Urban FP/MCH Working Paper No. 5

Immunization Beliefs and Coverage in Dhaka Urban Slums

Sandra L. Laston
Abdullah Hel Baqui
Ngudup Paljor
Diana R. Silimperi

International Centre for Diarrhoeal Disease Research, Bangladesh

May 1993

The **International Centre for Diarrhoeal Disease Research, Bangladesh (ICDDR,B)** is an autonomous, non-profit organisation for research, education, training and clinical service. It was established in December 1978 as the successor to the Cholera Research laboratory, which began in 1959 in response to the cholera pandemic in southeast Asia.

The mandate of the ICDDR,B is to undertake and promote research on diarrhoeal diseases and the related subjects of acute respiratory infections, nutrition and fertility, with the aim of preventing and controlling diarrhoeal diseases and improving health care. The ICDDR,B has also been given the mandate to disseminate knowledge in these fields of research, to provide training to people of all nationalities, and to collaborate with other institutions in its fields of research.

The Centre, as it is known, has its headquarters in Dhaka, the capital of Bangladesh, and operates a field station in Matlab thana of Chandpur District which has a large rural area under regular surveillance. A smaller rural and a large surveyed urban population also provide targets for research activities. The Centre is organised into four scientific divisions: Population Science and Extension, Clinical Sciences, Community Health, and Laboratory Science. At the head of each Division is an Associate Director; the Associate Directors are responsible to the Director who in turn answers to an international Board of Trustees consisting of eminent scientists and physicians and representatives of the Government of Bangladesh.

The **Urban Health Extension Project (UHEP)** is a follow-on activity of the Urban Volunteer Program (UVP). In 1981, the International Centre for Diarrhoeal Disease Research, Bangladesh (ICDDR,B) began training women volunteers in urban Dhaka in the use of ORS packets for diarrhoeal disease on the assumption that community women could play an important role in teaching others about the home treatment of diarrhoea with ORS. The United States Agency for International Development (USAID) began funding the project in 1986 with a mandate to provide primary health care services to the urban slums and conduct research on child survival related issues. UHEP continues to focus on health and family planning issues of the urban slums with an overall goal to strengthen the ability of the government and non-governmental agencies to provide effective and affordable family planning and selected maternal and child health services to the urban poor through research, technical assistance, and dissemination of its research findings.

Urban Health Extension Project

Urban FP/MCH Working Paper No. 5

Immunization Beliefs and Coverage in Dhaka Urban Slums

Sandra L. Laston
Abdullah Hel Baqui
Ngudup Paljor
Diana R. Silimperi

International Centre for Diarrhoeal Disease Research, Bangladesh
Mohakhali, Dhaka 1212, Bangladesh

May 1993

ICDDR,B Working Paper No. 33

Editing: Josephine Sack
M. Shamsul Islam Khan

Layout Design and Desktop Publishing: Tanbir Morshed
SAKM Mansur
Jatindra N. Sarker

Printing and Publication: Md. Nurul Huda
Hasan Shareef Ahmed

Cover Design: Asem Ansari

ISBN: 984-551-008-6

Urban FP/MCH Working Paper No. 5
ICDDR,B Working Paper No. 33

May 1993

Published by:
International Centre for Diarrhoeal Disease Research, Bangladesh
GPO Box 128, Dhaka 1000, Bangladesh
Telephone: 600171 (8 lines): Cable: CHOLERA DHAKA, Telex: 675612 ICDD BJ;
Fax: 880-2-883116 and 880-2-886050

Printed by Sheba Printing Press in Dhaka, Bangladesh

Foreword

I am pleased to release these reports on urban health and family planning issues which are based on the activities of the Urban Health Extension Project (UHEP). UHEP is a follow-on activity of the former Urban Volunteer Program, a pilot project funded by the United States Agency for International Development (USAID).

The poor health status and the health needs of the urban poor continues to be an important emerging public health issue in the Developing World. Bangladesh is no exception. Despite the constraints of poverty and illiteracy, there are proven strategies to provide basic health and family planning services to the urban poor. In Dhaka alone, aside from the Government health care facilities, there are numerous NGOs and private sector providers giving needed services to the urban population. The Centre's own Urban Health Extension Project continues to focus on the urban poor, especially the slum populations, in providing basic family planning and health services through outreach activities (viz. health education, ORS distribution and referral services to service points).

However, enormous challenges remain in providing an optimum level of services to the urban poor. The UHEP, with the support of the USAID, will focus on health and family planning services delivery strategies in reaching the needed services to the urban poor. We certainly look forward to learning more about the health and family planning needs of the urban poor, testing sustainable strategies and applying these proven strategies in collaboration with other partners in government, NGOs and the private sector.

Demissie Habte, MD
Director

Acknowledgements

The Urban Health Extension Project (UHEP) is funded by the United States Agency for International Development (USAID) under Cooperative Agreement No. 388-0073-A-00-1054-00 with the International Centre for Diarrhoeal Disease Research, Bangladesh (ICDDR,B). The ICDDR,B is supported by the aid agencies of the Governments of Australia, Bangladesh, Belgium, Canada, Denmark, France, Japan, the Netherlands, Norway, Saudi Arabia, Sweden, Switzerland, the United Kingdom and the United States; International organizations including the United Nations Development Programme (UNDP), United Nations Population Fund (UNFPA), the United Nations Children's Fund (UNICEF) and the World Health Organization (WHO); and private foundations including the Ford Foundation (USA) and the Sasakawa Foundation (Japan).

This Working Paper is from the baseline information of the Urban Surveillance System (USS) of the Urban Health Extension Project (UHEP). The USS is a comprehensive health and demographic longitudinal surveillance of the slum populations of Dhaka. Numerous project staff are involved in the functioning and maintenance of the USS. Sincere acknowledgement is extended for the hard work and dedication of the USS staff, both the field-based staff and the data management and the project management support side of the USS.

Much effort has been put into the analysis and review of the information presented in this report. We would like to acknowledge the valuable input of the following individuals in this report.

Ms. Mridula Amin, EPI Communication Advisor, CCC/JSI, Dhaka
Ms. Gretchen Antelman, Research Fellow, UHEP, ICDDR,B
Dr. Stan Becker, Professor, Johns Hopkins University, Baltimore
Dr. Robert Black, Professor, Johns Hopkins University, Baltimore
Dr. Mary Carnell, Urban EPI Advisor, CCC/JSI, Dhaka
Ms. Pauline Dolan, Intern, UHEP, ICDDR,B
Ms. Nancy Fronczak, MCH-FP Program Advisor, UHEP, ICDDR,B
Ms. Sarah Salway, Demographer, UHEP, ICDDR,B/LSHTM, London

Urban Health Extension Project (Formerly, Urban Volunteer Program),
Community Health Division,
International Centre for Diarrhoeal Disease Research,
Bangladesh (ICDDR,B)

Contents

	Page
Summary	viii
Introduction	1
Background	2
Methodology	3
Results	4
Perceptions of Preventable Diseases	4
Perceptions and Knowledge of Measles	12
Perceptions and Knowledge of Polio	15
Knowledge of Measles and Polio Immunization Schedule	18
Perceptions and Knowledge of Tetanus	23
Immunization Sources	28
Immunization Referral Sources	29
Immunization Coverage	30
Discussion	35
References	37

List of Tables

		Page
Table 1.	List of Diseases Mothers Believe are Prevented by Immunization	5
Table 2.	Reasons Why Child Was Never Immunized	8
Table 3.	Source of Information about Immunizations	10
Table 4.	Knowledge of Sites where Immunizations are Available	11
Table 5.	Mothers' Perceptions of Symptoms of Measles	12
Table 6.	Mothers' Perceptions of Problems That Can Occur Following an Episode of Measles	13
Table 7.	Perception of Methods to Prevent Measles Infections	14
Table 8.	Mothers' Perception of Symptoms of Polio	16
Table 9.	Mothers' Perception of How Polio Can Be Prevented	17
Table 10	Percentage of Mothers with Knowledge of Correct Number of Doses for Measles and Polio and Immunization Status of Child	22
Table 11.	Symptoms of Tetanus Listed by Mothers	24
Table 12.	Perceptions of How A Mother or Child Gets Tetanus	25

List of Tables (Contd...)

		Page
Table 13.	Mothers' Knowledge about Tetanus Prevention	26
Table 14.	Mothers' Perception of Target Individuals for Tetanus Immunization	27
Table 15.	Source of Immunization	28
Table 16.	Immunization Referral Source	29
Table 17.	Immunization Coverage for Children 12-23 Months of Age	31
Table 18.	Immunization Coverage for Women 15-45 Years of Age	32
Table 19.	Percentage of Tetanus Toxoid Coverage for Women by Education	33

List of Figures

		Page
Figure 1.	Individuals Mothers Believe are Most at Risk for Immunizable Diseases	6
Figure 2.	Mothers' Perception of Age to Begin Child's Immunizations	19
Figure 3.	Mothers' Perception of Number of Doses Required for Measles and OPV Coverage	20

Summary

This report uses baseline information from a probability sample of urban slums in five *thana* (police administrative areas) of Dhaka city and describes the immunization practices and beliefs in the sample. The data indicate that lack of knowledge about immunization was the main reason given for failure to immunize the children. The main source of immunization knowledge for the mothers was from neighbors and friends suggesting that mass media campaigns had not yet reached targets in the urban slum areas in early 1990.

Immunization coverage of target children (12-23 months of age) is lower than country-wide or rural studies, but similar to findings in other slum surveillance studies. Over half of the women with children under one year of age received tetanus toxoid (TT) vaccination. Only 17% of the women in the sample had received any formal education. Any education of the mother (one year or more) was significantly related to receiving the second dose of TT, but not the first dose of TT. Lack of knowledge about diseases that can be prevented by immunization may hinder coverage in this population with less access to radios and televisions.

Introduction

This report describes the beliefs, perceptions and practices toward immunization in a sample of slum areas of Dhaka. Data from the Urban Surveillance System of the Urban Health Extension Project were used to assess the immunization status of mothers and children in the slum areas. This report adds to the literature describing perceptions and practices regarding immunization in Bangladesh.[1,2,3,4,5,6,7] The tables and figures in this report provide a preliminary, descriptive report of attitudes and practices regarding immunization in the study area. Immunization coverage of young children (12 - 23 months of age) and women (tetanus toxoid) in the slum areas is also discussed.

Background

An intensified EPI (Expanded Program on Immunization) program began in August 1989 in the Dhaka Municipal Corporation.[8] Mothers and children living in the slums of Dhaka were targeted by the EPI as a high risk group for the transmission of communicable diseases due to the crowded and unhygienic conditions in their area.[5] Other reasons for targeting the urban population included limited access to mass media and low level of knowledge regarding the vaccines, timing and doses, and consequences of diseases that can be prevented by these vaccines for slum dwellers.[6]

This report describes the beliefs of the sample mothers regarding immunization and disease etiology and provides some explanation for low coverage rates in the slum population near the beginning (after six months) of the intensified EPI program in the Dhaka municipal area. The sampling frame of mothers' knowledge and attitudes regarding immunization in this report is somewhat different from other EPI studies, because mothers with a child under six years of age were the respondents rather than those with children 0-23 months of age (EPI target age group). Some mothers surveyed may not have had a child in the EPI target age group (0-23 months of age).

Immunization coverage in a sample of the target group of women (with a child under 11 months of age) and children (12-23 months of age) residing in the slums of Dhaka is discussed in this report.

Methodology

A baseline survey was conducted in 4,558 households in five *thana* of the Urban Health Extension Project target area. These households comprise a probability sample of the urban slums of the five *thana* based on an areal sampling of clusters (168). The sample households were registered and a baseline survey was carried out to assess mothers' health knowledge and practices. The data used for this report include subsets of women with at least one child under the age of six years (n=2,683) for immunization knowledge and attitudes, women from 15 to 45 years of age (n=770) with a child under the age of 11 months (tetanus toxoid coverage), and/or immunization coverage of children from 12 to 23 months of age (n=785). The baseline surveys of sample registration data and immunization status and beliefs were collected simultaneously during January-April 1990.

Results

Perceptions of Preventable Diseases

Table 1 presents the list of diseases mentioned by mothers residing in the slums with children less than 6 years of age when asked what diseases can be prevented by immunization. It may not be reasonable to expect women with low levels of education to recognize the medical terms of the immunizable diseases. Still, 59% of the mothers knew that tetanus could be prevented by immunization, while only 12% recognized diphtheria as a preventable disease. A country-wide EPI needs assessment found that 72% of the mothers knew how to prevent tetanus.[7] The EPI study used a more representative sample of both rural and urban populations in Bangladesh compared to this urban slum sample.

Measles and tuberculosis were respectively recognized by 47% and 46% of the mothers as preventable. Other diseases not necessarily preventable through immunization (or not targeted) were mentioned by 575 mothers (21%). Fourteen percent (362) of the mothers could not name any of the six immunizable diseases or list any other diseases they believed could be prevented by immunization.

Table 1. List of Diseases Mothers Believe are Prevented by Immunization
(n=2,683 mothers with children less than 6 years of age)

Name of Disease prevented	Percent* of Mothers Reporting
Tetanus	58.6%
Diphtheria	12.3%
Whooping Cough	24.3%
Measles	47.4%
Polio	27.0%
Tuberculosis	46.1%
Other**	21.4%
Don't Know	13.5%

Source: USS baseline data, 1990

* Total percentage is more than 100 due to multiple responses

** Other diseases mothers mentioned included:

1) diarrhoea (cholera), typhoid, smallpox (vaccines exist but use not promoted), and
2) malnutrition, scabies, asthma, pneumonia, malaria, tumor, cancer, sore throat (vaccine not available).

Figure 1 shows who the mothers believe are most at risk for the diseases they perceived as "immunizable." When asked "who is most likely to become ill and die from the diseases that can be prevented by immunization," 62% of the mothers believed that children under two years of age were at the greatest risk of dying. Less than 2% of the mothers believed adult men or women were at higher risk for dying. Only two mothers felt malnourished children were at higher risk of dying from immunizable diseases. Nearly 25% of the mothers did not know which individuals would be more likely to die of these diseases.

Of the mothers who believed that children under two years of age were most at risk of dying of immunizable diseases, 68% also knew that tetanus was an immunizable disease, while only 16% perceived whooping cough as an immunizable disease.

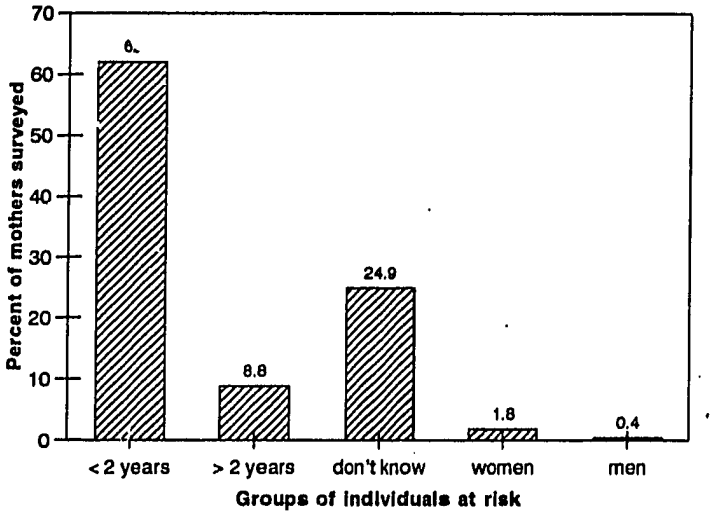

Fig 1. Individuals mothers believe are most at risk for immunizable diseases (n=2,683)

Source: USS baseline data, 1990

Table 2 lists the reasons mothers gave for not immunizing the group of 804 children (30%) in the total sample. Lack of knowledge about immunization was cited by 401 mothers (50%) of the women surveyed with children not immunized. Since few households in the slums own a radio (18%) or television (7%), most knowledge about immunization is through neighbors and relatives.[9]

Twenty-one percent of the women felt that immunizations were not necessary for their children. Eight percent of the mothers feared the vaccination, while 4% believed the vaccine would make their children ill. Fear of immunization may be related to a particular vaccine like DPT (diphtheria, pertussis, tetanus) which may cause some swelling or fever, or BCG (tuberculosis) which may leave a scar. Data regarding these specific fears were not available. Two percent of the mothers mentioned lack of money as the reason for not immunizing their children. Distance of the immunization site was the reason given by 47 (6%) of the mothers for not immunizing their child.

Table 2. Reasons Why Child Was Never Immunized
(n=804 mothers with children <6 years of age, not vaccinated)

Reasons Child Was Not Immunized	Percent*
Lack of Knowledge	50
Not Necessary	21
Other	18
Lack of Time	15
Fear of Vaccination	8
Site Too Far	6
Child Will Get Sick	4
Lack of Money	2
Religious Objection	1

Source: USS baseline data, 1990

* Total percentage is greater than 100 due to multiple responses

Table 3 shows the sources of information regarding immunization for the mothers surveyed. The most frequent sources of information were neighbors and friends (66%). This result differs from an EPI study where only 32% of urban mothers said neighbors and friends were their most important source of information.[10] This discrepancy could be due to differences in sample selection of metropolitan (urban) mothers in the EPI study and restriction to Dhaka slum mothers for this study. Mothers who recently migrated to the slum area might have different sources of information. Another explanation for the inconsistency is that the EPI study asked for the most important source of information (single response), while this study permitted multiple responses by asking from which sources they heard about immunization.

NGOs were the most frequently named formal organizations (42%). Twenty-one percent of the mothers mentioned government hospitals as their information source. Six percent of the mothers said their information source was the Urban Volunteer Program of ICDDR,B. Two percent of the mothers said that they had never heard about immunizations.

Table 3. Source of Information about Immunizations
(n=2,683 mothers with at least one child less than 6 years of age)

Where Did You Hear About Immunizations?	Percent of Mothers*
Neighbors, friends	66
Relatives	28
UVP, ICDDR,B	6
EPI, Mohakhali	1
Dhaka Municipal Corporation	6
Government Hospital	22
Television	15
Radio	18
NGOs	42
Other (announcements, posters, leaders)	6
Did not hear about immunization	2

Source: USS baseline data, 1990

* Total percentages is greater than 100 due to multiple responses

The sites where mothers said immunization facilities were available are presented in Table 4. Mothers were asked if they knew any places in their area where they could get immunizations. Multiple responses for sources of immunization were included in the analysis. Over half of the mothers (52%) knew immunizations were available at the NGOs. Thirty-eight percent of the mothers mentioned the government hospitals, while 21% said immunizations were available through Dhaka Municipal Corporation. Less than 2% of the respondents listed the EPI, ICDDR,B or the Urban Volunteer Program (UVP). Sixteen percent of the mothers were unable to name the location of an immunization facility.

Table 4. Knowledge of Sites where Immunizations are Available
(n=2,683 mothers with children under 6 years of age)

Where Can You Get Immunizations?	Percent*
Urban Volunteer Program	1.6
ICDDR,B	1.5
EPI, Mohakhali	1.5
Dhaka Municipal Corporation	20.8
Government hospital	38.2
Private clinic	6.2
NGOs	51.5
Don't know immunization site	15.7

Source: USS baseline data, 1990

* Total percentage is greater than 100 due to multiple responses

Perceptions and Knowledge of Measles

Table 5 shows the symptoms of measles the mothers reported (more than one symptom listed by most mothers). The six symptoms listed in Table 5 are those frequently associated with an episode of measles.[11,12] When asked to name all the symptoms of measles they knew, most of the mothers (96%) associated measles with a rash, and 89% of the mothers reported that fever was a symptom of measles. Cough was mentioned by 40% of the mothers. Diarrhoea was listed as a symptom of measles by 11% of the mothers in the sample. Eighty-nine of the mothers (3%) could not name any symptoms associated with measles.

Table 5. Mothers' Perceptions of Symptoms of Measles
(n=2,683 mothers with children under 6 years of age)

Symptoms of Measles	Percent*
Rash	96
Fever	89
Cough	40
Runny nose	24
Red eyes	16
Diarrhoea	11
Other	6
Don't know	3

Source: USS baseline data, 1990

* Total percentage is more than 100 due to multiple responses

Problems the mothers felt could occur following a measles episode are presented in Table 6. Forty-three percent of the mothers felt that measles could result in weight loss in children when asked, "what problems may come after measles." Twenty-one percent of the mothers believed that the child could get another illness more easily following a measles infection. Twenty percent of the mothers associated measles with a cold or cough, and 19% with diarrhoea. Mothers in the slums may have more knowledge about problems related to measles, since they are more likely to have some experience with this more common disease. Twenty-four percent of the mothers could not describe any problems that might follow a measles infection in young children.

Table 6. Mothers' Perceptions of Problems That Can Occur Following an Episode of Measles
(n=2,683 mothers with children under 6 years of age)

What Problems Follow Measles Infection?	Percent*
Weight loss	43
Gets another illness easily	21
Cold and cough (respiratory infection)	20
Diarrhoea	19
Blindness	10
Don't know	24

Source: USS baseline data, 1990

* Total percentage is more than 100 due to multiple responses

Methods the mothers recommended to prevent measles are presented in Table 7. Sixty-five percent of the mothers listed immunization as a method for measles prevention, while only 47% listed measles as a preventable disease in Table 1. This inconsistency may be the result of contextual variation during the interview period. Another country-wide EPI needs assessment conducted in 25 urban and 75 rural *upazila* (sub-districts) in Bangladesh found that 88% of the mothers had correct knowledge of how to prevent measles.[7] This difference in findings may be due to differences in sample selection (rural compared to urban settings). Also, some mothers may not perceive measles as a serious disease that requires prevention.

Fifteen percent of the mothers believed that maintaining good hygiene, taking medicine or using an amulet or talisman were methods that prevent measles infection. Thirty percent of the mothers could not name a method for preventing measles.

Table 7. Perception of Methods to Prevent Measles Infections
(n=2,683 mothers with children under 6 years of age)

How to Prevent Measles	Percent*
Immunization	65
Maintain good hygiene	6
Amulet or talisman	3
Take medicine	6
Other	<1
Don't know	30

Source: USS baseline data, 1990

* Total percentage is more than 100 due to multiple responses

Perceptions and Knowledge of Polio

Table 8 lists the symptoms of polio the mothers provided. Fever (17%), paralysis (11%) and body pain (2%) were correctly mentioned by the mothers. The body and head bending back (15%) and convulsions (6%), symptoms of tetanus, were incorrectly described as symptoms of polio. The low prevalence of polio in Bangladesh means the mothers have little previous experience or direct knowledge of this disease. Sixty percent of the mothers were not able to identify any symptoms of polio.

Seventeen percent of the mothers felt high fever caused polio, while 12% believed bad spirits caused the disease. Five percent of the mothers mentioned the lack of immunization as a cause of polio. Fifty nine percent of the women didn't know how a child might contract polio.

Table 8. Mothers' Perception of Symptoms of Polio
(n=2,682* mothers with children under 6 years of age)

Mothers' Perceptions of Polio Symptoms	Percent**
Fever	17
Body/head bends back	15
Paralysis	11
Convulsions	6
Body pain	2
Legs/hands thin/swollen	1
Weakness	<1
Child cannot talk	<1
Other***	4
Don't know symptoms of polio	59

Source: USS baseline data, 1990

* Missing data, one respondent

** Total percentage is greater than 100 due to multiple responses

*** Other perceived polio symptoms include cold, diarrhoea, inability to breastfeed, and enlarged abdomen.

Table 9 shows methods the mothers believed could prevent polio. Immunization was listed most frequently by mothers as a method of prevention (50%). More mothers believed polio could be prevented through the use of a talisman or amulet (2%) than through the practice of good hygiene (1.7%). Over 45% of the women did not know how they could prevent polio.

Table 9. Mothers' Perception of How Polio Can Be Prevented
(n=2,682* mothers with children under 6 years of age)

How to Prevent Polio	Percent**
Immunization	49.9
Maintain good hygiene	1.7
Amulet or talisman	2.1
Take medicine	5.4
Eat nutritious food	0.6
Lead a careful life	0.5
Other	0.3
Don't know	45.3

Source: USS baseline data, 1990

* Missing data, one respondent

** Total percentage is more than 100 due to multiple responses

Knowledge of Measles and Polio Immunization Schedule

Figure 2 shows the ages mothers thought children should have their first measles injection and first dose of oral polio vaccine (OPV). A total of 919 mothers (34%) felt children should be immunized against measles before nine months of age, the recommended lower age limit.[12] Eighteen percent of the mothers thought children should be immunized from one to three months of age. Over half of the mothers (54%) did not know the correct age for measles immunization.

For OPV, 28% of the women felt that infants should receive their first dose from one to three months of age. The recommended age for administration of the first dose of OPV is six weeks in developing countries and can be given at birth in countries where poliomyelitis has not been controlled.[12] Twelve percent of the mothers thought the first dose should be given from three to nine months of age. Over 58% of the women didn't know at what age a child should receive his first dose of OPV.

Data were not available for knowledge of mothers regarding the correct age for the first dose of DPT. Sixty-one percent of the mothers did know that children under two years of age should be immunized against tetanus.

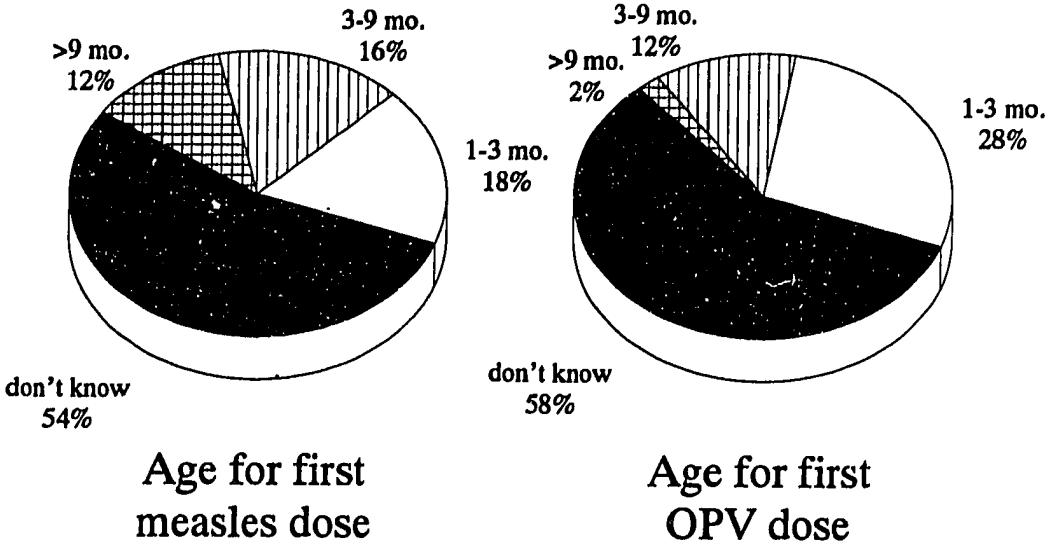

Fig 2. Mother's perception of age to begin child's immunization (% of 2,682* mothers with children <6 years)

Source: USS baseline data, 1990
** Missing data, one respondent*

Figure 3 shows the number of doses mothers thought is required for adequate measles and polio coverage (data not available for DPT, BCG). Twenty-four percent of the mothers correctly responded that one dose of measles vaccine was required. Ninety-five mothers (3%) believed that two doses were necessary. Eight percent of the mothers felt that three doses of measles vaccine were required. The majority of the mothers (62%) didn't know how many doses of measles vaccine were recommended for immunization coverage.

Similarly, 65% of the mothers did not know how many doses of OPV should be administered (Fig 3). Over 7% of the mothers felt only one dose of OPV was necessary, while 6% believed two doses were adequate. Twenty percent of the mothers correctly said three doses of OPV were required for coverage.

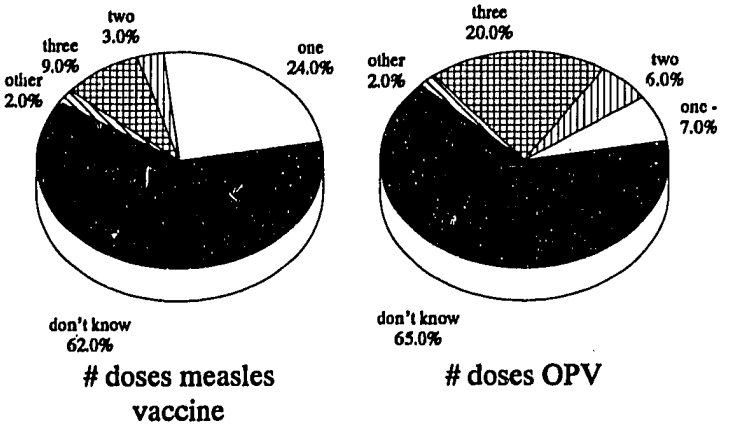

Fig 3. Mother's perception of number of doses required for measles and OPV coverage (% of 2,682* mothers with children <6 years)

Source: USS baseline data, 1990
** Missing data, one respondent*

There is a lack of knowledge regarding the correct number of vaccine doses recommended for full measles and polio coverage. Previous research indicates that lack of knowledge about vaccine schedules and repeat doses is a reason mothers give for not immunizing their children.[13] Table 10 shows the results of cross-tabulations between the knowledge of the correct number of vaccine doses for polio and measles and whether a child received any immunizations. Lack of knowledge of the correct number of doses required for measles or polio coverage was significantly (X^2, $p<0.001$) associated with absence of immunization in this sample of children under six years of age.

The association between immunization and knowledge of number of doses may also suggest that mothers retain the information they receive at the EPI centre or vaccination clinic during their child's immunization visits. A prospective study would better determine the significance of this association. Children with missing data (11) were excluded from analysis.

Table 10. Percentage of Mothers with Knowledge of Correct Number of Doses for Measles and Polio and Immunization Status of Child
(n=2,582* children under six years of age with data available)

Measles Correct Dosage Knowledge	Immunized	Not Immunized	Sample Total
Yes	91%**	9%	24%
No	62%**	38%	76%

Polio Correct Dosage Knowledge	Immunized	Not immunized	Sample Total
Yes	86%**	14%	20%
No	65%**	35%	80%

Source: USS baseline data, 1990
* Missing data, one respondent
** Row percent of immunization status

Perceptions and Knowledge of Tetanus

Table 11 lists mothers' perceptions of the symptoms of tetanus. Convulsion was the most frequently mentioned symptom (67%) followed by body/head bending back (31%). Over 17% of the mothers mentioned the symptom of 'lockjaw' and 12% described the body as being 'stiff.' Symptoms of tetanus described in the literature correspond with the symptoms mentioned most frequently by the mothers. Usual symptoms of tetanus include trismus (spasm of the muscles of mastication lockjaw), seizures, stiffness of the neck, difficulty swallowing, rigidity of abdominal muscles, and temperature elevations from 2 - 4°c.

Other symptoms mothers believed were associated with tetanus included the individual becomes senseless (loss of consciousness), the body becomes cold, or the body color changes to red, blue or black (usual symptoms of impending death including loss of consciousness, cyanosis, vascular collapse). Nearly 24% of the mothers did not know the symptoms of tetanus.

Table 11. Symptoms of Tetanus Listed by Mothers
(n=2,681* mothers with children under 6 years of age)

Symptoms of Tetanus	Percent**
Convulsion	67.0
Body/head bends back	30.6
Lockjaw	17.1
Body stiff	12.2
Can't eat or suck	11.3
Fever	6.6
Foaming from mouth	1.9
Body becomes red/blue/black	1.6
Other	3.5
Don't know	23.9

Source: USS baseline data, 1990
* Missing data, two respondents
** Total percentage is more than 100 due to multiple responses

The perceived causes of tetanus are presented in Table 12. When mothers were asked, "how does a mother or child get tetanus," lack of immunization (23%), and cuts on the hands or legs (22%) were listed most frequently. Other mothers believed tetanus was caused by fever (8%), while 6% of the mothers felt tetanus resulted from the umbilical cord being cut with a dirty instrument. Forty-four percent of the mothers did not know the cause of tetanus.

Table 12. Perceptions of How A Mother or Child Gets Tetanus
(n=2,681* mothers with children under 6 years of age)

How Do You Get Tetanus?	Percent**
Lack of immunization	22.5
From cuts on hands, legs, etc.	22.0
From high fever	8.4
Umbilical cord cut with dirty instrument	6.2
From bad air	4.2
From bad spirits	3.5
From germs	3.0
From weakness	2.5
Other***	10.3
Don't know	43.9

Source: USS baseline data, 1990

* Missing data, two respondents

** Total percentage is more than 100 due to multiple responses

*** Other responses included: from anemia, cold, pregnancy period, and dirty water or objects.

Table 13 shows methods the mothers felt prevented tetanus. The majority of mothers (78%) felt that immunization prevented tetanus. Two percent of the mothers believed that tetanus could be prevented through improved hygiene or boiling instruments used for cutting the umbilical cord. Some of the mothers (2%) felt that a talisman or amulet could prevent the disease. Nearly one-fifth of the mothers (20%) did not know how tetanus could be prevented.

Table 13. Mothers' Knowledge about Tetanus Prevention
(n=2,681* mothers with children under 6 years of age)

Ways to Prevent Tetanus	Percent**
Immunization	78.1
Maintain good hygiene	1.6
Amulet or talisman	1.8
Take medicine	3.2
Boil instruments to cut umbilical cord	1.6
Other	0.9
Don't know	19.7

Source: USS baseline data, 1990

* Missing data, two respondents

** Total percentage is more than 100 due to multiple responses

The majority of mothers felt children under two years of age (61%) and women (67%) were the target individuals for tetanus immunization (Table 14). Nearly 7% of the women mentioned men as the targets for immunization and 14% felt children over two years of age should receive tetanus immunizations. Slightly more than 18% of the mothers did not know who the target group should be for tetanus immunization.

Table 14. Mothers' Perception of Target Individuals for Tetanus Immunization
(n=2,681* mothers with children over 6 years of age)

Who Should Have Tetanus Immunization?	Percent**
Children under 2 years of age	60.8
Children over 2 years of age	14.1
Women	67.1
Men	6.9
Other	3.2
Don't know	18.4

Source: USS baseline data, 1990

* Missing data, two respondents

* Total percentage is more than 100 due to multiple responses

Immunization Sources

Table 15 lists where mothers said their children under two years of age were actually immunized. The immunization centres included NGOs (32%), followed by the government hospital (20%). The women mentioned Dhaka Municipal Corporation as another source of immunization (7%). Nearly 37% of these children were not immunized.

Table 15. Source of Immunization
(n=1,554 children under 24 months of age)

Where Child Was Immunized	Percent
Urban Volunteer Program	0.7
ICDDR,B (Cholera Hospital)	1.0
EPI, Mohakhali	0.7
Dhaka Municipal Corporation	7.3
Government Hospital	20.4
NGOs	32.0
Private clinic	1.3
Not immunized	36.6

Source: USS baseline data, 1990

Immunization Referral Sources

Immunization referral sources mentioned by mothers of children under two years of age are presented in Table 16. NGOs were the most frequently mentioned referral source, followed by neighbors and friends (16%) and self or family (14%). Word of mouth referral seems to be an important mechanism regarding immunization knowledge in the slum areas surveyed by the Urban Surveillance System. Referrals through the Urban Volunteer Program appear very low, but in the Urban Surveillance Sample, a volunteer was present in only 20 of the clusters.

Table 16. Immunization Referral Source
(n=1554 children under 24 months of age)

Referral for Immunization	Percent
Urban Volunteer Program	1.1
ICDDR,B	0.7
EPI, Mohakhali	0.3
Dhaka Municipal Corporation	2.3
Government Agencies	7.3
NGO	21.9
Self/family	14.1
Neighbor/friends	15.8
Child not immunized	36.6

Source: USS baseline data, 1990

Immunization Coverage

Table 17 shows recall of immunization coverage for children from 12 - 23 months of age. The first DPT (diphtheria, pertussis, tetanus) immunization had the highest coverage (67%), followed by the first oral polio (OPV) vaccine (65%). Nearly 62% of the children had BCG (tuberculosis) coverage, while only 48% received the measles vaccine. The initial dose of DPT and OPV are given at six weeks, but the first measles vaccine is not given until nine months of age. Coverage for the initial DPT and OPV injections was relatively high. Dropout in subsequent immunizations for the DPT and OPV series (3 injections) resulted in measles vaccine coverage rate being slightly higher (48%) than the final DPT and OPV coverage rate (44%). The dropout rate (subsequent vaccination not completed) during the DPT immunization and OPV vaccine was 15% from the first to the second dose. Dropout rates were 33% from the first DPT and OPV immunizations to the third and final dose. These data indicate that mothers are less motivated or miss follow-up immunizations for the older children.

The full coverage rate (completion of three DPT, three OPV, one measles and one BCG immunization) was 37.3% for this sample. Cross-tabulation of the data indicated no statistically significant difference between the coverage rates of male and female children (X^2 statistic, $p>0.05$). The presence of signed immunization cards ranged from 35% (first DPT and OPV dose) to 27% (for third DPT and OPV dose) of the children, while 5% had cards which were not marked. Sixty percent of the 785 children did not have an immunization card available during the interview session.

Table 17. Immunization Coverage for Children (n=785) 12 - 23 Months of Age

Specific Immunization	Yes (%)	No (%)	Unsure/ missing
DPT shot #1	66.7	30.8	2.5
DPT shot #2	56.9	41.5	1.6
DPT shot #3	44.8	53.8	1.4
OPV #1	65.4	32.4	2.2
OPV #2	55.5	42.7	1.8
OPV #3	43.9	54.5	1.6
Measles	48.3	49.8	1.9
BCG	62.2	36.3	1.5
Full Coverage	37.3	61.3	1.4

Source: USS baseline data, 1990

Table 18 shows the coverage for TT (tetanus toxoid) for 770 women from 15 to 45 years of age with a child from 0 to 11 months of age. Fifty-eight percent of the eligible mothers received the first TT injection, while half (50%) received the second TT injection. Data were not collected regarding knowledge of number of doses required or when the doses should be given to these mothers. The standard WHO definition recommends two doses of TT for mothers during pregnancy, or two doses during the last three years and a booster dose for that pregnancy necessary to protect a newborn.

Table 18. Immunization Coverage for Women 15-45 Years of Age
(n=770 women with a child 0 - 11 months of age)

Specific Immunization	Yes (%)	No (%)	Unsure/missing
Tetanus toxoid #1	58.0	41.1	0.9
Tetanus toxoid #2	50.0	49.6	0.4

The average age (in years) was not significantly different for tetanus coverage in the total sample of 3,368 women from 15 to 45 years of age. Education (none or any) was not significantly associated with whether the mother received the first dose of TT, but education was related (X^2, $p<0.01$) to whether the mother received the second dose of tetanus toxoid (Table 19). This finding is similar to results from a study in the ICDDR,B Hospital of 113 children under two years of age, where parental level of education was significantly related to the risk of the child not receiving the second dose of DPT.[14]

Table 19. Percentage of Tetanus Toxoid Coverage for Women by Education

(n=3,368 women from 15 - 45 years of age)

Tetanus Toxoid 1	No education	Any education
Yes	26%*	30%
No	74%	70%
Total Sample	83%	17%

Tetanus Toxoid 2	No education	Any education
Yes	19%*	24%
No	81%	76%
Total sample	83%	17%

Source: USS baseline data, 1990

* Column percentage of immunization status (by education status)

Cross-tabulations indicate that for this sample, literacy was significantly related to immunization coverage of the mothers (X^2, $p<0.05$). Of the illiterate mothers, 26% were immunized, while 30% of the mothers who could read and write had received TT. Place of birth demonstrated a significant relationship with TT coverage (X^2, $p<0.05$). Women born in Dhaka district but outside Dhaka city were more likely to be immunized than women living in the slum areas (X^2, $p<0.05$). The EPI acceleration began in 1985 and all rural areas of Bangladesh were included by 1989. Services and motivation are expected to be more effective in the rural areas since the urban EPI program began only in 1989.

Discussion

The findings of this report suggest that children from 12 to 23 months of age living in the slums of Dhaka have lower immunization coverage rates than some previous studies in Dhaka reflect.[8] The findings of the vaccination coverage survey conducted in July 1990 by the Dhaka Municipal Corporation (n=215 children, 12 to 23 months of age) indicated a full vaccine coverage rate of 66% for these urban children. It is important to remember that this sample was city-wide and represented all economic groups, providing an explanation for the increased full vaccine coverage rate.

The larger sample from the slum areas of Dhaka used for this report (785 children, 12-23 months of age) had a full coverage rate (completion of 3 DPT, 3 OPV, 1 measles and 1 BCG immunization) of only 37.3% for the 785 sample children. This full coverage rate of 37.3% is more comparable to a January 1990 study of 212 children of 12 - 23 months of age living in Dhaka slums (EPI, 1990). The full coverage rate for this sample was 50%. Given the +/- 10% accuracy range for the WHO cluster methodology for surveys,[15] these rates are more comparable than the city-wide sample.[8]

Lack of maternal knowledge about which diseases can be prevented by immunization (Table 1) may also hinder immunization coverage. The mothers may be motivated to have their children vaccinated with little knowledge about which specific diseases her child is being immunized against.

The lower coverage in the slum areas may indicate that mass communication messages had not yet reached the target population compared to other areas of the city in early 1990. Studies indicate that residents of the urban slum areas were not getting information on the place or time of immunization sessions.[16] In 1990, EPI began using microphone messages through public address systems on rickshaws to announce time and location of immunization.[17] In the urban slum sample, many of the respondents (66%) listed friends or relatives as their major source of knowledge of immunization (Table 3).

Some of the beliefs affecting immunization practices of the households are discussed in this report. Factors discussed in other studies that may precipitate low immunization rates in this slum population compared to the general urban sample[8] include:

1) decreased access to mass communication messages[5]
2) traditional concepts of disease prevention[13]
3) in-migration or inter-migration in the urban slums
4) income[14]

This preliminary report of immunization beliefs and vaccination coverage in the slum areas of Dhaka provides the descriptive background for ongoing data analysis that will further address the above factors associated with low immunization rates. The immunization coverage rates of the UHEP sample of slum children for the 1991-1992 quarterly surveillance (12-month follow-up) will be included in the subsequent report to assess changes in the rates from this baseline report.

References

1. Rahman M, Chen L, Chakraborty J, Yunus M, Faruque A, Chowdhury A. Use of tetanus toxoid for the prevention of neonatal tetanus. 2: Immunization acceptance among pregnant women in rural Bangladesh. *Bull WHO* 1982;60:269-77.
2. Bangladesh Rural Advancement Committee. Perception of villagers about six immunizable diseases and vaccination. Dhaka:BRAC, 1988.
3. Gupta A. Communicating immunization: a study of community attitudes and responses to immunization in Bangladesh. Dhaka: Worldwide International Foundation, 1988.
4. Voluntary Health Services Society. Knowledge, attitude and practice regarding EPI in municipal areas: a baseline KAP study conducted in Dhaka and Jessore. Dhaka: Voluntary Health Services Society, 1989.
5. Blanchet T. Perceptions of childhood diseases and attitudes towards immunization among slum dwellers. Dhaka:REACH, 1989.
6. Khan M, Rahman S, Chowdhury J, Kamal G. Assessment of EPI communication interventions in urban areas. Dhaka:Associates for Community and Population Research, 1990.
7. Associates for Community and Population Research. Needs assessment study of field workers involved in the expanded programme on immunization. Dhaka:ACPR, 1991
8. Dhaka Medical College. Findings of the vaccination coverage survey: Expanded Program on Immunization (EPI). Dhaka:Directorate of Health Services, 1990.

9. Urban Surveillance System (USS). Sociodemographic data. Dhaka: Urban Health Extension Project, 1991 (Unpublished).

10. Expanded Program on Immunization Slums of Dhaka: EPI coverage survey. Dhaka:EPI, 1990.

11. Mandell G, Douglas R, Bennett J. *Principles and practice of infectious diseases.* New York: Wiley, 1985.

12. Koster F, Cursion G, Aziz K, Haque A. Synergistic impact of measles and diarrhoea on nutrition and mortality in Bangladesh. *Bull WHO 1981;*59:901-8.

13. Pillsbury B. Immunization: the behavioral issues. Washington, DC: International Health & Development Associates, Office of Health, USAID, 1990.

14. Zeitlyn S, Rahman M, Nielsen R, Gomes M, Kofoed PE, Mahalanabis D. Compliance with diphtheria, tetanus, and immunization in Bangladesh: Factors identifying high risk groups. *Br Med J* 1992; 304:606-9.

15. Carnell M. Personal communication, 1992.

16. Huq M. Near miracle in Bangladesh. Dhaka: University Press Limited, 1991.

17. Worldview International Foundation. Quantitative testing of effectiveness of miking about EPI in urban areas. Dhaka: Worldview International Foundation, 1990.

ICDDR,B
Endowment Fund

Each year, ICDDR,B treats over 70,000 patients attending its two hospitals, one in urban Dhaka, the other in rural Matlab. Though they are planted in Bangladeshi soil, they grow because of the dedication of thousands of concerned people throughout the world. The patients are mostly children with diarrhoea and associated illnesses and the services are offered free to the poorer section of the community.

Since these services are entirely dependent on financial support from a number of donors, now we at the ICDDR,B are establishing an entirely new endeavour: an ENDOWMENT FUND. We feel that, given securely implanted roots, the future of the hospitals can confidently depend upon the harvest of fruit from perpetually bearing vines.

To generate enough income to cover most of the patient costs of the hospitals, the fund will need about five million US dollars. That's a lot of money, but look at it this way:

JUST $150 IN THE FUND WILL COVER THE COST OF TREATMENT FOR ONE CHILD EVERY YEAR FOREVER !

We hope you will come forward with your contribution so that we can keep this effort growing forever or until the world is free of life-threatening diarrhoea. IT IS NOT AN IMPOSSIBLE GOAL.

For more information please call or write to:
Chairman, Hospital Endowment Fund Committee
GPO Box 128 • Dhaka, 1000, Bangladesh
Telephone: 600-171 through 600-178
Fax: (880-2)-883116

Asem Ansari