Differentials of the Immunization Program in Rural Bangladesh

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Abstract

This study investigated the association of immunization coverage with some selected socioeconomic variables in rural Bangladesh. It was conducted in 75 villages in 10 areas of five administrative divisions. The eligible interviewees were the mothers having a child of age 12 to 23 months living in the selected villages. Both paternal and maternal education of 4-5 years of schooling were found to have a significant influence on immunization. No significant association exists between immunization coverage and child's sex, household land and labor sale. Parental religion impacts significantly. Exposure to media like radio increases predictability of immunization by about two folds. Most people favor none or minimal userfee, therefore restricting the self-sustainability of the program. An increase in parental education enhances affordability of userfees.

Key words: Immunization, rural Bangladesh, userfees and sustainabilty.

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 programs 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 services[3]. In Bangladesh, although other development efforts suffer from setbacks, stagnation or reversals, the IMC has shown a significant increase. Its Expanded Program for Immunization (EPI) is heavily subsidized by foreign donors, with only 30% of expenditure covered by the government. The major problem areas for research are the socioeconomic determinants of IMC in the rural perspectives of Bangladesh and the sustainability of the program. Success thus far is largely owed 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 program. This present study correlates some selected socioeconomic indicators with the immunization coverge, which may have proximate linkages with self-sustainabilty of the program. It has also tried to explore the influence of education in generating willingness for paying userfees.

Methods and materials

The study areas included 75 villages from 10 districts of Bangladesh. The areas were purposively selected to be representative of the country's diverse geographic terrain, socioeconomic enclaves and administrative divisions. Bangladesh Rural Advancement Committee (BRAC) - probably the world's largest indigenous non-governmental organization (NGO) [4] - operates its micro-credit, education, training, health and population interventions for the landless rural poor of these areas. Both BRAC and non-BRAC households were included in the study. The eligible respondents were 1,146 mothers having a child of age 12 to 23 months. The data were collected in January 1995 through a structured questionnaire. To validate consistency with the responses, the immunization cards were checked, procedural specifics of various vaccination were asked and for BCG, the scar was examined. The children who received all required doses of BCG, DPT, polio and measles were labeled as fully immunized, those who received even a single dose less than the required doses were categorized as partially immunized. The "none category" includes those who did not receive any vaccine at all.

The association between immunization coverage and socioeconomic factors were examined through bivariate tables and Chi-square test. Regression coefficients and Odd ratios were calculated with children's sex, parents' religion and education, household land and possession of radio in households. To make predictive value of parental education

statistically significant, 1-3 years of schooling was arbitrarily collapsed with the none category, and the other groups were 4-5 and above 5 years of schooling.

Results

Table 1 shows that of the 1,146 children studied, 52% were male. The sex ratio of the study children is comparable to national estimate. A majority of the children (64.3%) belong to poor households having less than 50 decimals of land. Forty five percent of the households had at least one member who sells labor for at least 100 days a year. Ninety percent of the children were Muslim, the rest Hindu. Mothers of 59.2% children had no education, 8.4% had 1-3 years of schooling, and 19.5% had been in school for 4-5 years. Only 12.9% of the children belonged to mothers having more than five years of schooling. Fathers of 57.8% of the children had no education, 7.9% had 1-3 years of schooling. Fathers of 13% of the children had 4-5 years of schooling and of 21.6% children had more than five years.

Table One about here

Table 2 shows immunization coverage. The coverage rate for BCG was highest among all EPI components (94.7%). It was lowest for measles (79.5%). For DPT and Polio, the coverage rates were 86.9% and 87.6% respectively. Those who were fully immunized were 78%.

Table Two about here

Table 3 shows that the immunization coverage increases with years of schooling of mothers. Those who had more than 5 years of education, 85.8% of their children were fully covered. Whereas it was 75.1% for those whose mothers had no schooling or up to 3rd standard. The difference between education groups is statistically significant ($p<0.05$). Percentage of "none category" consistently decrease with an increase in schooling. Compared to maternal education, the impact of paternal education is less pronounced. The children whose father's schooling was more than five years had a coverage rate of 83.9%. The rate was 74.7% for those whose fathers had no schooling or less than 4th standard. The difference between education groups is statistically significant ($p<0.01$).

Table Three about here

Household land size has no discernible impact on immunization coverage. Although Table 4 shows that families with 500 decimals or more have a lower rate of full coverage than the functionally landless (less than 50 decimals), the difference however, is not statistically significant.

Table Four about here

Table 5 shows that most people, irrespective of years of schooling, can afford a very minimal service charge. Fifty seven percent of the mothers with no schooling or less than 4th standard, expressed that they can afford charges at best only up to Taka 10. Even 51% of the mothers with more than 5 years of schooling were found unwilling to pay charges of more than Taka 10. It was found that willingness to pay higher charges increased the

number of years of mothers' schooling. The difference between various education groups of mothers is statistically significant ($p<0.001$). Father's education has a promotive impact too, but compared to mothers it is less pronounced. Thirty percent of fathers with more than 5 years of schooling expressed their readiness to pay charges above Taka 20. The ratio is lower than that of mothers with the same period of schooling. It is evident that schooling beyond five years makes a distinct difference in willingness to pay higher charges. The difference between various education groups of fathers vis-à-vis affordability of user fees is statistically significant ($p<0.001$).

Table Five about here

A multivariate analysis has been carried out to assess the relative influence of some sociodemographic characteristics on probability of immunization. Immunization was taken as a dichotomous variable in which a child was considered to be completely immunized or not completely immunized. The selected variables include sex of child, parent's religion and education, land and ownership of a household radio. Some categories of variables like education and land are collapsed so that the results reflect statistically significant difference between the categories. Table 6 depicts the results of the analysis through regression coefficients, standard error of the coefficients, the Odds ratio, and the level of significance.

Table Six about here

It is interesting to note that the impact of maternal education on immunization is not statistically significant unless it is imparted by at least 4-5 years of schooling. Such

association is also found with father's education. A radio in a household has a significant influence on immunization. The predictivity of getting an immunized child in such families is about twice as high as those without it. Land beyond 200 decimals shows a negative impact.

Discussion

The 1993 evaluation of EPI in Bangladesh among 0-11 months children shows reasonably impressive national coverage of 89% for BCG, 63% for 3 doses DPT and OPV and 59% for measles[5]. This study being 2 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 illnesses[6]. Mothers' knowledge of polio and DPT vaccines was positively correlated to education of mother[6]. Land holding did not have any discernible impact on coverage. There is no explanation why Hindu children should have a lower coverage. Additional studies are needed in this regard. On the other hand, exposure to media like radio has a positive impact. This may indicate the effect of the health education program of the national broadcasting system. However, it was found that only 25% of the households had a radio. Policies that can enhance availability of radio at an affordable price even by a poor family may contribute to the program. It may contribute to the dissemination of other health and educational massages.

There are indications that increased coverage may be due to the availability of free immunization, backed by media publicity. These findings raise some important questions. Is the EPI program financially sustainable in Bangladesh? If funding agencies shift their priority from EPI, can the government continue with the immunization program? Are there alternate approaches available to a country like Bangladesh?

Published data seems to 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, then there is a decline in coverage. The best example is China. The whole world applauded China for its rural health care system. With the new 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 services[7]. 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 a relatively low by World Bank standards, this fee was beyond 17% of Swaziland's people's budget[8].

A review of eight Aga Khan Foundation funded projects reveals that there has been only minimal cost recovery for services including immunization[9]. It is being increasingly articulated that continued large amounts of additional donor support to fund immunization activities are not expected[10]. There is increasing anticipation that private voluntary organizations and private sector participation will fill the gap when donor agencies withdraw funding[11]. It also anticipated that the immunization commodities of USAID, a leading donor to EPI in Bangladesh, will be phased out soon[12]. What will be the implications of such potential major changes for EPI? Local governments must share costs and volunteers contribute more[13]. 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,[14] giving more responsibility to the community and the use of revolving funds,[15] targeting specific age group of 0-11 months, increased provision of fixed centers, quantifiable monthly targets at the local level, supervisory functions at all local vaccination centers and modifying the immunization calendar[16].

From the available literature it is clear that Bangladesh which had achieved a "near miracle"[17] in immunization is likely to face problems of long term sustainability. The 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. As education has a significant promotive role, compulsory schooling of all children at least for five years 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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Tables

Table 1. Socioeconomic characteristics of study population.

Variable	Number	Percent
Children **(age 12 months to 23 months)**		
Total	1146	100
Male	596	52.0
Female	550	48.0
Religion:		
Muslim	1034	90.2
Hindu	112	9.8
Land:		
0 - 49 decimals	737	64.3
50 - 199	246	21.5
200 - 499	118	10.3
500 or above	45	03.9
Labor:		
Sells labor	518	45.2
Do not sell	628	54.8
BRAC membership:		
BRAC member	228	19.9
BRAC non-member	918	80.1
Mother's education: ***(in years of schooling)***		
0	679	59.2
1-3	96	8.4
4-5	223	19.5
5+	148	12.9
Father's education: ***(in years of schooling)***		
0	662	57.8
1-3	90	7.9
4-5	146	12.7
5+	248	21.6

Table 2: Immunization Coverage of Children from 12 to 23 months

Immunization	Number	Percent (n=1146)
BCG	1084	94.7
DPT	995	86.8
Polio	1003	87.5
Measles	910	79.4
Complete	894	78.0

Table 3. Immunization coverage (%) of children by year of schooling of the parents.

Year of schooling	Immunization coverage (in percentage)		
	None	Partial	Complete
Mother			
0-3	5.8	19.1	75.1
4-5	4.5	12.6	83.0
5+	2.7	11.5	85.8
Father			
0-3	6.4	18.9	74.7
4-5	1.4	13.7	84.9
5+	3.6	12.5	83.9

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

Immunization status	Land in decimal			
	0-49 (n=737)	50-199 (n=246)	200-499 (n=118)	500 & above (45)
Complete	78.2	80.9	72.9	73.3
Partial	16.8	14.2	22.2	17.8
None	5.0	4.9	5.1	8.9

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

Years of schooling	Affordable charges in Taka			
	1-10	11-20	21-50	50+
Mother				
0-3	57.3	10.2	4.4	28.1
4-5	64.6	10.3	10.3	14.8
5+	51.4	17.6	20.3	10.8
Father				
0-3	57.6	9.0	5.3	28.1
4-5	65.8	15.1	4.8	14.4
5+	54.4	15.3	16.1	14.1

Table 6. Regression coefficients and Odd Ratios to predict the probability of immunization.

Variable	Beta Coefficient	S.E. of Beta Coefficient	Odds ratio	Level of significance
Sex of child				
Male	0	-	100	-
Female	.04	.15	1.04	.524
Religion:				
Muslim	0	-	100	-
Hindu	-.56	.23	.57	.058
Mother's education *(in years of schooling)*				
0-3	0	-	1.00	-
4-5	.37	.22	1.44	.027
5+	.5	.30	1.65	.024
Father's education *(in years of schooling)*				
0-3	0	-	1.00	-
4-5	.59	.26	1.80	.051
5+	.39	.24	1.48	.023
Land:				
<50 decimals	0	-	1.00	-
50-199	-.04	-.23	.96	.057
200-499	-.66	.27	.51	.037
500 or above	-.75	.39	.47	
Radio:				
None	0	-	1.00	-
Available	.69	.21	1.99	.087