Years of schooling	Affordable charges in Taka		
	1-10	11-20	20+
Mother (p<0.01)			
0	44.1	37.9	18.0
1-3	48.7	34.6	16.7
4-5	37.3	40.4	22.3
5+	28.1	31.7	40.3
Father p<0.01)			
0	46.2	37.4	16.4
1-3	38.9	34.7	26.4
4-5	41.6	35.2	23.2
5+	28.4	38.6	33.0

Multivariate analysis was carried out to assess the relative influence of some socio-demographic characteristics on probability of childhood immunization. The analysis was done using dichotomous dependent variables like:

- ⌘ DPT third dose received (yes or no),
- ⌘ polio third dose received (yes or no),
- ⌘ both polio and DPT third dose received (yes or no) and
- ⌘ complete immunization against six diseases e.g. tuberculosis, diphtheria, pertussis, tetanus, polio and measles (yes or no). The selected explanatory variables included sex of the child, mother's age and education, father's education and religion, labour sale and membership of the nongovernment organization (NGO) of any household member, cultivable land and a household radio. Table 6 depicts the results of the analysis through Odds ratio and the level of significance.

Table 6. Log odds ratios of some selected variables to predict the probability of immunization

Explanatory Variable	Immunization type			
	DPT	Polio & DPT	Complete	
Polio				
Sex of child ⁺	1.06	1.11	1.11	1.11
Paternal factors				
Mother's education	1.08 ^a	1.07	1.07	1.08 ^b
Father's education	1.06 ^a	1.06 ^a	1.06 ^a	1.04
Age of the mother	0.96 ^c	0.96 ^c	0.96	0.98
Household factors				
Cultivable land	1.0	1.0	1.00	1.00
Labour sale	0.83	0.85	0.86	0.73 ^a
NGO membership	1.42 ^a	1.22	1.24	1.27
Radio	1.73 ^b	1.99 ^c	1.91 ^b	1.81 ^c
Religion	0.44	0.47 ^c	0.47 ^c	0.53 ^c

⁺ reference category is male

^a $p < 0.10$

^b $p < 0.05$

^c $p < 0.01$

Table 6 reveals that maternal education enhances the chances of full immunization; however, the impact of paternal education is insignificant. It is noteworthy that increasing age of mother significantly reduces the probability of getting three doses of polio and DPT. But it has no significant predictivity for full coverage. A radio in a household significantly improves the chances of full immunization. The probability of getting an immunized child in such families is about twofold higher than those without it. Unexpectedly, a household's cultivable land has no impact. A household's labour sale does not have any significant influence either. Surprisingly, religion has a very significant predictivity; children from Hindu family are less likely to be immunized than the Muslim cohort. However, the influence of religion on receiving three doses of polio is insignificant. NGO membership has no significant predictive power for full immunization but significantly enhances the chances of receiving full doses of polio.

Discussion

The 1993 evaluation of government's Expanded Programme on Immunization (EPI) in Bangladesh showed reasonably impressive national coverage of 89% for BCG, 63% for three doses of both DPT and OPV and 59% for measles⁵. The present study being two years later, probably shows an even higher coverage. It is evident that the immunization coverage increases with the increase in parental education. This broadly falls in line with the observation that education probably enhances the knowledge of parents to effectively prevent, recognize and treat childhood illnesses⁶. Mothers' knowledge of polio and DPT vaccines was positively correlated to the education of mother⁷. Land holding did not have any impact on coverage. There is no explanation why Hindu children should have a lower coverage. Additional studies are needed in this regard. Moreover, it has a policy implication too. Since increasing age of mother significantly reduces the chances of getting full doses of polio and DPT, immunizing the children of older mothers should get more emphasized. Exposure to media, such as radio, has been found to have a positive impact. This may indicate the effect of the health education programme of the national broadcasting system. Since the study did not collect data on receiving any message on immunization from the radio, it was restrained from directly correlating such a positive impact to any specific radio transmission. However, the finding reinforces the importance of radio as an IEC (Information, Education and Communication) tool in a developing country like Bangladesh. The study found that only 25% of the households had a radio. National policies that can enhance the availability of radio at an affordable price even by a poor family may contribute to the programme. It may contribute to the dissemination of other health and educational messages, and thus reinforce the importance of immunization in the public conscience.

Since the study was designed to examine the rural profile, it faces limitations in generalizing the results in the national perspectives. Moreover, the study is restricted, by its small sample size, to reveal even a picture of the rural whole. It was designed to look into the issues after the children had enjoyed full opportunity of vaccination till their first birthday, hence restrained from evaluating immunization

profile in under-one children. Although the sample population was not randomly selected from all over Bangladesh, the villages come from a diverse geographic and socio economic terrain. Since each village is a politico-cultural unit with all possible elements of socio-economic diversities, the census survey of a whole village - as was the case in this study - gives opportunities to reveal valuable information vis-à-vis rural Bangladesh.

There are indications that increased coverage may be due to the availability of free immunization, backed by media publicity. In this context, there emerge some important questions. Is the EPI programme financially sustainable in Bangladesh? If funding agencies shift their priority from EPI, can the government continue with the immunization programme? Are alternative approaches available to a country like Bangladesh? Most of the rural people can afford only a very minimal service charge, even less than half of the population are willing to pay more than Taka 10. The study shows that parental education up to fifth grade does not contribute to accepting a user fee above Taka 10. However, more than five years of schooling significantly enhances affordability to pay comparatively higher charges. In the Bangladesh perspective, such issues have important policy implications.

Published data suggest that once donor countries withdraw their support or when private market forces are allowed to play a major role in the provision of immunization, there is a decline in coverage. The best example is China. The whole world applauded China for its rural health care system. With the trickle down economics of the late 1970s and 1980s, the cooperative medical system disappeared. The current unresponsive free market economy, combined with political repression, has resulted in the decline of the economic and social base for equitable rural health services⁸. The experience of Swaziland is probably one of the best-documented ones. In 1984, the Government of Swaziland raised its health fees and regulated mission health services. Immunization and outpatient preventive visit charges were increased by US\$0.50. As a result, outpatient services in the government came down by 32% and increased in the mission services by 10% resulting in a combined decline of 17%. Even though the increase in fee was considered relatively low by World Bank standards, this fee was beyond the budget of 17% of Swaziland's population⁹.

A review of eight Aga Khan Foundation-funded projects reveals that there has been only minimal cost recovery for services, including immunization¹⁰. It is being increasingly articulated that continued large amounts of additional donor support to fund immunization activities are not expected¹¹. There is increasing anticipation that private voluntary organizations and private sector participation will fill the gap when donor agencies withdraw funding¹². It also anticipated that the immunization commodities of USAID, a leading donor to EPI in Bangladesh, will be phased out soon¹³. What will be the implications of such potential major changes for EPI? Local governments must share costs and volunteers contribute more¹⁴. In addition, the country will have to look more seriously at non-financial strategies which may ensure sustainability. These include an increased role by the private sector, effectively integrating EPI within the health services delivery,¹⁵ giving more responsibility to the community and the use of revolving funds,¹⁶ targeting specific age group of 0-11 months, increased provision of fixed centres, quantifiable monthly targets at the local level, supervisory functions at all local vaccination centres and modifying the immunization calendar¹⁷.

From the available literature it is clear that Bangladesh, which had achieved a "near miracle"¹⁸ in immunization, is likely to face problems of long-term sustainability. Countries which have been forced to take on sustainable strategies have faced problems, and Bangladesh is no exception. The people are not ready to meet the cost of EPI on their own. Since, for a significant positive outcome, education should be more than five years, as the present study reveals, compulsory schooling of all children at least for the secondary level should receive some rigor. To enhance social sustainability, efforts should be made to bring forth participatory strategies between the community organization, the grassroots NGOs, the private sector and the government.

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