



IOCH
Immunization and Other Child Health Project

Vaccination Coverage Survey
By Unicef & IOCH

Debidwar Upazila

Survey Report No. 03

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Table of Contents

	Page No.
List of Tables and List of Charts	3
Acronyms	4
Terminology	5
Executive Summary	6
Introduction	9
Objectives	10
Methodology and its Limitations	10
Results	
General information	13
Routine immunization coverage levels of children	13
Routine TT immunization coverage levels of women	16
Coverage levels in the sixth NID campaign	18
Coverage levels in the MNT campaign conducted in September 1999	20
Discussions	23
Conclusions and Recommendations	24
Reference and Resource Materials	26
Annexures	
Annex A: EPI Cluster Survey design (extracts from an article written by Anthony G Turner, Robert J Magnani and Muhammed Shuaib)	27
Annex B: Illustration of when children surveyed first became eligible for different vaccines	28
Annex C: List of selected clusters	29
Acknowledgements	30

List of Tables

Table 1: Routine Immunization coverage levels of the children

Table 2: Reasons for non-immunization and partial immunization of the children

Table 3: Reasons for non-immunization and partial immunization for TT of the women

Table 4: Reasons for not having TT vaccine during the MNT campaign

List of Charts

Chart 1: Immunization coverage among children less than 12 months old

Chart 2: Drop out rates for childhood immunization

Chart 3: Invalid doses of immunization provided to the children

Chart 4: Routine immunization coverage levels for TT of the women (15-49 years)

Chart 5: Drop out rates for TT immunization

Chart 6: Coverage of OPV and Vitamin A during the sixth NID campaign

Chart 7: Reasons for non-immunization during the sixth NIDs

Chart 8: Reasons for not receiving Vitamin A capsule during the second round of sixth NIDs

Chart 9: Places of vaccination during the sixth NIDs

Chart 10: Sources of information about the sixth NID campaign

Chart 11: Coverage levels achieved during the MNT campaign

Chart 12: Reasons for not receiving OPV during the MNT campaign

Chart 13: Reasons for not receiving measles vaccine during the MNT campaign

Chart 14: Sources of information about the MNT campaign

Acronyms

BCC	Behavior Change Communication
BCG	Bacillus of Calmette and Guerin
CES	Coverage Evaluation Survey
COSAS	Coverage Survey Analysis System
DPT	Diphtheria, Pertussis and Tetanus
EPI	Expanded Program on Immunization
IOCH	Immunization and Other Child Health
MNT	Measles, OPV and TT (multi antigen) campaign
Mouza	Smallest administrative locality in an Upazila
MSH	Management Sciences for Health
NGO	Non Governmental Organization
NID	National Immunization Day
OPV	Oral Polio Vaccine
TT	Tetanus Toxoid
Upazila	Sub district (previously known as Thana)
UNICEF	United Nations Children's Fund
WHO	World Health Organization

Terminology

This provides the meaning of some of the more technical terms used in this report and a brief explanation of their use.

By card: An immunization given to a child is termed as by card if the date of the dose is entered on an immunization card. Only doses recorded by card are treated as valid data in this survey.

By history: Immunization history collected from a parent's recall is termed as by history. Often no date will be mentioned. This information is only included in crude data.

Crude coverage rate is calculated from the doses recorded by card and/or by history. It is not ascertained whether the doses were given at the correct age and/or following the correct interval (where applicable). Crude data however, helps us to understand how much additional coverage could be achieved if all vaccines were given at the optimum age for the child and following the optimum interval. It also provides useful information on access to the EPI program and on the operational aspects of the provision of health services.

Valid coverage rate is calculated from the vaccinations recorded by card. Valid data includes only the doses of vaccines that were given after the minimum date of eligibility and/or after the minimum interval necessary to be effective and to protect the child. There is no maximum interval for a dose and therefore a dose administered after 52 weeks is still regarded as valid. By comparing crude coverage with valid coverage data of any particular antigen, one can determine how much coverage was lost due to the inability to give vaccine at the appropriate time.

Invalid doses are those administered at the wrong age and/or at the wrong interval. Doses administered before the minimum age in the case of DPT/Polio 1st doses and Measles vaccine or with less than four weeks interval in the case of DPT or Polio vaccines are classified as "invalid" doses.

The **criteria for a valid dose** used in this survey is the criteria recognized by the Bangladesh EPI program: minimum age for DPT/Polio 1st dose - 6 weeks old; minimum DPT/Polio interval - 4 weeks; minimum age for Measles vaccine - 38 weeks old.

Program access is measured by the percentage of children surveyed who received DPT 1st dose (crude data – by card and history) in the routine immunization session.

Fully immunized means the child has received all the doses it requires (BCG, OPV 1-3, DPT 1-3 and measles).

Missed Opportunity refers to a visit of a child to a vaccination center for a dose that he received. However at that time he was also eligible for another dose of antigen that he did not receive. If the missed dose was provided at a later date, it is a *corrected missed opportunity*. If not, it is an *uncorrected missed opportunity*.

Executive Summary

Background

Government of Bangladesh conducted a multi-antigen campaign (here in this report will be termed as MNT campaign) in September 1999 (12th to 21st September) in high risk areas for vaccine preventable diseases. This campaign was conducted in Debidwar Upazila. Between February 10–22, 2000 a coverage evaluation survey was conducted by UNICEF through MRC MODE limited (an independent agency) in Debidwar Upazila, to assess vaccination coverage of the children and women achieved through the campaign. Additional information on routine immunization and NID campaign were also collected to understand the operational profile of the provision of immunization services in this area.

Objectives

The principal objectives of the survey were to assess:

- a) the levels of routine immunization coverage of children (12 – 23 months);
- b) the levels of TT immunization coverage in women of child bearing age (15-49 years) regardless of their marital status
- c) the OPV and Vitamin A coverage levels achieved during the sixth NID campaign conducted in Nov-Dec 1999 among children (0-59 months) and
- d) the OPV, measles and TT vaccination coverage achieved during the September 1999 multi antigen (MNT) campaign.

Coverage Levels for the Routine Immunization of Children

Access: 94% of the children received at least one dose of antigen (DPT 1st dose in this case) from routine immunization sessions based on crude data (card plus history). However, 5% of the children did not receive any immunization.

Crude coverage between 12-23 months: 95% children received BCG, 78% received three doses of OPV, 78% received three doses of DPT and 73% received measles vaccine.

Valid coverage between 12-23 months: 95% children received BCG, 61% received three doses of OPV, 61% received three doses of DPT and 60% received measles vaccine.

Valid coverage by 12 months: 94% children received BCG, 57% received three doses of OPV, 57% received three doses of DPT and 48% received measles vaccine.

Source of immunization: Childhood immunization is provided by EPI outreach centers in 86% of the cases. EPI vaccination center is within half-an-hour walking distance from client's residence in 98% of the cases.

Reasons for non-immunization and partial immunization of children: The main reasons for non-immunization and partial immunization were the lack of knowledge of the parents/caretakers about the importance of immunization and in particular the need to return for the subsequent doses. Some parents had fear of side reactions.

Problems detected: although access to immunization was fairly high, there was very high drop out rate (18% from DPT1 to DPT3 and 22% from DPT1 to Measles vaccine) and a number of invalid doses due to early immunization (6% for DPT1 and 19% for Measles vaccine). Uncorrected missed missed opportunities occurred rarely. Child immunization cards were available in only 24% of the cases and were lost in another 28% of cases.

Coverage Levels for the Routine TT Immunization of women

82% of women of childbearing age (15-49 years) had received a first dose of TT. Only 29% women had received the five doses of TT vaccine. 18% of the women had not received any immunization.

Reasons for non-immunization and partial immunization of women: The major reason cited for non-immunization was that the women were unaware of the need for immunization and fear of side reactions. Whereas the major reasons for partial immunization were that they were either unaware of the need for immunization or the health worker did not specified the date to return for the next dose of TT vaccine.

Coverage Levels for the sixth NID Campaign

In Debidwar Upazila the NID coverage figures were fairly good. 75% children received a dose of OPV during the first round and 78% during the second round. It still means however, that there were children who received only one dose of OPV or no OPV during the sixth NID campaign. This occurred at a time when every child under five years old should receive a dose of OPV on each round of the NID in order for Bangladesh to achieve its goal of being a “Polio free country”.

The main reasons for non-immunization during the NIDs were that the parents were not aware of the campaign and in some cases vaccine was not available. Health workers and miking were the main source of information about the campaign. Posters, radio or television did not play a significant role in the dissemination of NID information.

Vitamin A capsules were given to 81% of the eligible children on the second round of the sixth NID campaign.

Coverage levels in the September 1999 MNT campaign

83% of the children received a dose of OPV and 16% of the eligible children received measles vaccine during the MNT campaign. 59% of the eligible women received a dose of TT vaccine. Parents of most of the children and women who were not vaccinated during the campaign cited that they were either unaware of it or they do not have faith in immunization. Those who knew about the campaign knew it either from health workers or from miking. Posters, radio or television appeared to be less effective in dissemination of MNT campaign messages in this area.

Information and motivation activity

Health worker was the most important source of information for NID and MNT campaigns in Debidwar Upazila. Miking also found to be effective in dissemination of the NID/MNT campaign messages. Effectiveness of other printed/mass media as a source of information and motivation was very low.

Suggested solutions

The survey indicates a need for appropriate information being given to parents / caretakers in an effective way about the importance of each child being fully immunized (preferably before 12 months) and about how to achieve full immunization (the time and place of the immunization sessions and the number of doses required). Women of childbearing age require more education about how to prevent neonatal tetanus with 5 doses of TT vaccination. There is also a need for training to be given to the service providers to help them keep up to date with EPI policies and guidelines and increase their capacity for counseling parents about EPI.

Fear of side reactions cited by significant number of parents for non-immunization and partial immunization points towards technical and supervisory issues. These need local level review and solution. Information and motivation activities need to be well planned according to the local situation to make the campaign activities like NID/MNT to be more effective.

Introduction

Government of Bangladesh conducted a multi-antigen campaign in September 1999 (12th to 21st September) in high-risk areas. The campaign targeted women of childbearing age with TT vaccine, children between 9-35 months for measles vaccine and children between 0-59 months with oral polio vaccine. A total of 496 hard to reach and under served unions and slums in 4 city corporations and 27 large municipalities throughout the country were selected for this campaign. This campaign is termed as MNT campaign in this report. The objectives of the campaign were a) to reduce morbidity and mortality from neo-natal tetanus, b) to reduce the morbidity due to measles and c) to accelerate progress towards eradication of polio. These supplementary immunization activities were targeted to those children and women who would otherwise remain un-reached and therefore unprotected. In rural areas women were screened for eligibility of doses through updating of women's immunization register. WHO recommended 5 doses TT schedule was followed for identification of eligibility. In urban areas an extra dose of TT was recommended unless a woman was immunized within last one month of the multi-antigen campaign (MNT campaign). Measles vaccine was recommended for all children between 9-35 months of age irrespective of previous vaccination status excepting those who received it within last one month of campaign. OPV was recommended to give to all children below 5 years of age regardless of previous OPV immunization status.

The routine EPI program in the Upazilas is carried out by Government Health and Family Planning staff at fixed and outreach sites. NGOs and private practitioners also provide immunization services in many places. The doses of immunization provided are supposed to be reported to the Upazila Health and Family Planning Officer at the end of each immunization session. After compilation, the data is submitted on a monthly basis to the concerned Civil Surgeon's office that aggregates it with other district results and sends it on to the EPI HQ in Dhaka. For many reasons (e.g. immunization provided to children older than the target age group, tendency for over reporting, underestimated target etc.) routine EPI coverage data is generally unreliable^{5,7,8} and does not provide specific information for such areas as those surveyed.

To evaluate the multi-antigen campaign (MNT campaign), NID and routine EPI program WHO recommended 30 cluster sample survey was conducted by UNICEF through an independent agency called MRC-MODE Ltd. Debidwar Upazila (please see map) was taken as an unit and 30 clusters were chosen through random sampling method.

Objectives

The overall objective of the survey was to assess the level of immunization coverage in Debidwar Upazila. The specific objectives were to:

- a) assess the level of immunization coverage of the children (12-23 months) and to find out the reasons for non immunization and partial immunization
- b) assess the level of immunization coverage among women of 15-49 years of age irrespective of their marital status and to find out the reasons for non immunization and partial immunization
- c) assess the coverage levels of OPV and vitamin A administered during the sixth NID campaign and
- d) assess the coverage levels for OPV, measles and TT vaccine provided during the September 1999 multi-antigen (MNT) campaign.

Methodology and its Limitations

The survey followed the WHO recommended 30-cluster survey method¹, which has been widely used in many developing countries to assess immunization coverage. It is relatively simple and can be done at low cost. (The detailed survey methodology and its limitations are presented in **Annex A**). Briefly, the immunization information is collected on a randomly selected group of 210 children/women from 30 clusters (7 children/women per cluster) in a given community. It gives an estimate of immunization coverage to within +/- 10 percentage points of the true population proportion with 95% statistical confidence, assuming a design effect of 2.

In this survey 7 children between 12-23 months (children born between February 8, 1998 to February 7, 1999) were selected from each cluster to ascertain their routine vaccination status. **Annex B** describes how the dates of eligibility of different antigens in routine immunization were determined for children. The multi-antigen (MNT) campaign was conducted in September 1999 (12th to 21st September). The sixth NID campaign was conducted between November 2-10, 1999 and December 2-8, 1999 in two rounds respectively. Children born between November 2, 1994 and November 1, 1999 were selected for collecting information on NIDs and OPV vaccination coverage in the MNT campaign. Whereas children born between September 13, 1996 and December 12, 1998 were selected to collect information on measles coverage achieved during the MNT campaign. Seven women between 15-49 years of age, irrespective of their marital status were selected to ascertain their tetanus toxoid vaccination status both for routine immunization and MNT campaign.

The 30 clusters (villages) were chosen randomly by UNICEF in collaboration with IOCH from a list of the populations of mouzas and villages in the Bangladesh Population Census 1991. These clusters are identified in **Annex C** and their location is shown on the following map. The WHO standard questionnaire was used in this survey for documenting the routine immunization status of children and women. Separate questionnaires were used for collecting the data on the NID and MNT campaigns.

MRC-MODE Ltd, a local consulting firm with proven experience in conducting similar surveys, was hired through a competitive bidding process by UNICEF to collect the information from field. EPI Project, UNICEF and IOCH provided training and other technical assistance for the orientation of the surveyors. Data collection period was from February 10-22, 2000. There was one supervisor for a team of five data collectors. The supervisors were assigned to accompany one interviewer and to check the filled questionnaire of the rest of the interviewers every day. Field guides from local areas were selected for identification of the mouza and village.

All the checked and completed questionnaires were handed over to UNICEF and then to IOCH. Data entry and analysis was done by IOCH using COSAS 4.3³ and “EPI Info” programs. The final report was prepared by the Monitoring and Evaluation Unit, IOCH/MSH Project.

Limitations of the 30-cluster survey method

Although the 30-cluster survey method is relatively simple, it has several limitations² that can be grouped into two types:

Linked to the sampling method:

- As an inherent bias in the sampling technique in 30 clusters, bigger villages are more likely to be selected as a cluster. The survey leaves out scattered small villages with poor access to services. It also does not reflect the lack of uniformity in service availability or the behavior of particular populations.
- There is a wide confidence interval (+/- 10%). It means that if the result shows 48% of children received a valid dose of measles before 12 months of age, then the “true” figure of measles immunization of children could be anywhere between $(48-10) = 38\%$ and $(48+10) = 58\%$. This type of survey is useful when the coverage is low but is less relevant to assess higher coverage or to compare surveys – unless there is a big difference between two surveys.
- To be relevant the analysis of valid data must apply to a relatively high percentage of available cards.

Linked to the implementation:

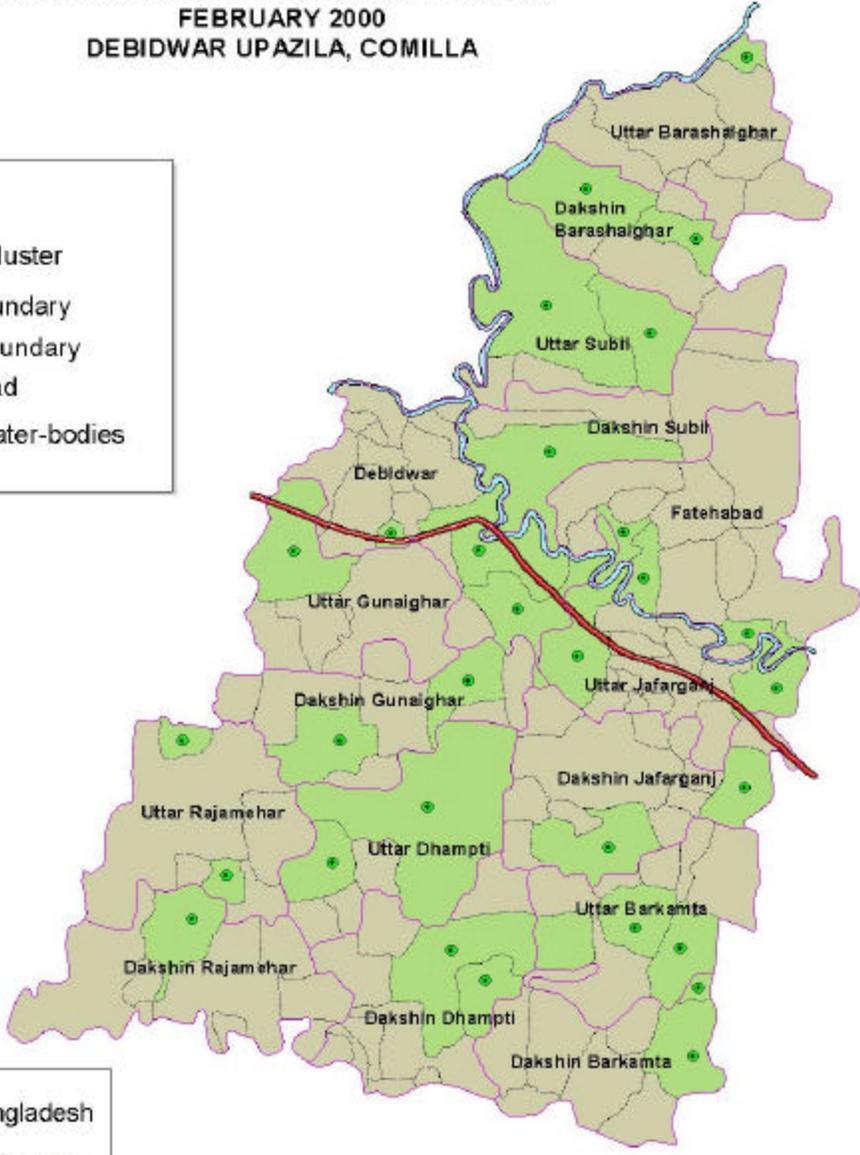
- The selection of the index house is key. Too often the proper method is not followed because the surveyors do not make the effort to number all the houses from their location to the end of the village along the direction indicated by the bottle or by the pencil.
- If a household includes an eligible child who is not at home for a few hours, the surveyor often does not return later on but skips the house and substitutes another child. This is, of course, an incorrect procedure that introduces a bias.

It is also important to remember that this survey coverage data gives little information about the current program as it documents the activities of a year earlier.

VACCINATION COVERAGE SURVEY AREAS
 FEBRUARY 2000
 DEBIDWAR UPAZILA, COMILLA

Legend

-  Sample Cluster
-  Union Boundary
-  Mauza Boundary
-  Major Road
-  River / Water-bodies



Prepared by IOCH / MSH.

Base Map: BBS, 1989.

Results

General information

210 children were surveyed. 60% of them were boys and 40% were girls. 87% of them live in a building or tin shade house. Only 10% of the infants were away of their home for more than 2 months in their first year of life. Childhood immunization is being provided by EPI outreach centers in 86%, 6% from Family Welfare Centers, 5% from Upazila Health Complex, 3% from hospitals. Survey findings show that 98% of the immunization centers are within half an hour's walking distance of the children's home and in 2% of the cases it was located more than one-hour walking distance. 210 women were surveyed. 7% of them were unmarried at the time of the survey. 86% of the women live in a building/tin shade house. 10% of the women were away for more than 2 months at one time from their normal residence within last two years. 49% of the women knew that the TT vaccine could be given to unmarried women and 57% knew that TT vaccine could be given to non-pregnant women.

A. Routine Immunization coverage of children

Coverage Levels (card plus history data of COSAS analysis)

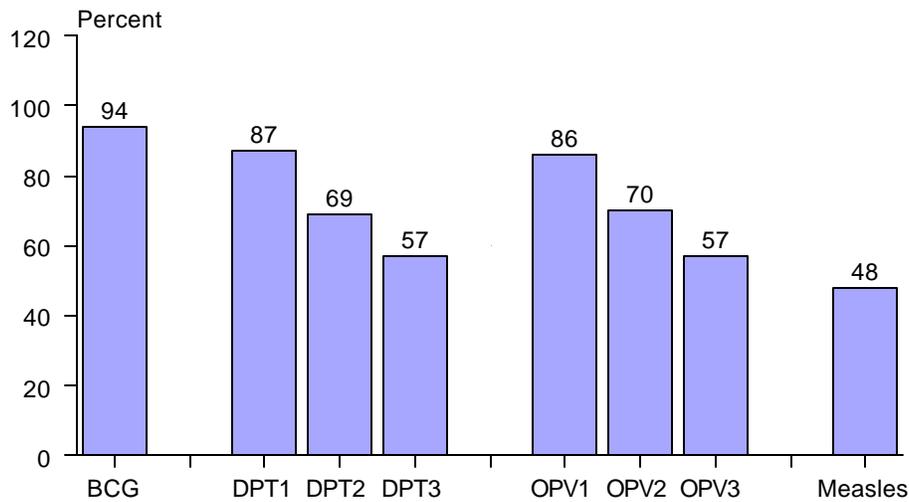
Table 1 shows the coverage levels of children between 12-23 months and their vaccination status at 12 months of age. The crude data figures for the 12-23 month age group indicate that 78% of the children received three doses of OPV, 78% received three doses of DPT and 73% were vaccinated against measles. The valid coverage levels are however considerably lower (except BCG), only 61% of children received three doses of OPV, 61% received three doses of DPT and 60% were vaccinated against measles. 5% of the children surveyed had not been immunized at all and were therefore not reached by the routine EPI program.

Table 1: Routine Immunization coverage levels of the children

	Coverage (%)		Coverage (%) Immunized by 12 months Valid data
	Crude data (Access)	Valid data	
BCG	95%	95%	94%
Polio 1	93%	88%	86%
Polio 2	89%	72%	70%
Polio 3	78%	61%	57%
DPT 1	94%	89%	87%
DPT 2	88%	71%	69%
DPT 3	78%	61%	57%
Measles	73%	60%	48%
Zero dose	5%		

Table 1 shows little difference between the valid data of immunization of the 12-23 months age group and the valid data by 12 months except for measles coverage (60% versus 48%). **Chart 1** shows the actual coverage for children of less than 12 months.

Chart 1: Immunization coverage among children less than 12 months old



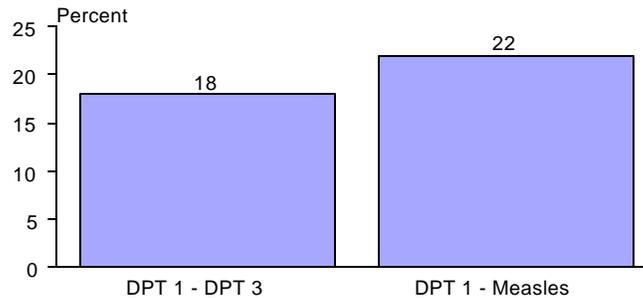
Program access [(percent of children surveyed who received DPT 1st dose (crude data - by card or history)].

Access to immunization was very good as 94% of children received a 1st dose of DPT.

Program continuity (dropout rate)

Crude data for antigens received by 12-23 months of age is used for calculating the dropout rate. In this survey, the DPT1 to DPT3 dropout rate was 18% and DPT 1 to measles drop out rate was 22% (**Chart 2**).

Chart 2: Drop out rates for childhood immunization

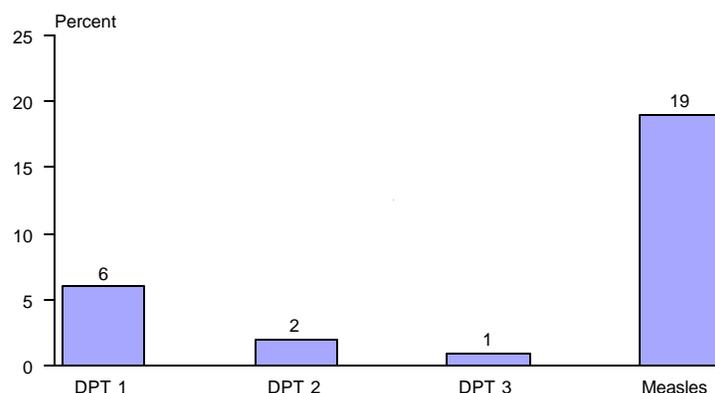


Program quality

Adherence to the immunization schedule – invalid doses

Adherence to the immunization schedule is generally considered to be the major indicator of program quality. The data indicates that the provider's performances reduced the coverage of DPT1 from an initial access of 94% measured by crude data to a coverage of 89% (valid data) for children between 12-23 months of age. A similar trend is seen for the other antigens (except for BCG). 6% of children received an invalid dose⁴ of DPT1 and 19% received an invalid dose of measles vaccine. 2% children received a DPT second dose less than 4 weeks after the first dose of DPT and another 1% children received DPT third dose less than 4 weeks after the second dose of DPT (**Chart 3**).

Chart 3: Invalid doses of immunization provided to the children



BCG vaccination

95% of the children surveyed received BCG vaccine based on card plus history data. 85% of the children were found with a BCG scar but 10% did not produce a visible scar.

Missed opportunities of immunization

The prevalence of uncorrected missed opportunities for immunization was very low (range 0% for Measles to 1% for BCG/DPT1). This is a good side of the program.

Availability of documentation of immunization

Child immunization cards were available in only 24% of the cases and were lost in another 28% cases.

Reasons for non-immunization and partial immunization of the children

Table 2 shows that parents of children cited the following reasons for non-immunization a) unaware of the need for immunization (60%); b) fear of side reactions (20%) and c) rumors (10%). Whereas the major reasons cited by parents for partial immunization were: a) unaware of need for subsequent doses (34%), b) unaware of need for immunization (26%) and c) fear of side reactions (9%).

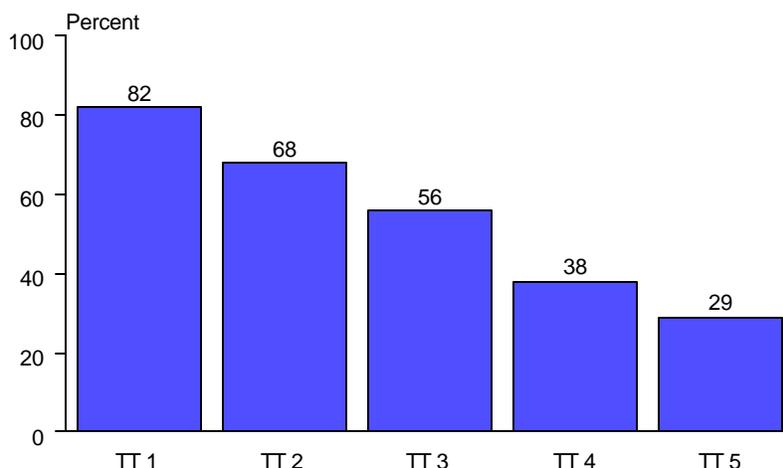
Table 2: Reasons for non-immunization and partial immunization of the children

Reasons	Not immunized	Partially immunized
Unaware of need for immunization	60%	26%
Unaware of need for subsequent dose(s)	-	34%
Place and/or time of immunization unknown	-	1%
Fear of side reactions	20%	9%
Other reason related to lack of information	10%	7%
Postponed until another time	-	7%
Rumors	10%	-
Vaccine not available	-	7%
Family problem including illness of mother	-	1%
Child ill, not brought	-	4%
Others (related to obstacles)	-	4%

B. Routine TT immunization coverage levels of the women

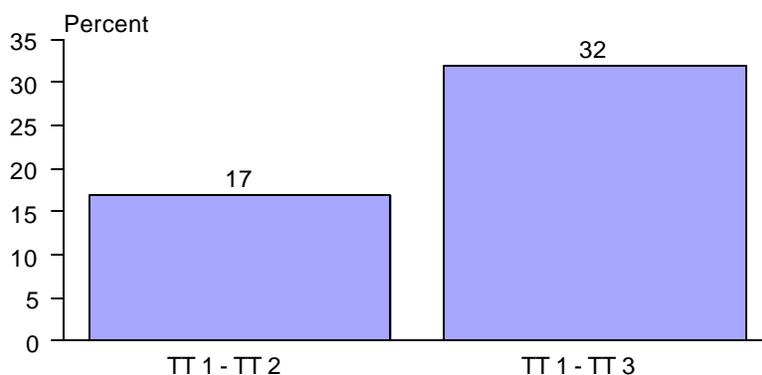
82% of the women had access to a first dose of TT vaccine (based on crude data). 68% of the women received two or more doses of TT vaccine. Only 29% had received all the 5 required doses (**Chart 4**). 18% of the women surveyed had not received any doses of TT vaccine.

Chart 4: Routine immunization coverage levels for TT of the women (15 – 49 years)



The dropout rate from first dose of TT vaccine to second dose of TT vaccine was 17% and the dropout rate from first dose of TT vaccine to third dose of TT vaccine was 32% (**Chart 5**). Survey findings indicate that no women missed an opportunity for a first dose of TT immunization during their antenatal check-ups. Only 6% of the women had TT immunization cards and they were lost in another 6% cases.

Chart 5: Drop out rates for TT immunization



Reasons for non-immunization and partial immunization of the women

Table 3 indicates that the major reasons cited for non-immunization of women were: a) unaware of the need for immunization (75%) and b) fear of side effects (11%). Whereas the major reasons cited for partial immunization were: a) health worker did not specify the date to return for the next dose (39%) and b) unaware of need for immunization (50%).

Table 3: Reasons for non-immunization and partial immunization for TT of the women

Reasons	Non immunized	Partially immunized
Unaware of need for immunization	75%	50%
Health worker did not specify the date to return for the next dose	-	39%
Place and/or time of immunization unknown	3%	2%
Fear of side reactions	11%	3%
Wrong ideas about contraindications	6%	1%
Others (lack of information)	2%	1%
Vaccine not available	-	1%
Nobody took the women to the EPI center	3%	-
Next dose is not yet due	-	2%
No response	-	1%

C. Coverage Levels in the sixth NID Campaign

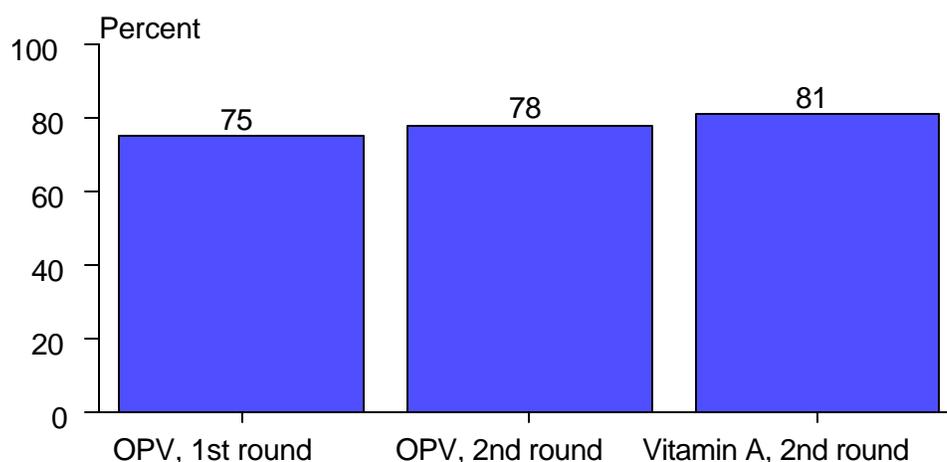
OPV Coverage

75% of children below 5 years of age received OPV during the first round and 78% during the second round of the sixth NID campaign (**Chart 6**).

High potency Vitamin A coverage

During the second round of the sixth NID campaign a high potency vitamin A capsule was also administered to 81% of the children between one and five years of age (**Chart 6**).

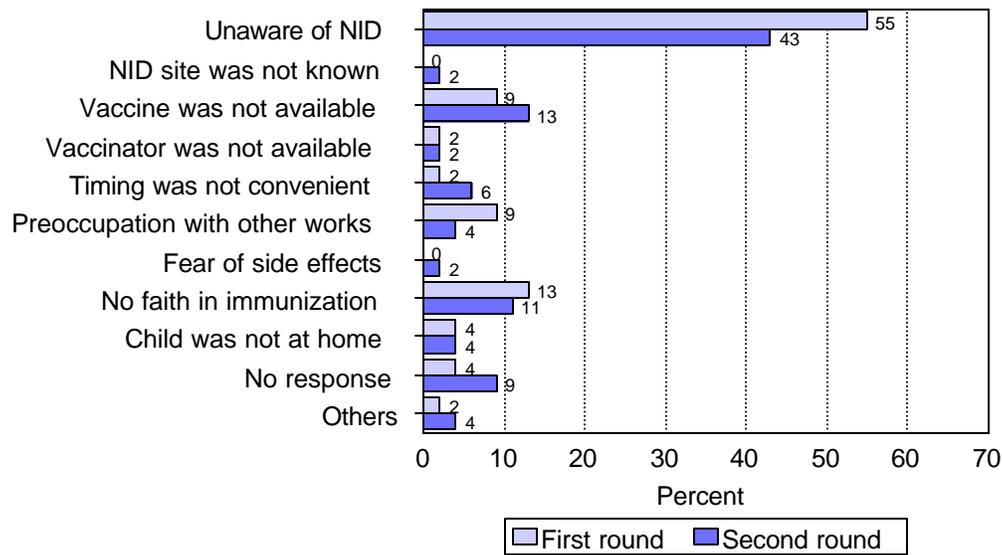
Chart 6: Coverage of OPV and Vitamin A during the sixth NID campaign



Reasons for non-immunization of OPV

About 22-25% of the eligible children did not have OPV during the sixth NIDs. The main reasons invoked for not being immunized (first and second round) were the lack of knowledge of the campaign and vaccine was not available. These together with the other reasons are shown in **Chart 7**.

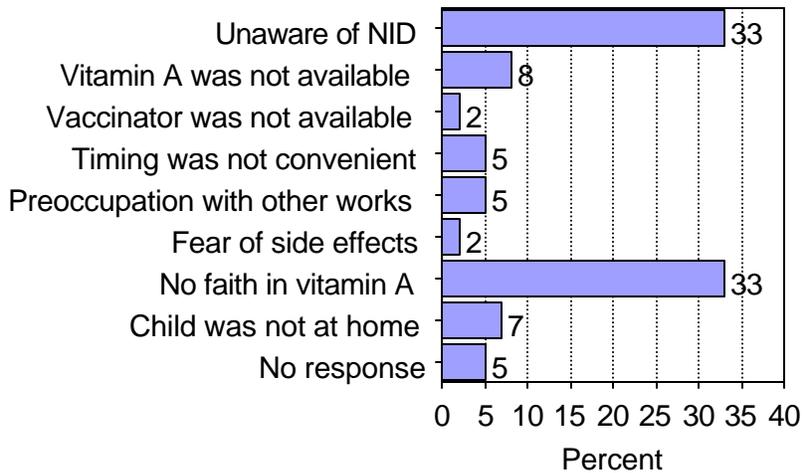
Chart 7: Reasons for non-immunization during the sixth NIDs



Reasons for not receiving Vitamin A

Chart 8 indicates that the major reasons given by parents for their child not having the vitamin A capsule were: a) unaware of NID (33%) and b) no faith in Vitamin A (33%).

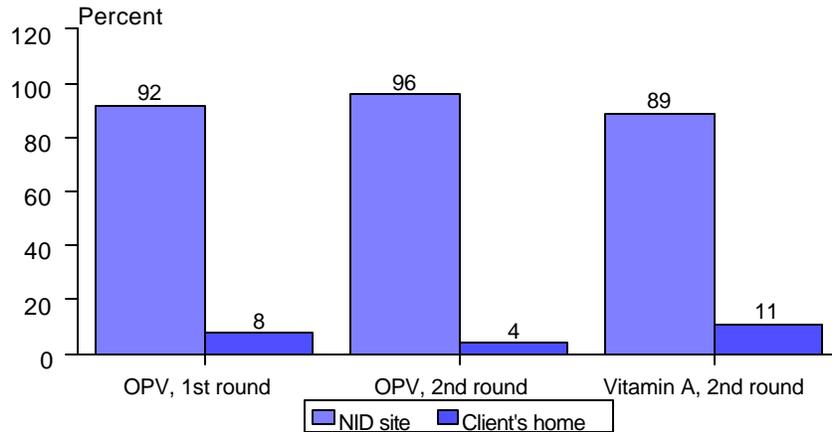
Chart 8: Reasons for not receiving Vitamin A capsule during the second round of the sixth NIDs



Places of vaccination during the sixth NIDs

Chart 9 indicates that 92% children received OPV vaccine from the NID vaccination sites and 8% at their home during the first round. The places of immunization were almost the same during the second round. 89% of children received vitamin A from the NID site and 11% children received it at home.

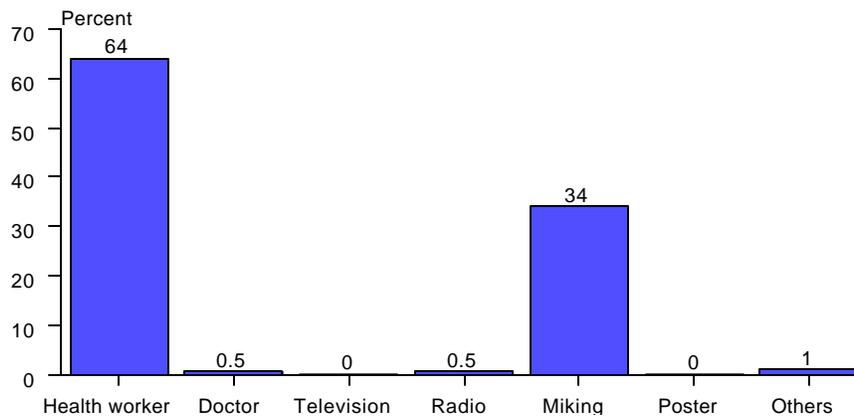
Chart 9: Places of vaccination during the sixth NIDs



Source of information about the NID campaign

About two thirds of respondents said that health workers were their source of information and another one third got the message from miking. It is apparent from the survey that here in this Uapzila, radio, television and poster were not effective in the dissemination of the NID message (Chart 10).

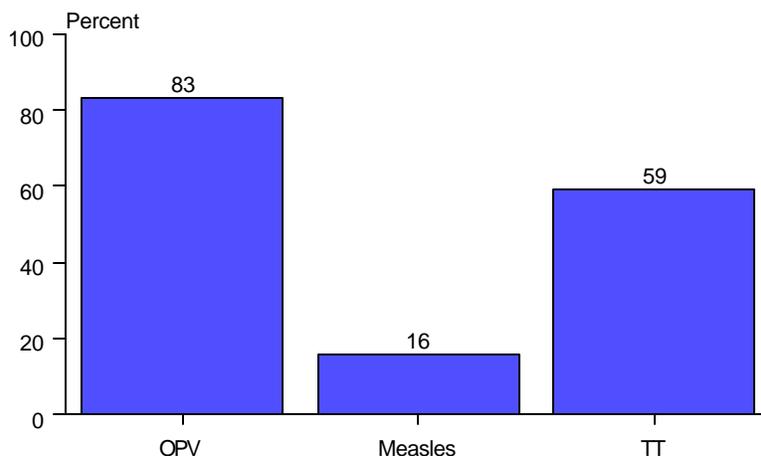
Chart 10: Sources of information about the sixth NID campaign



D. Coverage Levels in the MNT Campaign conducted in September 1999

The MNT campaign was conducted in September 1999. 83% of the eligible children received OPV during that campaign. 16% of the children received a dose of measles vaccine and 59% of the eligible women received a dose of TT (Chart 11). All these results might have been affected by a recall bias as the data was collected about five months after the campaign

Chart 11: Coverage levels achieved during the MNT campaign



Reasons for not accepting OPV and measles vaccine during the MNT campaign

The majority of the parents of the children who were not immunized for OPV and/or measles vaccine were either unaware of the MNT campaign or did not have faith in immunization. These together with other reasons are shown in **Chart 12 and 13**.

Chart 12: Reasons for not receiving OPV during the MNT campaign

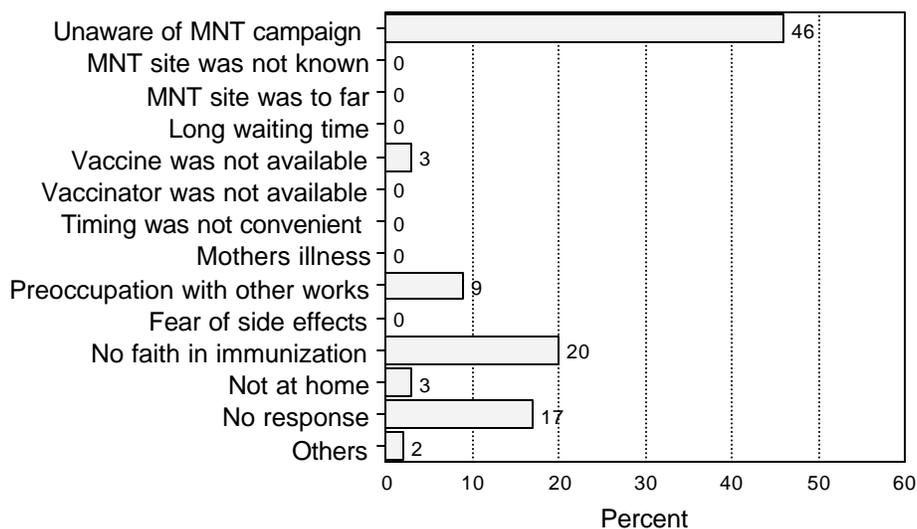
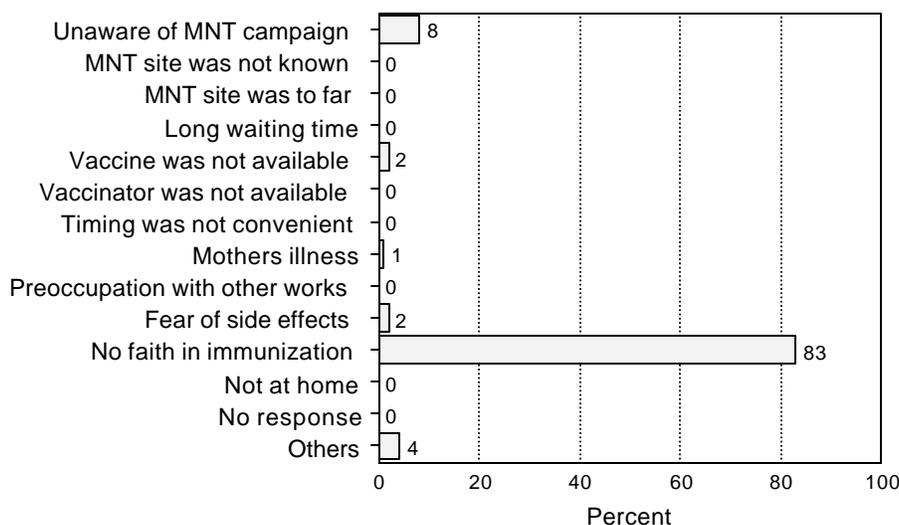


Chart 13: Reasons for not receiving measles vaccine during the MNT campaign



Reasons for not having TT vaccine during the MNT campaign

41% of the eligible women were not vaccinated during MNT campaign. 43% of them cited that they were not aware of the MNT campaign as a cause of not having TT vaccine. 14% women were unaware of need of TT vaccine and another 14% had no faith in immunization. These together with other reasons are shown in **Table 4**.

Table 4: Reasons for not having TT vaccine during the MNT campaign

Reasons	TT vaccine
Unaware of MNT campaign	43%
Unaware of need for TT vaccine	14%
MNT site was not known	1%
Vaccine was not available	1%
Timing was not convenient	1%
Sickness of the women	1%
Preoccupation with other works	1%
Fear of side effects	12%
No faith in immunization	14%
Others	12%

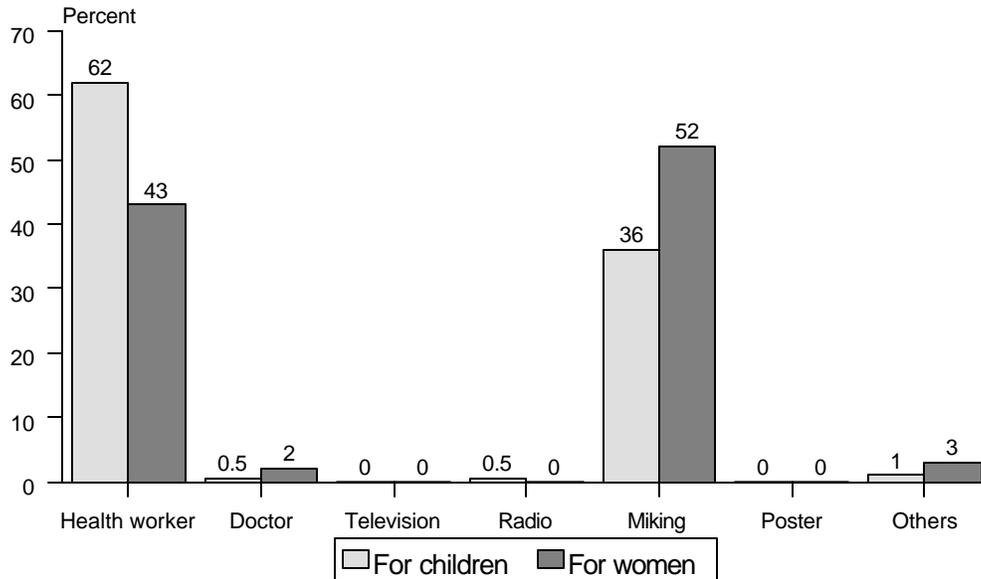
Source of vaccination during the MNT campaign

Children received OPV and measles vaccine during MNT campaign from the MNT site in 95% and 97% of the cases respectively. In rest of the cases they were vaccinated at home. Whereas 92% of the women received TT vaccine from the MNT site, 3% from Family Planning Center and rest from Upazila Health Complex and other sources.

Source of information of the MNT campaign

Chart 14 indicates that health workers and miking were the major sources of information for MNT campaign both for children and women. None of the respondents mentioned television or poster as a source of MNT information.

Chart 14: Source of information about the MNT campaign



Discussion

The survey showed that 94% of the children of 12-23 months of age had access to routine immunization. But the promising start was eroded by a high dropout rate (e.g. 18% from DPT1 to DPT3 and 22% from DPT1 to measles vaccine) and by the number of the invalid doses (6% for DPT1 and another 19% for measles vaccine). 5% of the children had not been immunized at all. This is indicative of the poor quality of the immunization services. Child immunization cards were available in only 24% of the cases and were lost in another 28% of cases. Only 6% of the women had TT immunization cards and another 6% women had lost their cards. The absence of cards has got serious implications as it may mean that when a child comes to the immunization session for the second or subsequent doses, the vaccinators will have to immunize without accurately knowing the date of birth of the child and the date of previous immunization. This is another factor likely to increase the number of invalid doses given.

It is a fairly good achievement that 75% of the children between 0-5 years of age surveyed received a dose of OPV during the first round and 78% received OPV during the second round of the sixth NID campaign. But these figures still mean that there were a significant number of children who did not receive any dose or only one dose of OPV. This occurred at a time when the goal of each of the NID campaigns is to vaccinate each and every child under five years of age with two doses of OPV.

The coverage levels in the MNT campaign were not very satisfactory. 83% of the children received OPV, 16% received measles vaccine and 59% of the eligible women received one dose of TT vaccine during this campaign. But, these figures may not represent the true situation and the campaign's achievements as the data was collected from parent's statements about five months after the campaign.

Conclusions and Recommendations

Coverage levels for routine immunization of children

Access to routine immunization and low full immunization

This survey found that the access to routine immunization for children in Debidwar Upazila was fairly good with 94% of the children receiving a first dose of DPT, but this percentage was not maintained for subsequent immunizations. This important shortcoming can be mainly attributed to the lack of knowledge on the importance of full immunization leading to high drop out rates and also but to a lesser extent to the number of invalid doses and uncorrected missed opportunities.

The dropout rates

The high drop out rates could be reduced to acceptable levels^{5,6,9} by:

- providing better counseling to parents/caretakers about the importance of each child receiving all the required antigens before 12 months. They also require advise about when and where they should take their child for the next dose. Most children will need to attend 4 immunization sessions. 34% of the children dropped out simply because their parents/caretakers did not know that they were required to return to the EPI center for subsequent doses.
- undertaking appropriate Behavior Change Communication (BCC) activities through the mass media and service providers to increase awareness of the need for children to receive all the doses of each of the antigens.
- providing refresher training and orientation to the service providers for counseling parents. It is apparent from the results of the survey that they lack the relevant technical skills and/or motivation for counseling. Some parents reported that they had never received any immunization information from a health worker and others complained that they had not been spoken to at all.

Invalid doses

A number of children received invalid doses of vaccine because they received them before the minimum age recommended for each of the antigens or before the minimum interval that should occur between the doses. This indicates the poor quality of screening, inadequate technical knowledge and/or lack of motivation of the service providers. This situation may be improved by:

- providing appropriate refresher training to the service providers to emphasize proper screening and filling of vaccination cards, to remind them about the correct ages and intervals for immunizations and checking for BCG scar at the time of measles immunization
- strengthening the support given to the service providers through supervision;
- emphasizing the need to retain and use vaccination cards by parents.

Children not being immunized

5% of the children were not immunized at all. The main reasons were that the parents were unaware of the need for immunization (60%) and fear of side reactions (20%). This situation may be improved by:

- undertaking appropriate BCC activities to reach this still un-reached population and to increase the awareness of the parents for the need for their children to be vaccinated
- Many parents cited fear of side reactions as a cause of non-immunization. From the survey finding it is not clear whether the parents meant serious complications like abscess or trivial symptoms like fever or pain at the site of injection etc. The authority may look into the matter in depth to find out the cause and take appropriate measures if required.

Coverage levels for TT vaccination

Access to TT vaccine (TT1) was good but the rate of drop out after the second dose was very high. The coverage of 82% for TT1 reduced to 29% for TT5 and 18% had not been immunized at all. A woman of reproductive age needs to receive 5 doses of TT at appropriate intervals to acquire immunity for rest of her reproductive life. TT coverage is likely to be improved by:

- checking the TT status of all women between 15-49 years at antenatal check ups and at routine child immunization sessions to see whether the mother or female caretaker is eligible for any dose of TT and provide a dose of TT if it is required
- undertaking appropriate BCC activities to increase awareness of the women of childbearing age of the need for 5 doses of TT vaccinations
- providing refresher training to the service providers of the TT vaccination requirements.

Coverage levels for the sixth round of NIDs

The coverage levels of the sixth NID campaign were at a reasonably satisfactory level (75% receiving a dose on first round and 78% on second round); but it still means that there were children who received only one dose of OPV or were not immunized at all. This occurred at a time when every child under five years old should receive a dose of OPV in each round of NID campaign in order for Bangladesh to achieve its goal of being a “polio free country”. Improvements might be made by:

- increasing and improving the BCC activities to ensure that each parent/caretaker is aware that each and every child must receive polio vaccine during both rounds of each NID campaign planned in 2000;
- paying particular attention to immunization in remote areas, where there is a shortage of health staff and in those areas known to have low OPV coverage in earlier NIDs.

Coverage levels for MNT campaign

The coverage levels of the MNT campaign were low (83% children received OPV, 16% received measles vaccine and 59% women received a dose of TT vaccine). However the data was collected five months after the campaign. This may have affected people’s recall and therefore influenced the coverage figures negatively. Improvements might be made by:

- providing appropriate BCC activities to inform parents/caretakers of the campaign and make them aware of the importance of vaccination for their children

Reference and Resource materials

1. WHO EPI Mid Level Managers module: Evaluate Vaccination Coverage (WHO/EPI/MLM/91.11)
2. Anthony G Turner, Robert J Magnani and Muhammad Shuaib, “A not quick as quick but much cleaner alternative to the Expanded Programme on Immunization (EPI) cluster survey design”, International Journal of Epidemiology, 1996, volume 25, Issue No. 1, pages 198-203.
3. COSAS 4.3 version manual, WHO, November 1991.
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Annex - A

The following are extracts from **Anthony G Turner, Robert J Magnani and Muhammad Shuaib's** article entitled **"A not quick as quick but much cleaner alternative to the Expanded Programme on Immunization (EPI) cluster survey design"** published in the *International Journal of Epidemiology* in 1996, volume 25, Issue No. 1, pages 198-203.

The standard EPI Cluster Survey Design

"The sample design for the EPI Cluster Survey is a two stage design involving the selection of 30 primary sampling units or 'clusters' (usually village or other area units), from which 210 children with a target age range (usually 12-23 months) are chosen, seven children per cluster. The sample size of 210 children (per domain or stratum) is mandated by the desire to estimate the level of immunization coverage to within +/- 10 percentage points of the true population proportion with 95% statistical confidence, assuming a design effect (i.e. *deff*) of 2.0. Based upon prior experience with immunization coverage surveys (primarily in the US), 30 clusters are generally thought to be necessary to yield sufficiently reliable estimate."

"In the standard design, clusters are chosen from a list of primary sampling units (i.e. villages, urban communities, census enumeration areas etc.) through systematic random sampling with probability proportional to estimated size (*ppes*). The latest estimates of cluster population sizes, which are assumed to be proportional to the number of children in the target age group in each cluster, are typically used as measures of size. The 30 clusters so chosen are then visited by survey field staff who carry out the second stage of sample selection and conduct the household interviews. "

"The original EPI design called for sample children to be chosen randomly from a list of all eligible children in each sample cluster. However, because the creation of lists of households and children tends to be time consuming, costly, and unfeasible in some settings, this procedure is only infrequently used in actual practice. Instead, one of several simplified second stage sampling procedures is commonly used. In one variant, children are selected by first choosing a random direction from a central location in a village or community (e.g. by spinning a bottle). The number of households in that direction to the edge of the community is then counted, and one household is randomly chosen to be the first sample household. Subsequent households are chosen by visiting the nearest neighboring households until information has been gathered on seven children. In a yet simpler variant, a direction from a central starting point is randomly chosen as described above and households are contacted as the interviewer moves in the chosen direction until the required information has been gathered for seven children."

"The second stage sampling methods described above are 'quota sampling procedures' and some of the problems resulting from the use of this approach have been noted over the years."

"First, quota sampling does not ensure that every eligible member of the target population has a known, non-zero chance of being selected. Hence, the standard EPI design, as it is usually applied, is not a true probability sample design."

"A second problem concern sampling weights. However, since measures of size in sampling frames are often inaccurate due to census errors and changes in population since the census was taken, application of the standard EPI Cluster Survey method does not automatically result in a self weighting sample. The survey data must be weighed in order to yield unbiased estimates. However, since selection probabilities are not known in most EPI Cluster Survey applications, sampling weights can not be calculated."

"Thirdly, a computer simulation study demonstrates that the EPI Cluster Survey based upon quota sampling at the second stage of sample selection is considerably more prone to sampling bias than conventional cluster sampling, particularly where immunized children are 'pocketed' within clusters. "

"Finally, there is the issue of how second stage sample selection should proceed in surveys with multiple measurement objectives."

Annex C

EPI Coverage Survey in Debidwar upazila

List of clusters identified for survey

Union	Mouza	Village	Population	Cumulative population	Cluster number
Uttar Barashalgar	Istogram	Istogram	1024	10675	1
Daskhin Barashalgar	Isabpur	Isabpur	3962	23961	2
	Shibpur	Shibpur	1992	31131	3
Daskhin Barkamta	Fagunda	Fagunda	237	41556	4
	Premu	Premu	4004	53663	5
Daskhin Dhamti	Kalamuria	Sultanpur	2444	62594	6
	Tulagaon	Tulagaon	2386	74609	7
Daskin Gunaighar	Masikara	Masikara	2616	83603	8
	Ujanijora	Hapurkara	1039	93341	9
Daskin Jafarganj	Fultali	Fultali	3164	104664	10
	Magh Pushkarani	Mohammadpur	4177	114097	11
Daskin Rajamehar	Shaitala	Shaitala	1424	124510	12
Debidwar	Barera	Barera	6300	138348	13
	Bijali Panjar	Bijali Panjar	737	144955	14
	Debidwar	Balibari	1055	155526	15
Fatehabad	Bishnupur	Bishnupur	1439	166033	16
	Khatailpur	Khatailpur	1423	176222	17
	Purba Laxmipur	Purba Laxmipur	2103	186767	18
Rasulpur	Gopalnagar	Gopalnagar	5209	201037	19
	Khaiar	Khaiar	1426	207239	20
Subil	Wahedpur	Noakandi	1056	217659	21
Uttar Barkamta	Chhotna	Chhotna	3171	230494	22
	Mohanpur	Mohanpur	3907	238605	23
Uttar Dhamti	Dhamti	Dhamti	13034	256674	24
	Duaria	Duaria	1815	258489	25
Uttar Gunaighar	Chhepara	Dalahash	1940	269525	26
Uttar Jafarganj	Barur	Barur	3311	281942	27
	Jafarganj	Jafarganj	2597	291246	28
Uttar Rajamehar	Gobidapur	Gobidapur	800	300376	29
	Ukhari	Ukhari	708	310121	30

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Technical Report

1. Joint National/International Review of EPI Program in Urban Areas of Bangladesh—23 January – 3 February 2000. Technical Report No. 01, July 2000

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