PN-AAE-731
ISN 39772

[redacted]

WORKING PAPER SERIES # 7

AN OPERATIONAL STUDY OF EXPANDED PROGRAMME ON IMMUNIZATION IN TWO RURAL UPAZILAS OF BANGLADESH: LESSONS LEARNED

A.A. Zahidul Huque, M.B.B.S., M.P.H.
Md. Tariqul Islam, M.B.B.S.
Md. Fazlur Rahman, M.B.B.S.
Md. Jahangir Hossain, M.B.B.S.
Marjorie A. Koblinsky, Ph.D.

MCH-FP Extension Project
International Centre for Diarrhoeal Disease Research, Bangladesh
GPO Box 128, Dhaka-1000
Bangladesh

April, 1986

INTRODUCTION:

Infant mortality remains very high in rural Bangladesh. Recent estimates of infant mortality in Bangladesh range from 112 to 150 per 1000 live births, a rate more than ten times greater than that of developed countries [1,2]. Roughly one-third to one-half of these deaths occur in the first 28 days of life [3]. The mortality rate of neonates ranges from 70 to 117 per 1000 live births, with more than fifty percent of these deaths believed attributable to tetanus [4,5]. Other diseases which are major contributors to infant mortality include measles, poliomyelities, diphtheria, whooping cough and tuberculosis - all of which are preventable by immunization. With this knowledge, the Government of Bangladesh launched the Expanded Programme for Immunization (EPI) in 1979 with vaccines against the major diseases [6].

The MCH-FP Extension Project has been working in two upazilas, Abhoynagar of Jessore district and Sirajgonj sadar upazila of Sirajgonj district since late 1982. In each area, the proejct is guided by a local committee involving both government Ministry of Health and Family Planning officials and ICDDR,B staff, known as Project Implementation Committee (PIC), in an effort to improve the functioning of the government system [7]. The Project Implementation Committee reviewed the existing government EPI Programme and developed several alternate strategies to expand the programme.

The EPI Programme began in March, 1981 in Abhoynagar and in August,1982 in Sirajgonj, with BCG technician in each site providing services from the Upazila Health Complex (UHC). The Project Implementation Committee decided to expand the immunization programme to four rural subcentres and Health and Family Welfare Centres (H&FWCs) in Abhoynagar. Under this strategy, the BCG technician spends one day per week at each site including one day at the UHC. Although the number of sites for immunization increased, total vaccination days did not, as only one BCG technician provided the services. No advance publicity was carried out at the different sites which specified the days immunization services would be available.

After reviewing the EPI programme run by the BCG Technician, the committee developed a new strategy of tetanus toxoid vaccination to women of reproductive age in two unions of Abhoynagar upazila. This has been a weekly programme by the union female paramedic, FWV at village level. The initial findings were encouraging in terms of fewer dropouts but the coverage remained poor.

Recognizing the increased manpower needs of the programme, the committee developed two alternative strategies: 1) a routine weekly multiple vaccination programme at the doorstep by the Health Assistant, and 2) a tetanus toxoid campaign by the same cadre of worker. Female volunteers have played an important role in both of these strategies.

REVIEW OF VARIOUS STRATEGIES:

A. BCG TECHNICIAN STRATEGY:

Although the Government of Bangladesh officially launched its EPI programme in 1979, the programme did not start in Abhoynagar until March, 1981 and in Sirajgonj until August, 1982. While initially, the program was limited to only the Upazila Health Complex (UHC), later services were made available to Health and Family Welfare Centres (H&FWC) as well. In Abhoynagar the programme was once per week in each site; in Sirajgonj, immunizations were provided only once per month at the H&FWC and once per week at the UHC. The vaccines provided were Tetanus Toxoid (T.T), Triple antigen - Diphtheria, Pertussis and Tetanus (DPT), Double antigen - Diphtheria and Tetanus (DT), Oral Polio, Measles and Bacillus Culmette Guerine (BCG). Daily coverage has been found to vary from 28 to 30 doses, given to 15 to 18 clients. Poor coverage and high dropout rates are two major drawbacks of this strategy (see Table 1).

Reasons for Poor achievement of this strategy:

A number of factors contributed to the poor achievement of the BCG technician strategy. The main reason was that only one technician was responsible for an entire upazila, which has an average target population of 120,000 to 200,000. The technician could not (possibly) cover all unions, even working once per week at each H&FWC. Moreover, as the programme was clinic-based, pregnant women did not come to the clinics because of cultural beliefs about the harmful effects of vaccination upon the fetus. This approach did also not allow for, or anticipate the need for, prior motivation of clients. The programme was also inadequately supervised, since until very recently, no medical officer from the upazila health complex was assigned responsibility for the programme. Irregular supplies of vaccines and logistical problems hampered the programme to some extent. Finally, several cases of complications related to the vaccination, such as abcess at the site of injection, created a sense of distrust among potential clients.

B. DOMICILIARY TETANUS TOXOID PROGRAMME BY FWV:

With the BCG technician strategy having proved inadequate for covering the target population, the committee developed an alternative door step tetanus toxoid programme by the FWV once per week during her day at this satellite clinic. The programme was introduced in two unions of Abhoynagar in February and August of 1984. The objective of the programme was to immunize all women of reproductive age with two doses of tetanus toxoid within a two and one-half year period. The

FWVs of the two unions go out to the field (adjacent to the satellite clinics) once in a week to give tetanus toxoid to women between the ages of 15 and 45. A list containing the target population was prepared by the FPA in advance. Based upon this list, the FWV selects four different sites to be visited during the month. The vaccination sites were continually changed as the FWV completed vaccination of the target population in a particular area. The FWV is assisted by an Aya, a female contingency staff of the H&FWC, in transporting the vaccine from the Health and Family Welfare Centres to selected field sites. The programme is supervised by the Upazila Health & Family Planning Officer (UHFPO), the Medical Officer (MCH-FP), the Health Inspector (HI) and ICDDR,B personnel. The cold chain for the vaccine is maintained centrally at the Upazila Health Complex, and on the vaccination day, the MLSS uses a vaccine carrier to transport the vaccine to the H&FWC. From the H&FWC, the Aya carries the vaccine to the field and at the end of the day returns unopened vaccine vials and used syringes and needles to the H&FWC; from here the MLSS carries these items back to the upazila health complex. Syringes and needles are sterilized using the autoclave at the upazila complex and are transported to field covered by sterile linen.

A uniform recording system is maintained in a bound register containing the following information (see the Annex A):

-Serial number, -Household number, -Name and age of acceptor, -Date of first dose, -Due date for second dose - Date of actual administration of second dose, -Pregnancy status, -Remarks (for complication or any other issues).

Follow up of vaccination cases was carried out by the FWAs/HAs during their routine home visits and no complication have been reported to date.

The coverage rate of target population based upon this strategy was proved only satisfactory; significant improvement was observed, however, in terms of second doses covered on due date. Although the initial objective was to cover the target population with two doses of vaccine within two and one-half years, the initial field results indicated that this objective might require as much as 15 to 19 years.

Barriers to implementing the FWV strategy:

1) Total time spent by the FWV on vaccination was very low as the FWV actually worked only one-half day per week on this activity and travel time was substantial in most of the area.

2) During the monsoon season, most of the area was inundated with water, making it difficult or impossible to visit the remote households. Provision for hiring country boats during this season could to some extent overcome

this obstacle. The FWV also did not receive a travel allowance within a five mile radius of the union clinic, she is relactant to travel distant places.

3) As contingency staff, the Aya and MLSS are not eligible for travel allowances, rendering it difficult to transport vaccines from the Upazila Health Complex to field sites.

4) After the initial few months of the intervention, the workers began to lose interest and enthusiasm, in part due to inadequate supervision.

C. DOMICILIARY ROUTINE EPI PROGRAMME BY HEALTH ASSISTANTS:

Review of the immunization strategies involving the BCG technician and the FWV revealed that coverage of the target population was low in both strategies, although the FWV approach had the advantage of a lower dropout rate. The results of these interventions strongly suggested the need for, and potentially that a greater efficacy of, a domiciliary EPI programme.

If the number of vaccinators could be increased, total coverage would be much higher. It was also apparent that the BCG technician and FWV strategies could not achieve the desired coverage rate of the target population within a reasonable time frame--15 to 19 years would be required with the present rates of coverage. This estimate may in fact be overly optimistic, since it ignores the large new population which would be added to the target group in the interim.

The committee therefore suggested that in addition to the FWV and BCG technician programme, the Health Assistant (HA) be utilized for a routine domiciliary EPI programme. Accordingly, a doorstep immunization programme was initiated in March, 1985 in a different union of Abhoynagar.

The objectives of the strategy were:

1) To vaccinate 80 percent of the target population of a union with DPT, TT, DT and BCG vaccine within two years with a lower dropout rate.

2) For upazila officials to identity barriers to the implementation of this intervention, and to develop strategies to overcome them, so that it would be possible to replicate it in other unions of the upazila.

Three Health Assistants along with the AHI, FWV and FPA was given a three-day training course on EPI. Topics covered were EPI diseases, doses, operational procedures, and motivation of acceptors. The trainers were the medical officers of the UHC and the ICDDR,B. In addition, one day training was given to three female volunteers and one male

MLSS about the vaccine cold chain and also motivational techniques.

In terms of the field operation, each Health Assistant formed a team with a female volunteer. Each team worked one day per week delivering EPI, with each working on different days. Each team was responsible for one ward and selected four vaccination spots in the ward. A team would work in a different site each of the four weeks (see figure 1). In the second month, the team would go back to the first spot to cover due doses and to vaccinate new cases, with the entire cycle repeated during the second month. Ultimately the vaccination spots would be shifted as the target population was covered.

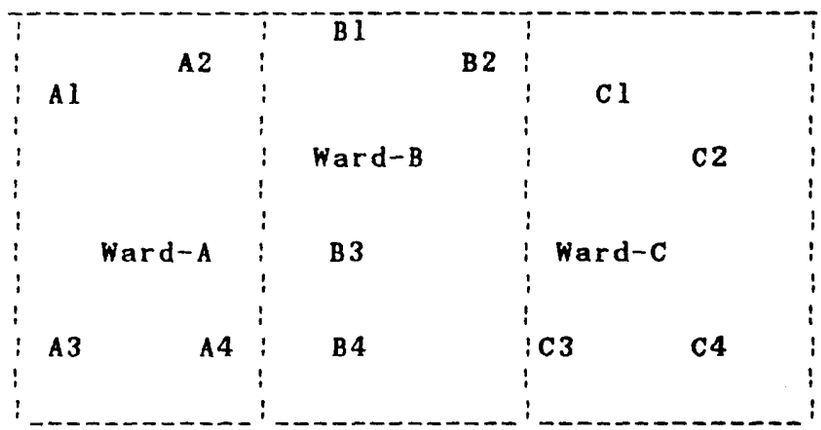

Fig 1. Description of HA Vaccination Routine.

The cold chain was maintained at the Upazila Health Complex, with the BCG technician monitoring the temperature of the refrigerator, with the vaccines carried to the field in a vaccine carrier. The MLSS carried the required vials of vaccine in a carrier to the field on the morning of the vaccination day, along with sterilized syringes, needles and cotton. At the end of the day, he returned the unopened vials of vaccine, as well as used syringes and needles to the UHC. Sterilization procedures and record keeping were maintained in a manner similar to that for the FWV strategy. FWA/HA follows up any complications resulting from the vaccination, and refer clients to the H&FWC/UHC for management.

The target populations and the projected time required to cover these populations are estimated in the table-1.

Responsibility for supervising the programme lay with the UHFPO, MO (EPI), Health Inspector, Assistant Health Inspector and ICDDR,B staff.

Findings:

After seven months of the programme, the coverage rate was 15 percent of the target population. The number of vaccination days was subsequently increased from one day to two days per week in November, 1985, which had the effect of doubling the previous monthly coverage rate. Similar to the FWV strategy, the HAs and their immediate supervisors lost interest and enthusiasm after the initial period of the programme. Maintaining the motivation of workers, maintenance of the cold chain and flow of logistics, remained as the largest concerns of the strategy. Female volunteers have been used effectively in this programme for motivating women to vaccinate both their children as well as themselves and for assisting the HAs to administer vaccines.

D. DOOR STEP TETANUS TOXOID (T.T.) CAMPAIGN BY HEALTH ASSISTANT:

A campaign approach was developed in Sirajgonj in April, 1985. The objective of the strategy was to immunize married women of reproductive age in a union with two doses of tetanus toxoid during a two month period, and to study the feasibility of utilizing Health Assistants (HAs) in a vaccination campaign. The first dose was administered by HAs in thirteen working days. Each HA formed a team with a female volunteer and visited house-to-house to vaccinate the target population. The female volunteer also visited the target households on the day prior to vaccination, to motivate women and encourage them to keep their children at home for vaccination during the following day. A target list was prepared from the couple registration books maintained by the FWAs. The first dose coverage (2870 doses) substantially exceeded the initial target coverage rate of 80 percent (2640 doses), in part due to the many under aged and unmarried women who participated in this programme. After a one month period, a seventeen day campaign was launched for the second dose; this campaign achieved a coverage rate of 74.5 percent. Subseqnently, a third attempt was made to vaccinate uncovered cases, resulting in a final coverage rate of 90.7 percent.

Two days training was offered to HAs, AHIs, and HIs by the UHFPO, MO (EPI) and MO (ICDDR,B). Leaflets were used to motivate community members. During the second dose, publicity for the program was achieved through loudspeakers by the district Public Relation Officer.

The vaccines were stored in the refrigerator of the Tuberculosis(TB) Clinic in Sirajgonj, which is located approximately 4 kilometers from the UHC. A MLSS brought the vaccine to the UHC in 5 vaccine carriers each morning. The HAs obtained the vaccine from the UHC and returned the vaccine carrier along with unused vaccine in the afternoon. The MLSS then returned the vaccine carriers to the Tuberculosis Clinic to change the ice packs and obtain a new

supply of vaccine. Five vaccine carriers and 40 ice packs were required. Syringes and needles were sterilized by autoclaving after wrapping in linen. The MLSS who initially brought the vaccine was engaged to clean and autoclave the syringes after their return from the field, with the UHFPO supervising the sterilization.

Recording was done on the same registers used for listing the target. Workers were given registers with a proforma, which they also used during the campaign for second dose.

The overall programme was supervised by the UHFPO and MO (EPI), District EPI Supervisor, HI and AHI. ICDDR,B staff also participated in the supervision of the programme.

Findings:

1) The first dose coverage exceeded the target by 33 percent--2640 versus 2870 doses.

2) The second dose coverage was 74.5 percent.

3) A third attempt was made which contributed to an overall coverage rate of 90.7 percent.

4) Wastage of vaccine was 28.5 percent.

5) Female volunteers were found effective in this campaign approach.

OPERATIONAL COST:

Additional funds were needed to implement this EPI strategy. Table 2 provides a breakdown of the operational costs of two strategies, excluding the costs of vaccine, cold chain and salaries of government workers.

IMPLEMENTATION BARRIERS TO THE ALTERNATIVE EPI STRATEGIES:

1) Inadequate manpower in the BCG technician strategy lead to poor coverage and very high dropout rate.

2) Irregular supplies of vaccines and logistics. There is a shortage of immunization cards. There is no uniform package of the peripherals available which are required for the vaccination procedure.

3) FWVs are not eligible for transportation allowances within a five mile radius of their homes, limiting the potential for expansion of immunization the programme using this cadre.

4) The absence of an Aya and MLSS in non-constructed H&FWCs makes it impossible to implement the FWV strategy in such unions.

5) In the routine EPI programme by HAs, it is difficult to maintain the workers' motivation for long durations of time. Supervisors also frequently lose interest after several months.

6) Cultural constraints and the low levels of education among the rural population, particularly women, contributed to underutilization of static service delivery approaches.

WHAT HAVE WE LEARNED?

a) HAs have proven their potential as vaccinators much as they did in the past during smallpox eradication programme.

b) The campaign by HAs works much better than a routine program. Campaign, by definition, keeps workers' motivation up and supervision and logistic flows become easier. In a routine program, targets cannot be maintained as planned because the worker's motivation and enthusiasm slows after the initial phase. Caution is warranted, however, in to extrapolating the findings of single vaccine campaign to multiple vaccine campaigns. A pilot study of a multiple vaccine campaign would contribute significantly toward deciding the optimal service strategy for EPI programs in rural Bangladesh.

c) Female volunteers from the community have played a vital role in the success of the EPI program, motivating village women to accept vaccines themselves and for their children. They also assisted the Health Assistants in administering vaccines.

d) FWAs have played an important role in motivating women during their usual work-round. Although our initial proposal was to involve them in the actual service delivery of EPI, careful review of their present work load led to the decision to use female volunteers instead of the FWAs. In the approach previously described, FWAs were instead used to motivate women during their normal work routine, with the result that not only was coverage inproved, but their routine tasks were unaffected.

e) Simply training workers does not improve the work system. Careful analysis and forward planning of the interrelationships among workers, their supervisory support, and their work routines is much needed.

f) A contingency fund is very useful in overcoming some of the important operational barriers to an effective EPI program.

ANNEX - A

PROFORMA FOR T.T. IMMUNIZATION REGISTER

Sl. No.	Household number	Name with husband/ Father's name	Age	Name of village/para	Date of 1st dose	Date of 2nd dose	Pregnancy status	Remarks

Table - 1

COMPARISON OF DIFFERENT IMMUNIZATION STRATEGIES:

STRATEGY : BCG Technician at Static facility:

Time period	Name of vaccine	Target pop.	No. of persons vaccinated	Coverage per working day	Coverage of target pop. (%)	Dropouts (%)	Time required to cover target pop. planned	observed	Remarks
Aug.'82-Dec.'84 (Sirajgoni upazila)	T.T.	60,153	1st dose: 585	2.8 dose	0.97%	7.6%	-	257 years	
			2nd dose: 540	0.6 dose	0.90%				
	D.P.T.	21,053	1st dose:204	1.0 dose	0.97%				
			2nd dose:161	0.79 dose	0.76%				
			3rd dose: 96	0.47 dose	0.46%	52.9%	-	543 years	
	Polio	21,053	1st dose:193	0.95 dose	0.91%				
			2nd dose:131	0.64 dose	0.62%				
			3rd dose: 90	0.44 dose	0.43%	53.3%	-	581 years	
	D.T.	75,192	1st dose:890	4.3 dose	1.18%				
			2nd dose:633	3.1 dose	0.84%	28.8%	-	297 years	
	BCG Measles	141,361	549	2.7 dose	0.39%		-	641 years	
March'81-Sept'84	T.T.	35,029	1st dose:4269	18.9 dose	12.2%	53.4%	-	69 years	
			2nd dose:1988	8.8 dose	5.6%				
	D.P.T.	5,254	1st dose: 729	3.2 dose	13.8%				
			2nd dose: 433	1.9 dose	8.2%	68.0%	-	85 years	
			3rd dose: 233	1.0 dose	4.4%				
	Polio	5,254	1st dose: 678	3.0 dose	12.9%	71.8%			
			2nd dose: 329	1.5 dose	6.2%				
			3rd dose: 191	0.8 dose	3.6%		-	104 years	
	D.T.	35,029	1st dose:3497	15.5 dose	10.0%				
			2nd dose:1745	7.7 dose	5.0%		-	75 years	
	BCG Measles	78,815	297	1.3 dose					

STRATEGY : Routine T.T. Programme by FWV at Door step once a week:

Time period	Name of vaccine	Target pop.	No. of persons vaccinated	Coverage per per working day	Coverage of target pop. (%)	Dropouts (%)	Time required to cover target pop. planned	observed	Remarks
March'84-Dec'85 Mohakal,Abhoynagar	T.T.	4,001	1st dose: 689		17.2%				
			2nd dose: 469		11.7%	3.3%	2.5 years	15 years	
Aug.'84-Dec.'85	T.T.	2,523	1st dose: 288	Average 6-15 dose	11.4%				
			2nd dose: 178		7.1%	1.8%	1.5 years	19 years	

STRATEGY: Routine EPI Programme by Health Assistant once a week :

March'85-Dec.'85	D.P.T.	1,139	1st dose: 348		30.5%				
			2nd dose: 248		21.8%			3-5 years	
			3rd dose: 148		14.5%				
	D.T.	3,940	1st dose:1142	Average 44 doses	29.0%		12 to 24 month	The coverage has doubled since Nov.'85 as vaccination day has been increased from one day per per week to 2 days.	
			2nd dose: 748		19.0%				
	T.T.	3,872	1st dose:1310		34.0%				
			2nd dose: 872		23.0%				
	BCG		484						

Daily coverage = 44 vaccines (mix)

STRATEGY: Campaign by Health Assistant at Door Step

April 6-May 21,85 Khokshabari, Sirajgonj	T.T.	2,640	1st dose:2870	44.2 dose	108.0%		2 months	53.3 days (2 months)	
			2nd dose:2602		98.0%	9.4%			

TABLE - 2

Operational costs for EPI Programme

An additional fund has been spent to cover the operational costs:

		Monthly cost
A.	For Routine EPI by Health Assistant:	
1.	Personnel (3 Female volunteers & 1 MLSS)	Tk. 960.00
2.	Logistics (Kerosine oil, soap, linens, registers, pens, towels, etc.	Tk. 102.75
3.	Training (Total cost will be depreciated over 2 years period.	Tk. 77.00
		Tk. 1,139.75

Operational cost for per dose of vaccine: Tk.1.59

B.	For I.I. campaign by Health Assistant:	
1.	Personnel (4 Female Volunteers and 1 MLSS)	Tk. 1,690.00
2.	Transport for carrying vaccines	Tk. 224.00
3.	Logistics	Tk. 438.50
4.	Training	Tk. 1,488.00
		Tk. 3,840.50

Operational cost for 1st dose : Tk. 1.34
Operational cost for 2nd dose : Tk. 1.18

Operational cost for 2 doses of vaccination = Tk. 2.52

R E F E R E N C E S

1. 1985 Report of MCH Task Force. National Strategy For A Comprehensive Maternal and Child Health Programme. MOHFC. p.4

2. 1983 Rabbani, A.K.M.G. and Hossain M.S. "Current Demographic Situation in Bangladesh." p. 23. Bangladesh Bureau of Statistics. GOB.

3. 1984 Greenberg J. Maternal and Child Health in Bangladesh. UNICEF Report. May, 1984.

4. 1985 Report of MCH Task Force. National Strategy For A Comprehensive Maternal and Child Health Programme. MOHFC. p.4

5. 1983 Foster S.O. "Neonatal Tetanus." Paper presented at the Workshop on Child Survival, Bellagio, Italy, October 11-14, 1983.

6. 1984 Personal Communication with Dr. Lutfur Rahman, Project Director, EPI.

7. Brief summary of The MCH-FP Extension Project.

8. 1983 Personal communication with Dr. Tariqul Islam, UHFPO, Abhoynagar and Dr. Suzabuzzaman, DCS, Sirajgonj.

9. 1984 Huque, A.A.Z. and A. Rahman Work plan for a tetanus toxoid immunization programme in the Demonstration Union of Abhoynagar Upazila: First Draft on Procedures Manual. Feb., 1984.