

## **Programmatic Aspects of Dropouts in Child Vaccination in Bangladesh: Findings From a Prospective Study**

Md. Abdul Quaiyum, Rukhsana Gazi, Azharul I. Khan, Jasim Uddin, Meghla Islam, Faiz Ahmed and Nirod C. Saha

*Asia Pac J Public Health* 2011 23: 141 originally published online 21 June 2010

DOI: 10.1177/1010539509342119

The online version of this article can be found at:

<http://aph.sagepub.com/content/23/2/141>

---

Published by:



<http://www.sagepublications.com>

On behalf of:



[Asia-Pacific Academic Consortium for Public Health](http://www.sagepublications.com)

**Additional services and information for *Asia-Pacific Journal of Public Health* can be found at:**

**Email Alerts:** <http://aph.sagepub.com/cgi/alerts>

**Subscriptions:** <http://aph.sagepub.com/subscriptions>

**Reprints:** <http://www.sagepub.com/journalsReprints.nav>

**Permissions:** <http://www.sagepub.com/journalsPermissions.nav>

**Citations:** <http://aph.sagepub.com/content/23/2/141.refs.html>

>> [Version of Record](#) - Mar 10, 2011

[OnlineFirst Version of Record](#) - Jun 21, 2010

[What is This?](#)

---

# Programmatic Aspects of Dropouts in Child Vaccination in Bangladesh: Findings From a Prospective Study

Asia-Pacific Journal of Public Health  
23(2) 141–150  
© 2011 APJPH  
Reprints and permission: <http://www.sagepub.com/journalsPermissions.nav>  
DOI: 10.1177/1010539509342119  
<http://aph.sagepub.com>



**Md. Abdul Quaiyum, MBBS<sup>1</sup>, Rukhsana Gazi, MBBS, MSc<sup>2</sup>, Azharul I. Khan, MBBS, PhD<sup>3</sup>, Jasim Uddin, PhD<sup>2</sup>, Meghla Islam, MA<sup>2</sup>, Faiz Ahmed, MSc<sup>2</sup>, and Nirod C. Saha, MA<sup>2</sup>**

## Abstract

The present study investigated prospectively programmatic factors relating to dropouts in child vaccination in 6 subdistricts of Bangladesh. A cross-sectional survey ( $n = 2700$ ) was conducted estimating overall coverage of immunization using cluster sampling. The eligible subsample of children ( $n = 1064$ ) was followed up prospectively to understand reasons for dropouts. In-depth interviews ( $n = 73$ ) with mothers/caregivers and service providers were done and EPI (Expanded Programme on Immunization) sessions were observed ( $n = 131$ ). Irregular EPI sessions were the prime cause of dropouts particularly in low-performing subdistricts. The other programmatic factors linked with dropouts were (a) no reminder about subsequent session/doses, (b) unfriendly behavior or absence of vaccinator, (c) refusal due to lost card or vaccine exhausted, and (d) short duration of sessions. Providers highlighted constraints such as financial problems for transportation, particularly in the hard-to-reach areas and vacancies of the posts of health assistants. The barriers to completing full schedules of vaccination can be removed to a large extent through programmatic adjustments.

## Keywords

Bangladesh, child health, dropouts, Expanded Programme on Immunization (EPI), vaccination

The Expanded Programme on Immunization (EPI) has been considered as one of the successful programs in Bangladesh. A fully immunized child in Bangladesh receives the 6 standard EPI antigens through 8 vaccinations (shots). However, completion of full schedule of vaccination still remains a great programmatic challenge. According to the recent national surveys rate of

---

<sup>1</sup>From the Public Health Sciences Division (MAQ)

<sup>2</sup>Health Systems and Infectious Diseases Division (RG, JU, MI, FA, NCS)

<sup>3</sup>Clinical Sciences Division, International Centre for Diarrhoeal Disease Research Bangladesh, Mohakhali, Dhaka, Bangladesh (AIK), International Centre for Diarrhoeal Disease Research Bangladesh, Mohakhali, Dhaka, Bangladesh

## Corresponding Author:

Rukhsana Gazi, Health Systems and Economics Unit, Health Systems and Infectious Diseases Division, ICDDR,B, Mohakhali, Dhaka 1212, Bangladesh

Email: [rukhsana@icddr.org](mailto:rukhsana@icddr.org)

crude coverage for fully vaccination ranges from 82% to 89% among children 12–23 months of age.<sup>1,2</sup> Although the proportion of children who received at least BCG (bacillus Calmet-Guérin) or DPT1 (diphtheria, pertussis, and tetanus) reached 98%, measles coverage was found to be 89%.<sup>2</sup> Another study done in Dhaka district reported even higher dropouts (13%) for DPT1 to measles.<sup>3</sup> This means that almost all the parents bring their children for the first of the 3 series of DPT and OPV (oral polio vaccine), but many do not return to complete the measles vaccination, thus not attaining full protective effect, although studies have indicated that children having no measles vaccination are not only exposed to risk of measles infection but are also at higher risk of stunted, underweight, and wasted compared with the fully immunized groups.<sup>4</sup>

Literature reports “lack of information and knowledge” as the commonly cited reason by parents for never or partially vaccinating their children.<sup>5–8</sup> Why the mothers are unaware of need for subsequent dose(s) and what are the gaps in the service delivery systems that lead to this unawareness are very important questions to be explored. It is also important to know whether relevant information is conveyed in an understandable way to the mothers of children during the EPI sessions. The other commonly cited factor attributable to low or partial immunization is the fear of side effects.<sup>5,7,8</sup> It is crucial to understand why considerable proportions of mothers are convinced of completing the recommended full dosages despite the notion of side effects.

From the programmatic point of view, it is very important to understand the underlying factors why such a successfully launched EPI program in Bangladesh is yet to achieve its expected goals. The present study adopted a prospective design to investigate and validate programmatic factors relating to dropouts of child vaccination in selected rural areas of Bangladesh. Specific objectives of the study were to identify the reasons for dropouts, to explore demotivating factors for completion of vaccination, and to understand the effect of client–provider interaction on completion of immunization. It is expected that the study findings would generate information to assist the program managers in reducing programmatic barriers and improving the program performance.

## Methods and Materials

The full course of child immunizations in Bangladesh consists of 3 shots of DPT, 3 doses of OPV, 1 shot of BCG vaccine against tuberculosis, and 1 shot of measles. Per this immunization schedule, BCG should be given at birth but it is invariably given at the time of DPT1, which is started at 6 weeks of age of a child. DPT1, DPT2, and DPT3 are given 4 weeks apart along with 3 doses of OPV. Measles vaccination is given on completion of 9 months of age. Immunization services in Bangladesh are delivered by health assistants (HAs) and family welfare assistants (FWAs) appointed by the Ministry of Health and Family Welfare (MOH&FW). In the study the vaccine dropout rates, being defined as “drop rates for DPT1–DPT2; give the proportion of the children receiving DTP1 who fail to receive DPT2.” Thus, the dropout rate for DPT3 to measles gives the proportion of the children receiving DPT3, who fail to receive the measles vaccine.<sup>2</sup> Dose-specific dropout rates were estimated for DPT1 to DPT2, DPT2 to DPT3, and DPT3 to measles. The study was conducted in 6 *upazilas* (subdistricts) of Bangladesh during the period 2002–2003. One high, one moderate, and one low performing geographical areas (zones) was selected based on routine EPI coverage information and district level information from UNICEF’s Multiple Indicator Cluster Survey (MICS).<sup>9</sup> According to the MICS survey, geographical areas having  $\geq 85.1\%$  measles vaccination coverage were identified as high-performing zones whereas areas reporting up to 65% measles coverage were categorized as low-performing zones. Areas having measles coverage 65.1% to 85% were considered as moderate-performing zones. From each of the selected zones, 2 *upazilas* were then identified based on high and low performance within the zones. The *upazilas* included are Abhoynagar from Jessore and Tala

from Khulna (high performing); Bashail from Tangail and Mirsarai from Chittagong (moderate performing); and Golapgonj from Sylhet and Nokla from Sherpur (low performing).

Both quantitative and qualitative methods were applied in the study. Broadly, the study had the following components: (a) cross-sectional survey to identify eligible children for immunization, (b) Prospective follow-up of the children to understand reasons for dropouts, (c) in-depth interviews with mothers/caregivers, (d) in-depth interviews with service providers, and (e) observation on client-provider interaction at EPI sessions.

The study used cluster sampling, which is reported to be efficient for assessing immunization coverage in many country settings.<sup>10</sup> The EPI uses a simplified cluster sampling method, based on the random selection of 210 children in 30 clusters of 7 children each, to estimate immunization coverage. In the present study, HA catchment areas were taken into consideration as primary sample unit, 1 EPI spot per HA catchment area, which on an average covers a population of 1000 people. To have information covering all designated HA areas in each selected upazila, 10 to 20 children aged 12 to 23 months were randomly selected from the selected catchment areas of the HAs for the survey. Trained interviewers collected data from mothers of the selected children at their homes using a pretested structured questionnaire. Mothers of 2700 children were targeted for the cross-sectional component.

The prospective follow-up enabled us in validating/cross-checking the findings from cross-sectional part. A subsample of 0- to 4-week-old children were enlisted and then followed for BCG and the 3 doses of DPT and polio per schedule. For prospective component, a total of 1064 infant aged 0 to 4 weeks were enrolled for follow-up for BCG and 3 doses of DPT and polio up to post 1 week of scheduled date for immunization. In the process, the same client was followed prospectively at home to identify the true cause of noncompletion of the vaccination schedule/dropout. For following up measles vaccination, the researchers would have had to wait until 9 to 12 months, which was not possible due to time and resources constraints. To minimize the problem, a subsample of children having already completed BCG, 3 doses of polio and DPT, and eligible for measles were followed up. Thus, another cohort of 617 infants having completed BCG and all 3 doses of DPT and polio but waiting for measles dose were followed up till they reached the age of 12 months.

A total of 79 interviews with the mothers of fully immunized children and 80 with dropout cases were done. In-depth interview of providers at different tiers of the health delivery systems in relation to EPI in particular was also conducted. A total of 73 HAs, 21 FWAs, 25 assistant health inspectors (AHIs), 10 health inspectors (HIs) and 7 family planning inspectors (FPIs) were interviewed by trained field research assistants. The research investigators themselves conducted in-depth interview of a total of 4 *Thana* managers at the upazila level and the Programme Manager and Deputy Programme Manager of EPI at the EPI headquarter in Dhaka. EPI sessions were observed (131) and client-provider interaction was observed during EPI sessions through guidelines and checklists. Quantitative data were entered using EPI Info and analyzed using the SPSS computer package. Qualitative data were tape recorded, transcribed, and coded. Different themes and subthemes were identified, coded, and content analysis was done manually.

## Results

### *EPI Coverage and Dropout Rates by Study Areas*

Crude EPI coverage estimated from the cross-sectional component is shown in Table 1. The highest performing upazila was Abhoynagar of Jessore with 89% fully immunized children followed by Mirsarai of Chittagong. The lowest performing upazila was Golapgonj of Sylhet with

**Table 1.** Immunization Coverage and Dropouts by Study Areas (Results From Cross-Sectional Component)

| Category                     | Percentage              |                   |                       |                      |                    |                        |
|------------------------------|-------------------------|-------------------|-----------------------|----------------------|--------------------|------------------------|
|                              | Abhoynagar<br>(n = 361) | Tala<br>(n = 598) | Mirsarai<br>(n = 449) | Bashail<br>(n = 252) | Nokla<br>(n = 471) | Golapganj<br>(n = 481) |
| Fully immunized              | 88.6                    | 78.1              | 82.2                  | 71.0                 | 48.8               | 46.6                   |
| Overall dropout <sup>a</sup> | 10.8                    | 20.6              | 14.3                  | 27.4                 | 42.7               | 36.8                   |
| Never immunized              | 0.6                     | 1.3               | 3.6                   | 1.6                  | 8.5                | 16.6                   |
| Dose-specific dropout rates  |                         |                   |                       |                      |                    |                        |
| DPI to DPT2                  | 2.0                     | 2.7               | 1.1                   | 3.0                  | 6.8                | 8.0                    |
| DPT2 to DPT3                 | 1.3                     | 4.2               | 3.7                   | 8.5                  | 8.4                | 10.5                   |
| DPT3 to measles              | 5.8                     | 14.6              | 9.3                   | 14.7                 | 22.1               | 18.2                   |
| BCG to measles               | 7.9                     | 20.4              | 11.6                  | 21.2                 | 31.5               | 31.2                   |

<sup>a</sup>Overall dropout estimated as children started BCG/DPT1 but missed any of the subsequent vaccination.

**Table 2.** Immunization Coverage by Study Areas (Results From Prospective Follow-up)

| Category  | Abhoynagar | Tala | Mirsarai | Bashail | Nokla | Golapganj |
|---|------------|------|----------|---------|-------|-----------|
| 0-4 weeks' children followed-up for BCG and 3 doses of DPT and polio          |            |      |          |         |       |           |
| Number (n)  | 139        | 209  | 278      | 105     | 213   | 120       |
| Completed (%)   | 53.2       | 48.2 | 65.9     | 21.5    | 28.1  | 1.8       |
| Not completed (%)   | 45.9       | 46.1 | 31.7     | 76.0    | 59.6  | 23.9      |
| No vaccination (%)  | 0.9        | 5.7  | 2.4      | 2.5     | 12.3  | 74.3      |
| Not followed-up <sup>a</sup> (n)  | 30         | 16   | 32       | 26      | 42    | 7         |
| Children completed BCG, 3 doses of DPT and Polio followed up for measles dose |            |      |          |         |       |           |
| Number (n)  | 87         | 136  | 183      | 51      | 62    | 98        |
| Completed (%)   | 81.6       | 82.4 | 87.4     | 68.6    | 75.8  | 13.3      |
| Not completed (%)   | 16.1       | 14.7 | 0.1      | 3.9     | 24.2  | 67.3      |
| Not followed-up <sup>a</sup> (n)  | 2          | 4    | 9        | 14      | —     | 19        |

<sup>a</sup>Numbers showing children who were not followed up.

47% fully immunized closely followed by Nokla of Sherpur with 49% complete coverage. Overall dropouts ranged from 43% in Nokla to 11% in Abhoynagar. Dropouts for DPT1 to DPT2 and DPT2 to DPT3 were highest in Golapganj among all other study areas. However, dropouts for DPT3 to Measles was highest in Nokla (22%) followed by Golapganj (18%) (Table 1).

Table 2 shows the coverage among prospectively followed up infants for 3 doses of DPT, polio, and measles. Considerable proportion of infants did not complete all 3 dosages of DPT and polio per schedule date in all the upazilas except Mirsarai. In the low-performing areas of Bashail and Nokla, noncompletion of vaccination was 4-fold to 2-fold higher compared with groups that completed vaccination.

### Reasons for Dropouts

Table 3 shows the reasons for dropouts among prospectively followed children. No idea about schedule of session and nonholding of session according to schedules were commonly cited reasons for dropouts. The other reasons were no idea about doses, vaccinator did not inform about subsequent doses, refusal by HA due to lost card or vaccine exhausted. These were more

**Table 3.** Reasons for Dropout by Upazila (Prospective Component)

| Reasons                       | Percentage             |                   |                      |                     |                    |                        | Total<br>(n = 519) |
|-------------------------------|------------------------|-------------------|----------------------|---------------------|--------------------|------------------------|--------------------|
|                               | Abhoynagar<br>(n = 39) | Tala<br>(n = 123) | Mirsarai<br>(n = 64) | Bashail<br>(n = 64) | Nokla<br>(n = 201) | Golapgonj<br>(n = 177) |                    |
| <b>Programmatic</b>           |                        |                   |                      |                     |                    |                        |                    |
| No idea about session         | 17.4                   | 22.0              | 28.6                 | 22.6                | 8.8                | 20.3                   | 17.5               |
| Session not held              | 4.3                    | 2.0               | 4.8                  | 4.8                 | 23.5               | 10.5                   | 12.5               |
| No idea about doses           | —                      | 6.0               | —                    | 4.8                 | 3.5                | 19.8                   | 8.9                |
| Refused/no vaccine available  | —                      | 2.0               | 2.4                  | 3.2                 | 8.2                | 7.6                    | 6.0                |
| Vaccinator did not inform     | 8.7                    | 12.0              | —                    | 3.2                 | 7.6                | 2.3                    | 5.2                |
| HA said vaccination completed | —                      | —                 | —                    | —                   | 4.7                | 3.5                    | 2.7                |
| <b>Nonprogrammatic</b>        |                        |                   |                      |                     |                    |                        |                    |
| Fear of side effect           | 34.8                   | 10.0              | 11.9                 | 29.0                | 13.5               | 12.8                   | 15.6               |
| Went away/no time             | 17.4                   | 32.0              | 23.8                 | 17.7                | 7.1                | 13.4                   | 14.6               |
| Negligence of mother          | 13.0                   | 4.0               | 11.9                 | 9.7                 | 16.5               | 1.7                    | 9.1                |
| EPI center not known          | —                      | —                 | —                    | —                   | 1.2                | 0.6                    | 0.6                |
| Other                         | 4.3                    | 10.0              | 16.7                 | 4.8                 | 5.3                | 7.6                    | 7.3                |

Abbreviations: HA, health assistant; EPI, Expanded Programme on Immunization.

marked in the low-performing upazilas, namely Nokla and Golapgonj. Reasons such as “fear of side effect” or “experiencing side effect” were also reported to be responsible for some dropouts (Table 3). Cross-sectional component of the study reported following reasons for measles dropouts; stayed outside study areas (7% to 26%), fear of side effect (11% to 30%), child was sick (8% to 22%), not holding the session (1.3% to 10%), and do not know about the EPI center (1.3%; data not shown).

### *Perspectives of the Mothers/Caregivers (Result From In-depth Interviews)*

Mothers/caregivers cited few specific reasons during in-depth interviews for not completing full vaccination. The reported reasons are ranked according to number of citations made by the participants.

**Irregular session.** An irregularity in holding the sessions was most frequently reported. Many mothers returned having no vaccination for their children as they found that the sessions were not held or it was closed before due time.

**Ambiguity on age limit for vaccination and full dosages.** Mothers had wide range of misconceptions on age limit for initiation and completion of vaccination. There are also wrong notion regarding how many doses actually constitute full coverage. Many clients felt that 3 doses constitute full coverage.

**Misconception on ineligibility due to sickness of children.** In some instances, the child was not taken for next schedule because the child was sick or looked thin. Mothers were confused what to do if a child gets sick on the due dates of vaccine as they were not given proper guidance by the provider. In few cases, the provider discouraged mothers to obtain vaccination for children because of their perceived low weights.

**Providers' unfriendly behavior.** Some of the mothers reported about unfriendly behavior of the vaccine provider. There are examples when mothers reached the EPI spot a little late or lost the card, and thus refused to get services.

**Table 4.** EPI (Expanded Programme on Immunization) Session Scheduled and Session Held

| Area       | EPI Session Scheduled | Session Held |
|------------|-----------------------|--------------|
| Abhoynagar | 24                    | 23           |
| Tala       | 33                    | 33           |
| Mirsarai   | 48                    | 48           |
| Bashail    | 18                    | 18           |
| Nokla      | 27                    | 13           |
| Golapgonj  | 36                    | 15           |

**Table 5.** Summary Findings From Client–Provider Interaction Observation

| Activities Performed <sup>a</sup>         | Abhoynagar | Tala      | Mirsarai  | Bashail   | Nokla     | Golapgonj |
|---|------------|-----------|-----------|-----------|-----------|-----------|
| Enquired age of child                     | 54.0       | 26.8      | 90.2      | 93.8      | 96.6      | 90.2      |
| Enquired previous doses                   | 15.8       | 23.2      | 17.4      | 54.2      | 36.0      | 34.6      |
| Enquired previous side effects            | 4.5        | 3.6       | 2.2       | —         | —         | 4.5       |
| Discussed about possible side effects     | 36.7       | 23.2      | 25.5      | 23.1      | 9.2       | 22.9      |
| Discussed benefits                        | 17.1       | 20.0      | 3.3       | 6.2       | 2.3       | 3.5       |
| Discussed harms of incomplete vaccination | 4.6        | 4.6       | 1.6       | —         | —         | 3.8       |
| Informed about number of visits           | 12.6       | 10.0      | 4.0       | 6.7       | 5.3       | 14.3      |
| Informed next visit date                  | 38.4       | 35.1      | 64.9      | 51.8      | 36.4      | 43.2      |
| Recorded in EPI cards                     | 93.8       | 88.8      | 89.7      | 98.5      | 90.9      | 85.7      |
| Motivated people for immunization         | 23.8       | 2.6       | 44.6      | —         | 3.4       | —         |
| Recorded in EPI register                  | 98.3       | 93.9      | 98.9      | 95.4      | 96.6      | 90.4      |
| Find out the absentees from register      | 16.7       | 36.5      | 31.4      | 17.1      | 55.8      | 11.1      |
| Mean duration of session in hours ± SD    | 3.2 ± 0.7  | 3.8 ± 1.1 | 2.7 ± 0.6 | 3.2 ± 0.7 | 3.6 ± 0.9 | 2.7 ± 0.8 |

Abbreviations: EPI, Expanded Programme on Immunization; SD, standard deviation.

<sup>a</sup>Multiple activities considered.

### Findings From Observations on EPI Sessions

In this study, out of 181 scheduled EPI sessions in the study areas 150 EPI sessions were held during the month of observation. In Nokla and Golapgonj, more than half of the sessions were not held according to the scheduled date (Table 4).

### Providers' Dealings With the Clients

Behavior of the provider during the process of administering the vaccine does not appear to be client friendly in some instances. In several places (e.g., Bashail, Nokla, Golapgonj) the provider did not exchange pleasantries, did not make any attempt to explain side effects, got irritated if the mothers wanted to discuss any problem and did not help the client if they lost or forgotten to bring the EPI cards (Table 5). In almost all the spots, the providers did not initiate any discussion unless the clients asked them anything. Most mothers were not informed about the next doses and no information was given on the benefits and possible side effects of vaccination. In low-performing areas, mothers were not satisfied with the services they received. For instance, in a session at Nokla, one mother expressed, “when you (she meant HA) vaccinate in your center

child becomes sick but when they are vaccinated from hospital (upazila health complex) they do not become sick.” Providers were found to be very attentive in the documentation of information whereas they lacked seriousness in interactions with clients. Also missing were some key factors related to maintenance of the sterilization chain, for instance, keeping of forceps in the bag and using it every time in a near-rusted state. As seen, mean duration of sessions held was around half or less than half of normal schedule in all the upazilas, which resulted in mothers missing sessions coming in the afternoon or after early closure.

### *Irregularities in EPI Sessions*

In some places (e.g., Nokla and Golapgonj) session was not held regularly and on time. It has been observed that mothers had to wait for a long time before they could vaccinate their children. In Nokla, some mothers completed the vaccination of their children from adjacent areas especially from the upazila health complex because EPI outreach sessions were not held. From our observations, we discern that sessions were cancelled for the following reasons: (a) vaccinator was absent without any notice, (b) porter did not arrive with vaccines, (c) porter arrived with vaccines on time but the vaccinator was absent, (d) HA lives in the city so he could not come because of general strike (*hartal*), (e) session was not held because of election or holidays, and (f) session was not held because targeted children did not come for vaccination.

### *Managers' and Supervisors' Perspectives*

*Reported constraints for effective supervision.* As part of the study, in-depth interview of the managers and supervisors of all the upazilas were conducted. The managers and supervisors admitted about lack of proper and adequate supervision. While asking about reasons for this they mainly complained of inadequate logistics for supervision such as transport. Although there is provision of reimbursement for transport cost for this, most of the managers and supervisors expressed this procedure as too cumbersome and did not ever benefit from any incentives resulting in their reluctance for supervisory visits. MO-MCH has multiple job responsibilities leaving them with insufficient time for effective supervision of all field-level activities including, EPI.

*Missing sessions linked with financial constraints and vacancies.* Local managers expressed dissatisfaction regarding financial provision at their discretion to use even a minimum fund for organizing and ensuring regular holding of EPI sessions. The daily wage of a porter has remain unchanged over years and is often far less than required by them to reach the site of EPI session particularly during natural calamities, such as flood and inclement weather conditions. Vacancies for HAs remain ignored for long, which has been reported as an important barrier for the arrangement and regular holding of EPI sessions. Our research team also documented such vacancies.

*Expressed needs for hard-to-reach areas.* The providers and managers highlighted about involvement of high transportation costs to provide services in the hard-to-reach areas. As reported by them, some of the areas were so remote that providers could not make day trips for service provision. In some hilly areas, there were pockets of inhabitants who were reluctant to come to scheduled site of EPI sessions, and in turn expect that the providers would visit their households providing vaccines.

## **Discussion**

The study findings indicated that programmatic factors such as nonholding or irregular holding of EPI sessions were linked with dropouts, particularly in the low-performing upazilas. The study has indentified that only half the scheduled sessions were held in the low-performing areas



during observation period. The managers and supervisors linked missing sessions with several factors, such as financial constraints particularly for transportation of porters, vacancies for posts of HA, and communication problems in hard-to-reach areas. Moreover, in many places the duration of EPI sessions was very short, thus mothers returned home without their children being vaccinated. In the low-performing upazilas, nonholding of scheduled outreach sessions forced the mothers to go to the upazila health complex as a compensatory site for missed sessions and the health complex was truly far away from their homes, although studies have already highlighted that distance to a health facility has a very important role in immunization coverage.<sup>11</sup> Community involvement in monitoring EPI program performance may be one of the appropriate means to improving the situation. A study on stakeholders' participation in health and population sector program of Bangladesh reported that monitoring of the activities of local health centers by the community resulted in regular attendance and a longer period of stay of service providers, serving patients with respect and elimination of the practice of charging money from clients.<sup>12</sup>

It was found through observation of EPI sessions that there were lack of seriousness in dialogue between client and providers that might have contributed in ambiguity and misconception among mothers about timing of dosages, completion of vaccination, and eligibility of children for vaccination. This can be considered as a programmatic lapse, because task of the program should not be limited only to provide vaccination but should also include education and encouragement to mothers so that they complete all the doses for their children. The messages of full immunization should be communicated to the clients in a way understandable in their local language and norms. One study done in Bangladesh reported that educating mothers about the vaccines and vaccine-preventable diseases may be highly effective in increasing the immunization coverage even in the presence of maternal illiteracy.<sup>13</sup>

The reported reasons for dropouts varied between cross-sectional and prospective components of the study. These reasons also varied between caregivers and service providers. The national survey found the following reasons for dropouts in rural areas: "child was sick" (16%), "parents/caregivers were too busy to take the child for vaccination" (13%) "parents/caregivers did not know when to go for measles dose" (12%), "health worker didn't give due attention to illness of child" (6%), "vaccine site was too far" (4%), "thought vaccinator would come at home" (4%).<sup>2</sup> The present study found that some of the respondents did not give subsequent vaccine to their children due to complications of vaccines and fear of side effects. This has also been reported by other studies.<sup>14,15</sup> This problem has very important programmatic perspectives. EPI session observation found that mothers are not properly informed during each contact about the possible side effects of vaccination and they are not assured that these side effects are minor. However, the program should be equipped to deal with complications. Ambiguity on the issues of whether a child can be vaccinated during sickness or having under weights should be addressed properly through interactions between providers and parents. The reasons for dropouts varied.

The providers and managers highlighted some practical constraints to provide services in the hard-to-reach areas. Chowdhury et al<sup>16</sup> also pointed out that children of hard-to-reach areas have lower EPI coverage. One study done on child immunization in hard to reach area of rural Bangladesh proposed some alternative strategies to address specific needs of the areas.<sup>17</sup> It is crucial to conduct effectiveness studies targeted toward meeting special needs of hard-to-reach areas through alternative strategies to achieve desired level of success in those areas.

The present study found considerable proportion of dropouts in DPT3 to measles vaccination particularly in the cross-sectional components, probably because of the wide time gap between the 2 schedules. Our study limitation is that it could not follow up children from DPT1 till measles vaccination. Rather it followed up children who completed DPT3 and who were eligible for measles. However, previous studies done in Bangladesh reported that 13% to 14% of all measles-related deaths occurred before 9 months of age.<sup>18,19</sup> This calls for investigations and reviews

of appropriateness of current measles immunization strategies with vaccination at 9 months in the Bangladeshi community.

The study cross-checked the quantitative survey results with the qualitative information and tried to capture providers' perspectives to explore programmatic factors linked with dropouts in the study areas. The lapses in the EPI program of Bangladesh were generally recognized by most the program managers who participated in the study. This study has identified some important programmatic factors that can be taken into account by the program managers for future adjustments in the program implementation. Based on the major findings of the study we would like to put forward the following recommendations for reduction of dropout rates:

*Regular sessions:* Regular holding of sessions should be ensured through continuous supervision and monitoring by the higher level officials. It should be ensured that sessions are open and functioning for full duration. Local support groups involving community people may be formed to monitor regular functioning of EPI sessions.

*Motivation of service providers:* The service providers should receive regular refresher training sessions that should give particular emphasis on issues such as eligibility of children for vaccination and importance of counseling to the caregivers for completion of full doses of EPI and reminder to caregivers about the timing of next dose. The service providers should receive rewards (not necessarily in cash) for good performance.

*Services to hard to reach areas:* Alternative strategies may be adopted to address the special needs of hard-to-reach areas. Financial constraints to meet high transportation costs for serving hard-to-reach areas can be solved by mobilizing local funds.

## Acknowledgments

This research study was funded by the International Centre for Diarrhoeal Disease Research Bangladesh (ICDDR,B) and United States Agency for International Development (USAID) under the Cooperative Agreement No. 388-A-00-97-00032-00. ICDDR,B acknowledges with gratitude the commitment of USAID to the Center's research efforts. ICDDR,B also gratefully acknowledges the following donors which provide unrestricted support to the Center's research efforts: Australian Agency for International Development (AusAID), Government of the People's Republic of Bangladesh, Canadian International Development Agency (CIDA), Embassy of the Kingdom of the Netherlands (EKN), Swedish International Development Cooperation Agency (SIDA), Swiss Agency for Development and Cooperation (SDC), and Department for International Development, UK (DFID).

## References

1. National Institute of Population Research and Training (NIPORT), Mitra and Associates, MEASURE DHS, Macro International. *Bangladesh Demographic and Health Survey 2007*. Dhaka, Bangladesh: NIPORT; 2007.
2. Expanded Program on Immunization, Directorate General of Health Services, Ministry of Health and Family Welfare 2005. *Bangladesh EPI Coverage Evaluation Survey, 2007*. Ministry of Health and Family Welfare: Dhaka, Bangladesh; 2007.
3. Khan MN, Rahman ML, Miah AA, Islam MS, Musa SA, Tofail F. Vaccination coverage survey in Dhaka District. *Bangladesh Med Res Counc Bull*. 2005;31(2):46-53.
4. Chowdhury F, Khan AI, Hossain MI, et al. Young children non-immunized against measles: characteristics and programmatic implications. *Acta Paediatr*. 2006;95:44-49.
5. Laston SL, Baqui AH, Paljor N, Silimperi DR. *Immunization Beliefs and Coverage in Dhaka Urban Slums*. Urban FP/MCH Working Paper No. 5. Dhaka, Bangladesh: ICDDR,B; 1993.
6. Atkinson SJ, Cheyne J. Immunization in urban areas: issues and strategies. *Bull World Health Organ*. 1994;72:183-194.

7. Chowdhury AMR, Aziz KMA, Bhuiya A, eds. The "Near Miracle" Revisited: Social Science Perspectives of the Immunization Programme in Bangladesh. Amsterdam, the Netherlands: Het Spinhuis; 1999.
8. Jamil K, Bhuiya A, Streatfield K, Chakraborty N. The immunization program in Bangladesh: impressive gains in coverage, but gaps remain. *Health Policy Plan.* 1999;14:49-58.
9. UNICEF. *Progotir Pathey.* Dhaka, Bangladesh: UNICEF; 1998.
10. Henderson RH, Sundaresan T. Cluster sampling to assess immunization coverage: a review of experience with a simplified sampling method. *Bull World Health Organ.* 1982;60:253-260.
11. Bhuiya A, Bhuiya I, Chowdhury AMR. Factors affecting acceptance of immunization among children in rural Bangladesh. *Health Policy Plan.* 1995;10:304-311.
12. Uddin J, Ashraf A, Sirajuddin AKM, Alam M, Tunon C. Incorporation of Community's Voice Into Health and Population Sector Programme of Bangladesh for Its Transparency and Accountability. ICDDR,B Working Paper No. 148. Dhaka, Bangladesh: ICDDR,B; 2001.
13. Rahman M, Islam MA, Mahalanabis D. Mothers' knowledge about vaccine preventable diseases and immunization coverage in a population of high rate of illiteracy. *J Trop Pediatr.* 1995;41:376-378.
14. Streatfield K, Singarimbun, M. Social factors affecting the use of immunization in Indonesia. *Soc Sci Med.* 1988;27:1237-1244.
15. de Silva R, Herm H. Bangladesh national immunization cluster survey: In: Huq M, ed. *Near Miracle in Bangladesh.* Dhaka, Bangladesh: University Press; 1991:85-96.
16. Chowdhury AM, Bhuiya A, Mahmud S, Abdus Salam AK, Karim F. Immunization divide: who do get vaccinated in Bangladesh? *J Health Popul Nutr.* 2003;21:193-204.
17. Uddin MJ, Larson CP, Oliveras E, et al. Coverage of Child Immunization in Rural Hard-to-Reach Haor Areas of Bangladesh: Acceptability of Alternative Strategy. ICDDR,B Working Paper No. 168. Dhaka, Bangladesh: ICDDR,B; 2008.
18. De Francisco A, Fauveau V, Sarder AM, Chowdhury HR, Chakraborty J, Yunus MD. Measles in rural Bangladesh: issues of validation and age distribution. *Int J Epidemiol.* 1994;23:393-399.
19. Fauveau V, Chakraborty J, Sarder AM, Khan MA, Koenig MA. Measles among under 9 month olds in rural Bangladesh: its significance for age at immunization. *Bull World Health Organ.* 1991;69:67-72.