Differentials of the Immunization Program in Rural Bangladesh and the Issue of Userfee

Firoz Mahboob Kamal, MBBS, MPH
Senior Medical Officer Research, BRAC

Abdullahel Hadi, MS, Dr.PH
Senior Research Sociologist, BRAC

A. Mushtaque R. Chowdhury, Ph.D
Director, Research, BRAC.

Address for correspondence:

BRAC
Research and Evaluation Division
75 Mohakhali CA, Dhaka 1212
Bangladesh

Abstract

This study investigated some aspects of the sustainability of the immunization program 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 areas of five administrative districts. Eligible interviewees were 1145 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 child's sex, household's cultivable land, labor 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 userfee, therefore restrict the financial sustainability of the program on its own. An increase in parental education enhances the willingness to pay 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 the national exchequer bearing only 30 percent of 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 If the donor funds are withdrawn or reduced, the government will have to make the difference either through diversion of funds from other activities or through service charges to the community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 program. Whatever success so far achieved largely owes 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 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. These are the villages that were primarily included in the health, demographic and socioeconomic surveillance project of Bangladesh Rural Advancement Committee (BRAC) - one of the world's largest indigenous non-governmental organization (NGO)[4]. As core elements of the project, data were being routinely collected on demogradhic, health and some development indicators to monitor the outcomes of various health and non-health interventions prevalent in the rural areas. These surveillances villages are dispersed over 10 different administrative divisions, and comprised of diverse geographic terrains and socioeconomic enclaves. The selection was not random, rather purposive to include villages from the flood-free high land, the less accessible marshy land, the central districts and also the tidal surge-prone coastal areas. Moreover, placement of BRAC programmes, infrastructural feasibility of placing field staff, easy accessiblity of these villages to the field and the supervisory staffs were other important citeria 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. Firstly, 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 analysis for the study. The total eligible mothers were 1,145. The data were collected in January 1995 by household visits through a pretested structured questionnaire. The interviewers were the BRAC's field staff working as data collectors for its surveillance programme known as 'Watch project'. The interviers are mostly colllege graduates with 12 to 14 years of education. Their field experience ranges from 6 to 12 years. The interviewees were usually the mothers of the children or other care-takers in the households. There was no incidence of failure in obtaining the data. To validate consistency with the responses, the immunization cards were checked, the mothers were asked about the procedural specifics of various vaccination and the children were examined for BCG scar. The children who received all the 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 partial; and those who did not receive any vaccine at all were categorized as "none".

Regarding user-fee, the respondents were simply asked whether they are willing pay any fees for the immunisation services that are made available to their communities. If the answer was in the affirmative then they were asked how much they are ready to pay for it. The study also collected data on various household assets including radio. It was tried to explore whether there exists any correlation between the possession of a radio in the household and the vaccination of children. The study did not collect any data whether the respondents received any particular massage on immunisation from radio or not. Since the government owned radio desseminates a lot of health massages, it was assumed that such transmission will promote immunisation among the recepient households. The association between immunization coverage and socioeconomic factors were examined through bi-variate tables and Chi-square test. Multivariate analysis were done with polio (third doses 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 male. The sex ratio of the study children is comparable to national estimate. Ninety percent of the children were Muslim, the rest being 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 percent 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 - a large non-government organisation (NGO) in Bangladesh. Of mothers, 59.3% had no education, 8.5% had 1-3 years of schooling, and 19.3% had been in 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 in schools for more than five years.

Table One about here

Table 2 shows the immunization coverage. The coverage rate for BCG was highest among all components of the government's immunization programme (EPI), it was 94.7%. It was 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 (both in three doses) were 86.6% of the children. Of all 12-23 months old children, about 78% had completed the immunization schedule.

Table Two about here

Table 3 shows that the immunization coverage increases with years of schooling of mothers. For mothers having more than 5 years of education, 86.5% of their children were fully covered and about 92% received 3rd dose of both polio and DPT. For mothers with no schooling, the full coverage rate was 74.1%. Of children with maternal education up to 3rd standard, 78.4% had the full immunization and about 92% received 3rd dose of both polio and DPT. Compared to maternal education, the impact of paternal education is less pronounced. For fathers with more than five years of schooling, 83.6% of their children had the full immunization and 90% received 3rd dose of both polio and DPT. For fathers with no schooling, 74.2% of their children received full immunization and 83.6% received 3rd dose of polio and DPT. Of children with paternal education up to 3rd standard, 79.1% had the full immunization, and about 90% received 3rd dose of both polio and DPT. For maternal education, such group-wise difference in coverage is statistically very significant ($p<0.01$). But for paternal education, the group-wise difference is very significant ($p<0.01$) only in case of receiving 3rd doses of polio and DPT, and less significant ($p<0.05$) for completion of the whole schedule.

Table Three about here

Household's cultivable land has no discernible impact on immunization coverage. Table 4 shows that 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 Four about here

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

Table Five about here

Multivariate analysis was carried out to assess the relative influence of some sociodemographic characteristics on probability of childhood immunization. The analysis was done using dichotomous dependent variables like (a). DPT third dose received (yes or no), (b). polio third dose received (yes or no), (c). both poilo and DPT third dose received (yes or no) and (d). the complete immunization against six diseases e.g. tuberculosis, diphtheria, pertussis, tetanus, polio and measles (yes or no). The selected explanatory variables included sex of child, mother's age and education, father's education and religion, labour sale and membership of the non-government 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 Six about here

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 the 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 two fold higher than those without it.

Unexpectedly, household's cultivable land has no impact. 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, 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 for Immunization (EPI) in Bangladesh showed reasonably impressive national coverage of 89% for BCG, 63% for 3 doses of both DPT and OPV and 59% for measles[5]. The present 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 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 like radio has been found to have a positive impact. This may indicate the effect of the health education program of the national broadcasting system. Since the study did not collect data on receiving any imunisation massage from radio, hence restrained to directly correlate such a positive impact to any specific radio transmission. However, the finding reinforces the imporatnce 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 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, therefore may reinforce the importance of immunization in the public conscience.

Since the study was designed to examine the rural profile, faces limitations to generalize 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 birth day, hence restrained from evaluating immunization profile in under one children. Although the sample population were not randomly selected from all over Bangladesh, the villages come from a diverse geographic and socio-economic terrains. 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-a-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 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? 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 5th grade does not contribute to accept userfee above Taka 10. However, more than 5 years of schooling significantly enhances affordability to pay comparatively higher charges. In Bangladesh perspectives, such issues have important policy implication.

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 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. Since for a significant positive outcome education should be more than 5 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.

References

1. Royal Tropical Institute and University of Amsterdam, Proceedings of the research design workshop on "Social Science and Immunization", April 1994:19, Leusden, The Netherlands.

2. World Health Organization. 1991 World Health Statistics Annual, 1992, Geneva, 52-72.

3. Shimouchi A, et al. Immunization Coverage and Infant Mortality Rate in Developing Countries. Asia Pacific Journal of Public Health, 1994; Vol.7. No4: 229-32.

4. Lovell CH. Breaking the Cycle of Poverty: *The BRAC Strategy*. Kumarin Press, 1992:1.

5. Expanded Program on Immunization: Program Review. Weekly Epidemiological Record. 1994; 69 (12): 87-90.

6. Cleland, J. Maternal Education and Child Survival: Further Evidence and Explanation, Paper presented at the Rockefeller Foundation Health Transition Workshop, Australian National University, Canberra, May 1989: 15-19.

7. Kumar A. Effective coverage for child immunization through the camp approach: results of a field experiment, Journal of Family Welfare. Dec 1986: 33 (2):44-52.

8. Sidel VW. New lessons from China: equity and economics in rural health care. American Journal of Public Health 1993. Dec; 83(12) : 1665-6.

9. Yoder RA, Herman DR. How much is too much? The impact of fees on use of health services. In Management Issues in health programs in the developing world. Selected papers from the twelfth Annual International Health Conference, of the National Council for International Health, May; 1986: 293-305.

10. Loos GP. Lessons Learned fro Primary Health Care Programs Funded by the Aga Khan Foundation: Asia-Pacific Journal of Publish Health. 1993; 6(4): 233-4.

11. Percy A; Brenzel L; Waty MO. Cost recovery for immunization: A world wide survey of experience. John Snow [JSI], Resources for Child Health (REACH), 1991 Apr. (4) V 75P. USAID contract No. DPE-5928-2-00-9034-00.

12. Harvey M; Lonton L. Child Survival Strategy for Sudan, USAID/Khartoum. Arlington, Virginia, John Snow, Inc. (JSI), Resource for Child Health Project (REACH), 1987. iii, 33, (22) P. USAID contract No: DPE-5927-0-00-5068-00.

13. Shutt M; Levis G; Spielman E; Romaguera RA. Midterm evaluation of the Bangladesh Family Planning and Health Services delivery project (388-0071). Arlington, Virginia, DUAL and Associates, Population Technical Assistance project (POPTECH), 1991 July 8. xvii, 85, (59)P Report No. 90-073-120; USAID Contract No. DPE-3024-2-00-8078-00; USAID/Dhaka PIO/T No.388-0071-3-80121.

14. Noto A, Mahmood RA, O'Brien P, Kawnine N. Cost Effectiveness and Sustainability of Immunization: In Huq Mujibul, Near miracle in Bangladesh, University Press Limited, Dhaka 1991: 75-84.

15. Chiavaroli ER, Agle NW, Clark SC, Gibson PS, Housen G. Evaluation of AID child survival programs: Morocco case study. Technical report No. 1; PN-AAX-254. USAID. Center for Development Information and Evaluation, Office of Evaluation, 1991 Dec.X 25(4)P.

16. Bernett FJ. Child Survival In Wallace HM, Giri K. Health Care of Women and Children in Developing Countries. Third Party Publishing, 1990: 364-81.

17. Brenzel L, Claquin P, Mclellan I, Stansfield S. Rapid Assessment of Senegal's Accelerated Phase. John Snow (JSI) Resources for Child Health (REACH) 1987 Nov. 106P.

18. Huq M. Near Miracle in Bangladesh. Dhaka: University Press Limited, 1991.

Tables

Table 1. Socioeconomic characteristics of study population.

Variable	Number	Percent
Children **(age 12 months to 23 months)**		
Total	1145	100
Male	597	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
Labor:		
Sells labor	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: Immunization Coverage of Children from 12 to 23 months

Immunization	Number	Percent (n=1145)
BCG	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. Immunization coverage (%) of children by year of schooling of the parents.

Year of schooling	Immunization coverage (in percentage)		
	None	Polio & 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.

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

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	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

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

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

+eference category is male

* p<0.10

** p<0.05

*** p<0.01