

# Strategies for Providing Essential Healthcare Services to Urban Street-dwellers in Bangladesh



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# Strategies for Providing Essential Healthcare Services to Urban Street-dwellers in Bangladesh

Md. Jasim Uddin  
Tracey Perez Koehlmoos  
Ziaul Islam  
Nirod Chandra Saha  
Iqbal Ansary Khan  
M.A. Quaiyum

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

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ICDDR,B

Mohakhali, Dhaka 1212

(GPO Box 128, Dhaka 1000)

Bangladesh

Phone: 88 02 8822467

Fax: 88 02 8819133 or 88 02 8823116

Email: [jasim@icddrb.org](mailto:jasim@icddrb.org)

Web: <http://www.icddrb.org>

**Edited by**

M. Shamsul Islam Khan

**Page formatting**

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Phone: 9566649

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## EXECUTIVE SUMMARY

**Background:** Bangladesh has experienced one of the highest growth rates (>6% per year) of urban population in the last three decades compared to the national population growth rate of about 1.5% per year. The numbers of urban poor people and street-dwellers will increase at least in proportion to the overall population growth. Street-dwellers are defined as people who sleep in streets, railway terminals and platforms, bus stations, parks and open spaces, religious centres, construction sites around graveyards, and other public places. Findings of recent studies suggest that street-dwellers are extremely vulnerable in terms of their health needs and healthcare-seeking behaviours. There is no mechanism for delivery of health services targeting this marginalized group of people. Some countries have taken initiatives to address the primary healthcare needs of street-dwellers. Although the Health, Nutrition and Population Sector Programme (HNPS) of Bangladesh designed programmes to ensure equitable essential services to all, this marginalized group of people was not, however, targeted. The Ministry of Health and Family Welfare (MoHFW) should, therefore, examine its role, together with the Ministry of Local Government, Rural Development & Co-operatives (MoLGRDC), to focus its future programmes to meet the needs of this extreme vulnerable group of people. The present study developed and tested a mechanism to provide essential healthcare services to urban street-dwellers in Bangladesh.

**Objective:** The overall aim of the study was to develop and test strategies for providing essential healthcare services to urban street-dwellers in Bangladesh.

**Methods and materials:** The study was a pre- and post-test design. This 12-month study monitored the indicators over time and documented the operational issues. Both impact and process indicators were measured in the study areas.

The study was conducted in purposively-selected two areas (one entry point and one concentrated area). The selected areas were Karwan Bazar (concentrated area) and Kamlapur (entry point). The two-kilometre radius areas of the two sites were the study areas. Two model clinics—model 1 (static clinic) and model 2 (satellite clinic)—were implemented in Kawran Bazar and Kamlapur respectively.

The study was conducted in two phases: (a) formative research and (b) implementation and evaluation of interventions.

a. Formative research:

The formative research was conducted to identify the preferred approaches to be used for providing services to street-dwellers. Based on the findings of the formative research, the interventions were designed and finalized.

b. Implementation and evaluation of interventions: Two models were developed and tested:

### Model 1: Static clinic

The study established a static clinic in one selected area of Dhaka city for providing services to street-dwellers. The concerned zonal office of the Dhaka City Corporation (DCC) allocated a room for this purpose. Two paramedics—one female and one male—were involved in providing services from the static clinic. A package of essential services (same package of the HNPS) for street-dwellers was provided every alternate evening (from 6:30 pm to 10:00 pm) from different spots of the selected area. One paid volunteer from street-dwellers was involved for motivating and informing street-dwellers about the availability of services.

## Model 2: Satellite clinic

The study also organized an evening satellite clinic. Mobile satellite clinics were organized in places of public utilities (railway station, stadium complex). Since no room was available, a makeshift clinic was used in the satellite clinics. The paramedics who worked with model 1 clinic also provided services in the model 2 clinic area in alternate evenings (from 6:30 pm to 10:00 pm) as street-dwellers return from their work at this time. One paid volunteer from street-dwellers was also involved with this component for motivating and informing street-dwellers about the availability of services.

A decorated rickshaw-van was used for both the clinics for carrying clinic staff and logistics, for publicity among the target people and for carrying patients from the model clinic to referral points, if necessary. A system of referral linkage was established from these clinics to the nearer health facilities managed by the Government and non-government organizations (NGOs). The paramedics referred the cases to these referral points, and the cases were followed up by a Field Research Officer to know what happened after referral.

All the components of primary healthcare were included as the components of essential services, with special focus on general health, reproductive and maternal health, child health, environmental issues, and health education, and the services were provided free of charge. Services were provided to those street-dwellers who slept for the last one week in the study areas. Patient cards were provided to all the clients so that it became easy to keep track in the subsequent visits. For the monitoring of the study activities, a project management committee, headed by Director, Primary Health Care of the MoHFW, was constituted. The committee met quarterly, reviewed progress of the study activities, and provided necessary feedbacks to the research team.

Data were collected through a survey; data included administrative data, cost data, and qualitative components.

Analysis of quantitative data was based on before and after implementation of the interventions of the selected health and family-planning indicators, calculation of changes, and statistical significance based on 95% confidence intervals and *t*-test. Comparison of service use between the model 1 clinic and the model 2 clinic was also carried out to determine their effectiveness.

Qualitative data collected through in-depth interviews and observations were analyzed through content analysis.

## Results

The findings revealed that sickness (any kind of sickness) among female and male street-dwellers at endline decreased in both model 1 and model 2 clinic areas, and the difference in the decrease of sickness was highly significant ( $p < 0.001$ ). The findings also showed that the use of healthcare services among female and male street-dwellers increased at endline compared to baseline, and the difference was highly significant ( $p < 0.001$ ). Although both female and male street-dwellers mostly bought medicines from drug-sellers at the nearest pharmacy at baseline in both the areas, the use of pharmacy by street-dwellers greatly decreased in both the areas at endline. The findings showed that most females and males interviewed used both model static and satellite clinic after their establishment.

The use of antenatal care (ANC) by pregnant mothers substantially increased at endline compared to baseline in both model clinic areas. The findings also showed that the rate of receiving ANC from the model 1 and 2 clinics were 88% and 50% respectively. Sixty-five percent of deliveries were conducted in street in the model 1 clinic area before the implementation of the model clinics while there was no delivery in street after the implementation of the clinics

in the area. The rate of deliveries in street decreased from 50% to 20% after the implementation of the model 2 clinic in its area. Since there was no delivery facility in the model clinic areas, the pregnant mothers were referred to referral centres for delivery. The findings revealed that the number of deliveries in clinics, such as public, NGO and private clinics, increased after the implementation of the model clinics compared to before its implementation. The deliveries attended by relatives came down from 59% at baseline to 0% at endline in the model 1 clinic area and from 40% at baseline to 24% at endline in the model 2 clinic area. The use of family-planning methods among female and male respondents significantly ( $p < 0.001$ ) increased at endline compared to baseline in both model clinic 1 and 2 areas. The findings revealed that the decrease of reported acute respiratory infection (ARI) among children, aged less than five years (under-five children) accompanied by females in the model clinic 1 area at endline compared to baseline was highly significant ( $p < 0.001$ ). Although not statistically significant, ARI also decreased among under-five children, accompanied by males, at endline compared to baseline in both model clinic areas.

**Conclusion and recommendations:** The findings of the study showed that both the model clinics tested contributed significantly to reducing morbidity and increased the use of healthcare services, improving the reproductive, maternal and child health among the street-dwellers. The findings of cost analysis showed that low investment per patient through the model clinics significantly reduced morbidity and increased the use of essential healthcare services among the street-dwellers. Therefore, the policy-makers should include the model clinics in the national programme for providing services to this marginalized group of people.



## BACKGROUND

In recent decades, most low-income countries have experienced a rapid growth in urban population without adequate expansion of public services. In most major urban centres, thousands of people live in overcrowded slums, streets, or other public places that lack basic facilities, such as safe water, sanitation, and health services (1). Bangladesh has experienced one of the highest rates of urban population growth (>6% per year) in the last three decades compared to a national population growth rate of about 1.5% per year (2). The number of the urban poor was estimated at 7 million in 1985 and 11.5 million in 1997 (3,4). The numbers of the urban poor and street-dwellers are likely to increase at least in proportion to the overall population growth. Employment, shelter, and basic services accessible to the growing number of the urban poor have become a major socioeconomic and policy issue in Bangladesh (3).

Generally, the health indicators for urban areas are better than those for rural areas of Bangladesh (6). However, there is a great disparity among a heterogeneous urban population. The urban poor are particularly deprived of basic health indicators. Urban street-dwellers are likely to be among the most deprived people in terms of living conditions, access to basic facilities, and health indicators (7).

A study in Bangladesh in 1997 defined street-dwellers as people who sleep in streets, railway terminals and platforms, bus stations, parks and open spaces, religious centres, construction sites, around graveyards, and other public places (3). A government census in 1997 used the term 'floating population', although this term is not widely used outside Asia (8). The floating population was defined as "the mobile and vagrant category of rootless people who have no permanent dwelling units whatever worse these are and they are found on the census night during 00:00-05:00 hours in the rail station, launch ghat, bus station, hat-bazar, mazar, stair case of public/government buildings and open space etc." The definition of street-dwellers in this study is based on the above definition, including people who sleep in census locations, streets, parks and open spaces, religious centres, construction sites, around graveyards, markets, and other public places.

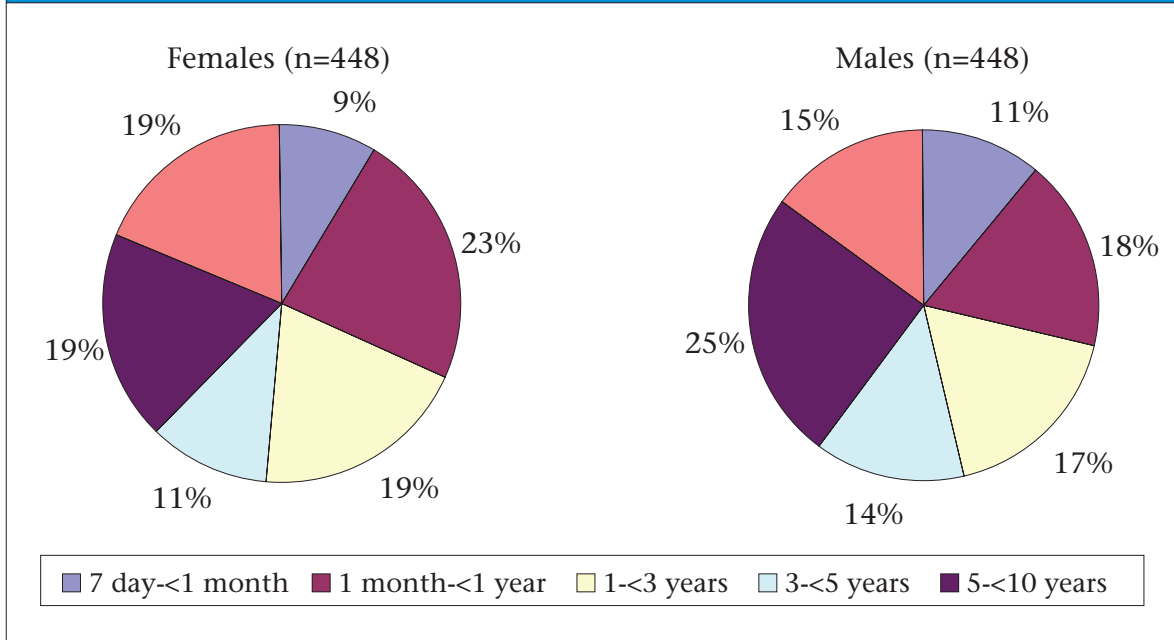
The census count of the floating population in 1997 showed that there were 14,999 floating people in Dhaka city and 17,082 in other metropolitan areas, cities, and paurashavas. It estimated the number of street-dwellers in 105 locations of Dhaka city at 11,500. A more recent study by the Marie Stopes Clinic Society (MSCS) estimated the number of street-dwellers between 1,000 and 4,000 in seven major locations in Dhaka city. The survey found that many street-dwellers were living on their own: 26% were unmarried females and 15% unmarried males. However, 36% were living as a married couple, and the number of average family members was 3.6. The proportion of people (street-dwellers) in different age/sex-groups, based on the rough estimates, in seven locations was as follows: 14% children, 11% adolescents, 46% women, and 29% men (9).

The definition of street-dwellers used in the present study reflects the fact that many people live without shelter in particular locations of major towns and cities. A recent study by ICDDR,B in Dhaka city found that approximately half of both female and male street-dwellers had lived in the street for more than three years. Fifteen percent of females and 19% of males had been street-dwellers for over 10 years (10) (Fig. 1).

### Health needs and services for street-dwellers

The ICDDR,B study found that 72% of female and 48% of male street-dwellers were sick at the time of data-collection. The female street-dwellers were mostly affected by reproductive

Fig. Duration of living as street-dweller



health problems, which included vaginal discharge, lower abdominal pain, genital itching/burning, and others (mass in the lower abdomen/irregular period/prolapse). The common general illnesses reported by them included diseases of the respiratory system (cold/cough/fever/asthma), diseases of the digestive system (gastric ulcer/gastritis, diarrhoea), severe pain (headache/chest pain), scabies, tuberculosis (blood with cough and fever at night), eye problem (burning in eye/problem in eye sight), tonsillitis, urinary infection, worm, jaundice, throat problem, and hearing problems. The findings of the ICDDR,B study revealed that most street-dwellers interviewed reported that their youngest child aged less than five years (under-five child) had more than one symptom associated with acute respiratory infection (ARI) during the last two weeks of data-collection. Thirty-seven percent of female and 34% of male street-dwellers reported that their accompanied under-five children had diarrhoea during the preceding two weeks. The findings revealed that 67% of newborns had neonatal morbidity, such as cold/cough/fever, infection in cord, measles, and pus in the eyes. The results of the study also showed that 69% of male street-dwellers used drugs, such as gaza/afim, charas, heroin, Bangla wine, gul, and sleeping pill during the last one year of data-collection (10).

About half of female and one-third of male street-dwellers did not seek healthcare services during their sickness. Of those who sought healthcare services, more than half of females and two-thirds of males bought medicines from drug-sellers at the nearest pharmacy. Other respondents used the mobile clinics of the MSCS, which are held once a week in seven locations in Dhaka city. Only 28% of pregnant women sought ANC. Eighty-two percent of mothers who sought treatment visited the mobile clinics of the MSCS. Twenty-one percent of mothers who gave birth during the last one year of data-collection reported that the deliveries were conducted in the street whereas 79% of deliveries were conducted by untrained personnel, such as neighbours and relatives, and 6% were self-conducted. Seventy percent of female and 67% of male street-dwellers sought treatment for their children (10).

The main reason for not using healthcare services by street-dwellers was lack of access to health services. The street-dwellers remain out of their sleeping place for work or searching of food for the whole day (whenever services are provided by essential service package providers). The other reasons for not seeking healthcare services were (a) lack of knowledge about the location of healthcare facilities, (b) the street-dwellers did not feel that treatment was necessary, and (c)

the neglect of service providers (10). The MSCS documented that the floating people (street-dwellers) generally lack access to health services due to lack of information on the availability of services and poor interest (11).

The findings of the study suggested that street-dwellers are extremely vulnerable in terms of their health needs and healthcare-seeking behaviours. There is no health service-delivery mechanism targeting this marginalized group of people, except the small-scale mobile clinic service-delivery system of the MSCS (10). According to the MSCS, provision of health services to them is inadequate in the context of need, and the service structure and mechanism are essentially pro-women that are the consistent main focus of the MSCS. It requires Tk 8,065 (US\$ 115) per session, including salary of Medical Officers, paramedics, volunteers, driver, cost of generator, motorized van and fuel, and cost of medicines, and the system cannot be sustained to introduce in a large-scale (11). The Government has stated that this is not feasible in the government set-up, and they want an alternative mechanisms to provide services to street-dwellers. However, findings of a study by ICDDR,B recommended that both mobile and static clinics might be feasible to provide essential healthcare services to urban street-dwellers in Bangladesh (12).

In some countries, initiatives have been taken to address the primary healthcare needs of street-dwellers. For example, in China where more than 80 million rural labourers have moved into the cities in recent years, the International Planned Parenthood Federation (IPPF) has implemented special programmes on sexual and reproductive health for the urban poor (13). In Delhi, India, the population of about 9 million includes a considerable floating population. An NGO—Sulabh International Social Service Organization—has been developing a healthcare and sanitation model to address basic health and sanitation needs of the poor and slum-dwellers. Toilet complexes have been combined with health centres for the poor. These provide free immunization services to children and pregnant women and also free family-planning services. Healthcare is provided to the poor at a nominal price, which covers the cost of consultation and medicines (14).

Although the Health Nutrition and Population Sector Programme (HNPS) of Bangladesh designed programmes to ensure equitable essential services to all, this marginalized group of people was not, however, targeted. The Ministry of Health and Family Welfare (MoHFW) should, therefore, examine its role, together with Ministry of Local Government, Rural Development & Co-operatives (MoLGRD), to focus future programmes to meet the needs of this extreme vulnerable group of people. The present study, thus, developed and tested a mechanism to provide essential healthcare services to urban street-dwellers in Bangladesh.

## Objectives of the Study

The overall aim of the research was to develop and test strategies for providing essential healthcare services to urban street-dwellers in Bangladesh.

The specific objectives were to:

- a. assess the changes in the use of health services after the implementation of static clinics for providing essential health services to street-dwellers;
- b. assess the changes in the use of health services after the implementation of satellite clinics for providing essential health services to street-dwellers; and
- c. determine the relative effectiveness of the two approaches.

## METHODS AND MATERIALS

### Research design

The study was a pre- and post-test design. This 12-month study monitored the indicators over time, documenting the operational issues. Both impact and process indicators were measured in the study areas.

### Study area

A study was conducted in 11 selected areas of Dhaka city. These included the five major entry points for rural people moving into the city and particular locations with major concentrations of street-dwellers (10). The MSCS provides primary healthcare services through their mobile clinics in seven of the 11 areas. These seven areas were excluded from the present study for avoiding duplication of services. Two of the remaining four areas (one entry point and one concentrated area) were purposively selected. The two areas selected for the present study are Kamlapur (entry point) and Karwan Bazar (concentrated area). The study covered two-kilometre radius areas of the two sites. Two model clinics—model 1 (static clinic) and model 2 (satellite clinic)—were implemented in Karwan Bazar and Kamlapur respectively.

The study was conducted in two phases: (a) formative research and (b) implementation and evaluation of interventions.

#### a. Formative research

Formative research was conducted before designing and implementation of the proposed interventions, and the following components were included in the formative research:

*Focus-group discussion (FGD) with street-dwellers:* In total, four FGD sessions (two with females and two with males) were conducted with ever-married street-dwellers aged 15+ years. Street-dwellers who slept for the last two weeks in the locations and affected by any disease during this period were selected for data-collection. Data were collected on knowledge about healthcare facilities available for them, their use of the facilities during illness, perceptions about available services, acceptability of proposed mobile satellite clinics and static clinics, appropriate time, and place for providing services.

*In-depth interviews with service providers:* In-depth interviews were conducted with service providers in the study areas. The service providers included drug-sellers, government/NGO and private-sector providers. In total, 12 service providers were interviewed, and an equal number of providers were randomly selected from each group for interview. A list of all the service providers in the study areas was prepared for one of our earlier studies (10). The list was updated for the selection of respondents for interview. Data were collected on the use of facilities by street-dwellers for treatment, barriers they faced in providing services to street-dwellers, alternative mechanisms that could be introduced for providing services to street-dwellers, and perceptions about proposed mobile satellite clinics and static clinics.

Based on the findings of the formative research, the interventions were finalized.

#### b. Implementation and evaluation of interventions

##### Interventions

The following two models were tested:

(a) Model 1: Static clinic and (b) Model 2: satellite clinic

## Model 1: Static clinic



Previous discussions on behaviours of street-dwellers and anecdotal evidence considered that street-dwellers are a highly-mobile population so that designing long-term programmes for them would not be an effective practice. However, findings of a recent study conducted by Uddin and colleagues revealed that half of street-dwellers were staying in the same place for three years and more (10). The findings also showed that a good percentage of this group of people was staying in the same place for 10 years and more. Findings of another study showed that 54% of street-dwellers were inhabited in one place for the past four years. The study also showed that 21% of street-dwellers were inhabited in a same location for 15 years and more (15). The studies, therefore, recommended establishing static clinics for providing services to street-dwellers. Based on these findings, this project established static clinic in one selected area of Dhaka city for providing services to street-dwellers. The concerned zonal office of Dhaka City Corporation allocated a room for this purpose. Two paramedics—one female and one male—were involved in providing services from the static clinic. A package of essential services (the same package of the HNPSP) for street-dwellers was provided every alternate evening (from 6:30 pm to 10:00 pm) from different spots of the selected area. One paid volunteer from street-dwellers was involved for motivating and informing street-dwellers about the availability of services.

## Model 2: Satellite clinic

Findings of a study showed that there was no service-delivery system targeting the needs of street-dwellers, except small-scale mobile clinics of the MSCS. Although there were other healthcare facilities surrounding the concentrated areas of street-dwellers, all were involved in providing services during the day time when the street-dwellers remain outside for searching of their food. Therefore, the project organized evening satellite clinics. The mobile satellite clinics were organized in rooms of public utilities (railway station and stadium complex). Since a room was not available, a makeshift clinic was used in the satellite clinics. The paramedics who worked with model 1 clinic also provided services in the model 2 clinic areas in alternate evenings (from 6:30 pm to 10:00 pm) as the street-dwellers return from their work at this time.



One paid volunteer from street-dwellers was also involved with this component for motivating and informing street-dwellers about the availability of services.



A decorated rickshaw van was used for both the clinics to carry clinic staff and logistics, for publicity among the target people and to carry patients from the model clinic to referral points, if necessary.

For ensuring the quality of services, the paramedics were trained by the experts from the primary healthcare programme of the Directorate General of Health Services following the essential services-delivery (ESD) protocol. The study investigators used a standard checklist in both the models for monitoring and supervising activities of the clinics and service providers. As the

same service providers were involved in the satellite and static clinics, it was possible to ensure the similar quality of services in both types of clinics. As the street-dwellers are extremely vulnerable groups, special focus was given during training of the service providers so that they become non-judgemental in providing services to street-dwellers. The service providers were also oriented towards attitudes and motivational aspects for dealing with street-dwellers.



The drug-sellers of local pharmacies were used for informing street-dwellers about the availability of services for them through the model 1 and model 2 clinics. Other public healthcare providers in the areas were also informed. Names and addresses of the clinics and types of services available in the static and satellite clinics were provided to the drug-sellers and other providers. They were motivated to inform the street-dwellers about the availability of services in the model clinics and also to motivate the street-dwellers to visit the clinics for services.

A system of referral linkage was established from these clinics to the nearer health facilities managed by the Government and NGOs. The paramedics referred cases to these referral points, and a Field Research Officer (FRO) followed up the cases to know what happened after referral.

The above-mentioned models were compared with each other in terms of their cost and effectiveness. This comparison enabled us to identify the model of choice, which is financially most affordable and programmatically most effective.

All the components of primary healthcare were included as the components of essential services, with special focus on general health, reproductive and maternal health, child health, environmental issues, and health education, and the services were provided free of charge. The services were provided to street-dwellers who slept for the last one week in the study areas. A patient card was provided to all the clients so that it became easy to keep track in subsequent visits. This study was a collaborative effort among ICDDR,B, Urban Health Programme of the DGHS of the MoHFW, DCC, Urban Primary Health Care Project (UPHCP) of the MoLGRD and NGOs. From the planning phase, relevant partners were involved, and information was shared continuously to assure a maximum of financial sustainability beyond the project and the pilot phase. For monitoring of the project activities, a project management committee headed by





Director, Primary Health Care (PHC) of the MoHFW was formed. The committee met quarterly, reviewed progress of the study activities, and provided necessary feedbacks and guidelines to the research team.

### Study population



The study population consisted of three age/sex-groups of street-dwellers. Table 1 shows the study sub-population and sources of data for each.

Table 1: Study sub-population and sources of data				
Study sub-population	Age-group (years)	Source of data	Age of respondents	No. of respondents
Children	<5	Structured questionnaire	Ever-married females aged 15+ years	800
			Ever-married males aged 15+ years	800
Females (ever-married)	15+	Structured questionnaire	Ever-married females aged 15+ years	800
		In-depth interviews	Ever-married females aged 15+ years	10-12
Males (ever-married)	15+	Structured questionnaire	Ever-married males aged 15+ years	800
		In-depth interviews	Ever-married males aged 15+ years	10-12

## Sampling and sample-size

Two groups of adults (male and female) were drawn from street-dwellers who slept in the last week within the area of two-kilometre radius in the two study areas. To estimate a 10% increase in the use of services by street-dwellers from the existing 34% from the government/NGO facilities for any ailment, with 95% confidence interval, and 80% power, the required sample was 200 ever-married females and 200 ever-married males aged 15+ years from each of the study area. In total, 800 females and 800 males were interviewed at baseline and endline from the two study areas. The interviewers visited the centre of a study area and spun a bottle to randomly select a direction. The interviewers then went to the border of the selected direction of an area and interviewed following clockwise direction till the completion of interviews of the target population from each area. A group of interviewers consisting both female and male conducted interviews.

In total, 12 randomly-selected service providers, including paramedics and volunteers involved in providing services in the model 1 and 2 clinics, general practitioners, and drug-sellers from each study area were interviewed.

## Collection of data

**Survey:** The community-based survey of adult street-dwellers was conducted by experienced interviewers using structured questionnaires, supervised by the researchers. A team consisting of both male and female interviewers collected data on the following variables:

**Males and females aged 15+ years:** Sociodemographic characteristics; knowledge on healthcare facilities available for them; number of street-dwellers became sick during the last two weeks and type of problems faced; knowledge on healthcare facilities and use of healthcare services; proportion of street-dwellers sought healthcare; type of facilities visited; reasons for not visiting the facilities; barriers experienced to accessing health services; attitudes of healthcare providers; measures taken for maintaining privacy; practice of providers during providing services; satisfaction with services received by street-dwellers from the mobile satellite clinics and static clinics; and practices relating to the use of water/defaecation/handwashing; sources of drinking-water and water for other purposes; places for defaecation; and handwashing habits.



**Females aged 15+ years:** Proportion of pregnant mothers who had ANC during a recent pregnancy (current 6+ months); sources of ANC; place of delivery (in the last 12 months); proportion of deliveries conducted by qualified persons; percentage of mothers used family-planning methods; sources of family-planning services; and knowledge on the use of service for the treatment of sexually transmitted diseases.

**Males aged 15+ years:** Use of family-planning methods; type of method use and sources of supply; and knowledge on sexually transmitted diseases and use of treatment.

**Under-five children:** The proportion of fully-immunized 12-23-month-old children; vitamin A supplementation for under-five children in the last six months; prevalence of diarrhoeal diseases among under-five children in the last two weeks; prevalence of acute respiratory infection (ARI) among under-five children in the last two weeks; and care sought for episodes of diarrhoeal diseases and ARI among under-five children in the last two weeks.

**Cost data:** Data on costs were obtained from the project's financial database, facility-level inventory (Annexure 1) record review of, and data derived from the baseline and endline surveys. The local market rate on rent of equivalent floor space was obtained from the owners of similar space/rooms (Annexure 2). Key-informant interviews (n=2) were conducted at the national level with the National Logistic Officer and Accounts Officer at the EPI headquarters to estimate the vaccine cost. The cost of EPI vaccine used per child [vaccines, vaccine carrier, auto-disposable (AD) syringe, and EPI card only] was calculated based on information from the latest consignment of EPI vaccines imported by the MoHFW in 2010. The unit cost of each type of vaccine was calculated which included the manufacturing cost, freight charge, service charge of the United Nations Children's Fund (7.50% of total cost), and duty paid by the Central Medical Stores Depo (CMSD) (7.50% of total cost) (Annexure 3). The unit cost of the vaccine carrier and

the EPI card was obtained from the EPI headquarters (Annexure 4). Costs of contraceptives were gathered from the partner NGOs (Annexure 5).

**Capital cost:** Costs of furniture-fixtures, medical appliances, renovations, and family health card were considered capital cost. The useful lifetime and current value of these inputs were ascertained in consultation with experts of the respective area. Based on the useful lifetime of each input and 5% discounting rate, the corresponding annualization factor was obtained from the standard table (16) for calculating the annualized cost for the study period of one year. The total economic value was then calculated, and the proportionate amount was allocated to each type of service-delivery models based on the percentage of use of individual inputs (Annexure 6 and 7).

**Recurrent cost:** Costs associated with medicines consumed, deployment of staff, refresher training, stationeries, and shadow price for rent of space used, and (hidden cost of) vaccines and contraceptives distributed were considered recurrent cost. Aggregated actual costs of medicines, stationeries, staff salary/allowances, and training were derived from the project's financial database and added to get the total recurrent cost (Annexure 2, 3, 8, 9 and 10). Cost allocation of the above-mentioned cost components to the model 1 and 2 clinics was made applying allocation factor, i.e. proportion of use/consumption of inputs by the individual model.

**Service statistics/administrative data:** Service statistics were collected from records and reports to assess the status of morbidity and use of facilities by street-dwellers during their sickness.

## Qualitative components

Qualitative data were collected to supplement quantitative data. Experienced Field Research Assistants (FRAs) collected quantitative data.

**In-depth interviews with street-dwellers:** In-depth interviews were conducted with ever-married female and male street-dwellers aged 15+ years. In total, 12 street-dwellers were interviewed from each sex. Street-dwellers who became sick during the last two weeks were selected for interview. The respondents were selected in such a way that they represent young adults, currently married, and pregnant mothers. Data were collected on the frequency of use of healthcare facilities for the treatment of their disease, awareness about old and new systems, use of model 1 and 2 clinics, source of information about the clinics, barriers they faced in receiving services, perceptions about the new and old systems, and also about their perceptions on services received (referral, especially concerning free services).

**In-depth interviews with healthcare providers:** In-depth interviews were conducted with service providers. A list of all the service providers in the study areas was available from the previous study (Uddin *et al.*, 2009). The list was updated for the selection of respondents for interview. Twelve randomly-selected service providers, including paramedics involved with providing services in the model 1 and 2 clinics and NGOs, volunteers involved with the model clinics, and drug-sellers from each study area were interviewed. Data were collected on the use of the model clinics by street-dwellers, barriers they faced in providing services, perceptions about the systems, and their suggestions on improving the strategies.

**Observations:** Observation was made in the study sites at different times throughout the study period using a set of guidelines. Client-provider interactions, counselling, maintenance of privacy, and practice of providers during the study period were observed by the FRO when street-dwellers visited the clinics for services. The main focus of attention was on how the street-dwellers were treated by the service providers and their healthcare-seeking behaviours. The FRO used an observation guideline for observation at the clinics.

## Analysis of data

a. The quantitative data from the surveys were entered into visual Basics/FoxPro and analyzed with the SPSS PC+ software. The quality of data was maintained through supervision and checking to ensure that errors were minimized. Analysis of quantitative data was based on baseline and endline for the assessment of the selected health and family-planning indicators, calculation of changes, and statistical significance based on 95% confidence intervals and *t*-test. Comparison of service-use between the model 1 clinic and the model 2 clinic was also carried out to determine the comparative effectiveness.

b. *Cost analysis*: A combination of bottom-up (micro-costing) and top-down (macro-costing) approach was applied to estimate the cost of intervention at the field level over the project period of one year, taking into consideration the supply-side perspectives only. Cost information has been presented in two ways: (a) combined total cost of the model 1 and model 2 clinics and (b) separate costs of the model 1 and 2 clinics that were attributable to the corresponding outcomes, i.e. number of patients received essential healthcare services by type of service-delivery model during the study period.

First, all inputs mobilized for implementing the service-delivery model 1 and 2 at the field level were identified, quantified, and valued in local currency. The total cost was estimated adding the capital and recurrent costs of the two models separately and combined. Second, an attempt was made to relate the costs of two models to the corresponding outcomes for estimating the average cost per patient managed.

Joint costs, i.e. staff, medicines, medical appliances, contraceptives, stationeries, van, etc., were apportioned applying the allocation factor based on the percentage of use of individual inputs by each type of service-delivery model. The percentage of use was determined according to the number of workdays each model remained functional out of the total length of operations. Shadow price was considered for three major inputs for which the project did not pay any charge. Charges for these were waived by the relevant authorities for the study purpose. These inputs included floor space used for static (model 1) and satellite clinics (model 2), EPI vaccines used, and contraceptives distributed. Other inputs were valued based on quantity and unit price.

c. Qualitative data collected through in-depth interviews and observations were transcribed and then translated into English. Data were then analyzed using content analysis. Analysis of qualitative data was begun with the first field activities and led to refinements as the study proceeded. The data-analysis processes followed a sequence of interrelated steps. The process included reading, coding, displaying, reducing, and interpreting. At first, transcripts were read carefully and then coding of data was begun. Reading and coding were initiated while data were collected. The data-display and reduction process was conducted at desk once all the data had been collected. Even during data display and reduction, the investigators reviewed earlier steps to refine codes, reread texts, and revised some aspects of the analysis.

## RESULTS

### Sociodemographic information

Table 1 shows that 8% and 13% of the female respondents (n=401 and n=403) at baseline and endline respectively were adolescents. About half of both female and male street-dwellers were aged 20-39 years. Of the female respondents, about half at baseline and one-third at endline were widowed, abandoned, divorced, or separated. The number of female street-dwellers who had never gone to school were higher compared to the number of male street-dwellers both at baseline and endline. The main occupations of the female street-dwellers were vegetable and

waste picking and selling, begging, day labour, and domestic help. On the other hand, the main occupations of the male street-dwellers were day labour, rickshaw/van-pulling, begging, and small business.

<b>Table 1. Sociodemographic characteristics</b>				
Characteristics	Females (%)		Males (%)	
	Baseline (n=403)	Endline (n=401)	Baseline (n=403)	Endline (n=401)
<b>Age (years)</b>				
<20	8	13	3	2
20-29	22	32	24	21
30-39	27	29	27	28
>40	43	27	50	49
<b>Marital status</b>				
Married	55	71	86	95
Widowed	25	16	4	2
Left off (abandoned)	10	8	7	1
Divorced	6	1	2	1
Separated (not divorced)	4	4	2	1
<b>Education</b>				
Never gone to school	86	76	64	56
Primary incomplete	12	19	26	32
Primary complete	1	2	7	7
Secondary incomplete	1	3	3	5
<b>Number of family members living together</b>				
Children (mean±SD)	2.2±1.2	2.1±1.2	2.2±1.3	2.6±1.4
Adults (mean±SD)	1.8±1.1	1.8±0.9	1.6±0.7	1.8±1.2
Total (mean±SD)	3.2±1.8	3.0±1.8	2.3±1.7	2.9±2.1
<b>Occupation</b>				
None/unemployed	14	9	1	-
Vegetable picking and selling	28	23	5	3
Begging	17	10	20	12
Housemaid (domestic help)	10	12	-	-
Day labour	9	26	36	47
Rickshaw/van-pulling	-	-	23	22
Small business	6	8	10	11
Salesman	4	-	2	2
Hawker	3	-	2	1
Garment worker	3	0	-	-
Drug (addicted substance) selling	3	8	1	1
Sex worker	2	4	-	-
Transport worker	1	-	-	1

The findings from qualitative data showed that the male participants were aged 21-57 years. All of them were living with their wives and children, and each family comprised 3-7 members. Their main occupations were van-pulling, hawker, labour, or begging. The duration of their living in the street was 5-20 years.

The females who participated in in-depth interviews were aged 22-39 years. Each woman lives with her husband and children under the open sky on the street. Each family comprises 3-6 members. They were staying in the street for 5-15 years. Three women have been staying in the street since their birth. Their main occupation was maid servant, collection of discarded materials around and selling, and day labour.

The street-dwellers were asked about reasons for living in the street. Both male and female street-dwellers mentioned lack of money, it is easy to get work, and no need to pay house rent (Table 2). Other common reasons included: feeling comfortable to stay on the street with others, relatives were also living in the street, it is easy to take drugs, and it is easy to do sex work.

Table 2. Reasons for living as street-dwellers				
Reasons*	Females (%)		Males (%)	
	Baseline (n=403)	Endline (n=401)	Baseline (n=403)	Endline (n=401)
Lack of money	52	20	35	55
Easy to get work	36	46	39	24
No need to pay house rent	31	68	10	32
No other alternatives	16	8	10	7
Feeling comfortable to stay in the street with others	11	1	10	2
As relatives/neighbourers stay in the street	6	-	12	2
Easy to take drugs	-	-	7	1
Easy to do sex work	1	2	1	-
*Multiple responses				

Table 3 shows the length of time both females and males, during baseline and endline data-collection, had been living in the street. The findings revealed that most female and male street-dwellers had been staying in the street for more than a year. About one-third of the street-dwellers had stayed in the street for 3-10 years. The findings also revealed that approximately one-third had stayed in the street for more than 20 years.

Table 3. Duration of living as street-dwellers				
Duration (years)	Females (%)		Males (%)	
	Baseline (n=403)	Endline (n=401)	Baseline (n=403)	Endline (n=401)
<1	4	3	7	2
1-<3	12	8	11	7
3-<5	9	7	10	8
5-<10	24	19	22	20
10-<15	16	16	15	19
15-<20	11	13	10	13
>20	24	34	25	31

## Morbidity among street-dwellers

Data on morbidity of the street-dwellers before and after the implementation of the model clinics were collected and analyzed. The street-dwellers were asked during data-collection if they were currently sick. Current sickness among the female street-dwellers at endline decreased in both model 1 and model 2 clinic areas, and the difference of decrease of sickness was highly significant ( $p<0.001$ ) (Table 4). The absolute difference of decrease of current sickness among the female respondents in the model 1 and 2 clinics was 35% and 15% points respectively.

Current sickness among the male street-dwellers at endline also decreased significantly in the model clinic 1 area compared to that at baseline. The absolute decrease of current sickness among the male respondents in the model 1 and model 2 clinics was 30% and 9% points respectively.

A question was asked to the street-dwellers who were not currently sick if they became sick during the past two weeks. The table shows that, although there was not a significant difference but sickness among the female and male street-dwellers during the past two weeks decreased at endline compared to baseline.

Morbidity	Females (%)					
	Model 1			Model 2		
	Baseline (n=203)	Endline (n=200)	Absolute difference (% points)	Baseline (n=200)	Endline (n=201)	Absolute difference (% points)
Currently sick	83	48**	35	83	68**	15
Reported illness during the past two weeks (if not currently sick)	51	48	3	40	31	9
Morbidity	Males (%)					
	Model 1			Model 2		
	Baseline (n=201)	Endline (n=200)	Absolute difference (% points)	Baseline (n=200)	Endline (n=201)	Absolute difference (% points)
Currently sick	89	59**	30	80	71	9
Reported illness during the past two weeks (if not currently sick)	64	60	4	40	35	5

\*\* $p<0.001$

Morbidity reported by the street-dwellers was divided into two categories: reproductive health morbidity and general health morbidity. Table 5 shows that the street-dwellers were affected by both reproductive and general health problems. The reproductive health problems included: lower abdominal pain, vaginal/urethral discharge, and genital itching/burning. The major general health problems reported by the street-dwellers were disease of the respiratory system, weakness, severe headache and chest pain, and diseases of digestive system. The findings revealed that both reproductive and general health problems reported by the female and male street-dwellers in both the model clinic areas decreased at endline compared to baseline.



**Table 5. Type of morbidity among street-dwellers**

Type of sickness*	Females (%)				Males (%)			
	Model 1		Model 2		Model 1		Model 2	
	Baseline (n=186)	Endline (n=145)	Baseline (n=179)	Endline (n=157)	Baseline (n=195)	Endline (n=167)	Baseline (n=176)	Endline (n=178)
Reproductive health								
Lower abdominal pain	16	6	16	1	4	1	3	1
Vaginal/urethral discharge	10	6	5	10	1	2	5	0
Genital itching/burning	7	3	8	3	6	3	4	0
Others (irregular period/ prolepses/ coming out of uterus)	5	3	7	2	6	4	4	2
General health								
Disease of the respiratory system (cold/ cough/fever/ asthma/ breathing difficulties)	36	27	34	24	37	25	39	18
Weakness	45	25	30	43	30	44	23	34
Sever pain (headache/ chest)	35	23	34	24	29	43	23	48
Diseases of the digestive system (gastic ulcer/gastritis, diarrhoea)	19	7	13	17	19	44	18	25
Eye problem	7	2	8	3	4	3	7	2
Scabise	4	2	2	4	5	8	5	3
Blood pressure (high)	2	3	2	3	1	0	0	3
Others (blood with cough, fever at night, chickenpox)	2	2	3	2	5	3	3	2
*Multiple answers								

## Knowledge about healthcare facilities and use of healthcare services

### *Knowledge about healthcare facilities*

To assess the knowledge of the street-dwellers about healthcare facilities where services are available for them, data were collected and analyzed. The findings revealed that knowledge about the government facilities decreased among both male and female street-dwellers at

endline compared to baseline in both the model clinic areas (Table 6). Most street-dwellers in both the model clinic areas reported during endline data-collecteion that they knew about the ICDDR,B's static and satellite clinics (model clinics). Knowledge about NGO clinics also increased among both female street-dwellers of both model 1 and model 2 clinic areas and male street-dwellers of the model 2 clinic at endline. Although both government and NGO clinics were referral points for the two clinics, the street-dwellers mostly visited the NGO referral points, which may be a reason for increasing knowledge about the NGO clinics among the street-dwellers.

**Table 6. Knowledge of street-dwellers about facilities where services are available for them**

Knowledge about facilities*	Females (%)				Males (%)			
	Model 1		Model 2		Model 1		Model 2	
	Baseline (n=186)	Endline (n=145)	Baseline (n=179)	Endline (n=157)	Baseline (n=195)	Endline (n=167)	Baseline (n=176)	Endline (n=178)
Government clinics/hospitals	53	45	30	15	75	59	50	15
ICDDR,B static clinic	0	92	0	3	0	96	0	0
ICDDR,B satellite clinic	0	0	0	97	0	0	0	96
NGO clinic	11	29	38	43	1	1	17	29
Private clinic	2	1	0	27	10	10	7	15
Doctors' chambers	5	16	9	38	36	16	22	27
Pharmacy	72	77	67	20	83	58	84	77
Homeopath pharmacy	7	1	5	1	8	3	1	2
*Multiple responses								

Qualitative data showed that the male and female informants of both the model clinic areas informed that there are clinics for the poor people in the zonal office of DCC at Karwan bazar, Kamlapur Railway Station, and Mughda Stadium, and different types of treatment are available there. One of the female said, "one year ago, this clinic was established". According to the street-dwellers, the poor street-people of the area usually visit the clinics for treatment. They were also aware of pharmacies and private clinics in their area. In addition, one male informant said about an NGO 'Aparajeyo Bangla' drop-in-centre, and two male informants said about the Bangladesh Government Press hospital.

They said about the model clinics that the male/female doctors of the cholera hospital (ICDDR,B) at Mohakhali come to the clinics and give them treatment and medicines free of charge. A female doctor provides treatment to female patients, and a male doctor provides treatment to male patients. They informed that both the clinics give them a yellow card and provide free treatment and medicines.

According to the female informants interviewed, different types of treatment are provided from the clinics, such as treatment for general patients, ANC, postnatal care (PNC), child immunization, tetanus toxoid (TT) vaccine, supply of family-planning methods, and oral rehydration solution (ORS) packets. They also added that the service providers of the clinics give different types of advice to the people, including family-planning methods; maintenance of hygiene; drug-use; handwashing before meal and after defaecation; child health; pregnancy, and delivery and post-delivery care. The street-dwellers stated that the service providers of the clinics referred them to

the government and NGO clinics as all types of healthcare services are not available in the clinics. The street-dwellers informed that the services were being provided from the clinics from 6:00 pm to 10:00 pm, and they could also mention the weekly schedule of service-delivery in the clinics. Most of them received information about the clinics from the project staff. According to them, the clinic staff visited them and informed them about the clinics. Some street-dwellers informed that their neighbours who visited the clinics for services informed them about the clinics and their services. One informant of the model clinic area said,

Everybody knows that the clinic opens three days a week, from evening to night. We got the information about the clinic from the people of the clinic—they came to us and wrote our names. When the clinic starts, people come to our area and inform us about the presence of doctors. And those who need any treatment go to the clinic. The people who went to the clinic received a card, and they visit the clinic with the card for services.

### *Use of healthcare services*



We collected and analyzed data to assess the status of use of healthcare services among the street-dwellers during their illness. Table 7 shows that the use of healthcare services by the female street-dwellers increased after the implementation of the clinics compared to before its implementation, and the difference was highly significant ( $p < 0.001$ ). The table shows that the absolute difference of increase in the use of healthcare services by the female street-dwellers between baseline and endline was 56% and 31% points respectively.

The use of healthcare services by the male street-dwellers at endline increased significantly compared to baseline in both the model 1 and 2 clinic areas (Table 7). The absolute difference of increase in the use of services by the male street-dwellers between baseline and endline was 27% and 34% points in the model 1 and 2 clinic areas respectively.

Table 7. Use of healthcare services						
Use of healthcare services	Females (%)					
	Model 1			Model 2		
	Baseline (n=186)	Endline (n=145)	Absolute difference (% point)	Baseline (n=179)	Endline (n=157)	Absolute difference (% point)
	40	96**	56	31	62**	31
Sought healthcare services	Males (%)					
	(n=195)	(n=167)	(% point)	(n=176)	(n=178)	Absolute difference (% point)
	72	99**	27	40	74**	34

\*\*p<0.001

Table 8 shows that the female and male street-dwellers mostly bought medicines from drug-sellers at the nearest pharmacy at baseline in both the clinic areas. However, the use of pharmacy by them greatly decreased in both the areas at endline. The use of static and satellite clinics by the street-dwellers was remarkably high at endline. The table further shows that the use of government and NGO clinics for healthcare services by them reduced at endline compared to

Table 8. Type of clinic/facility visited for services								
Type of clinic/facility visited*	Females (%)				Males (%)			
	Model 1		Model 2		Model 1		Model 2	
	Baseline (n=74)	Endline (n=139)	Baseline (n=109)	Endline (n=97)	Baseline (n=140)	Endline (n=165)	Baseline (n=122)	Endline (n=131)
Pharmacy/drug store	64	25	56	9	85	19	75	37
Government clinic/hospital	28	1	14	1	19	14	15	3
ICDDR,B static clinic (model 1)	0	71	0	0	0	93	0	0
ICDDR,B satellite clinic (model 2)	0	0	0	79	0	0	0	77
Quack doctors/street-vendors	5	0	6	0	12	0	3	0
NGO clinics	4	7	29	6	12	2	5	1
Homeopath and Ayurvedic pharmacy	13	1	9	6	9	5	6	2
Doctors' chambers	1	2	5	3	4	3	9	2
Private clinic	0	0	0	2	0	0	2	2

\*Multiple responses

baseline, which may be due to the increased use of the model clinics.

The healthcare services provided to the street-dwellers from the model clinics were recorded in the clinic register and were subsequently computerized. These service data of the project period

Table 9. Number of patients received general health services/treatments from the model clinics				
Treatment/service received for general health problems	No. of patients received treatment/services			
	Model 1		Model 2	
	Female	Male	Female	Male
Gastitis	949	1,041	555	594
General weakness	322	720	214	384
Hypertension	90	38	59	12
Anaemia	588	248	426	153
Pain (headache and others)	992	1236	605	689
Common cold and cough	333	545	257	355
Fever	153	417	122	233
Asthma	45	70	43	63
Scabies	70	37	28	24
Infections (any)	218	232	96	158
Injury (any)	25	127	15	98
Diarrhoea	47	60	42	70
Dysentery	13	49	8	18
Others	756	667	504	428
Total	4,601	5,487	2,974	3,279
Referred for treatment of general health problems	60	67	34	30
Reproductive health				
STI/RTI	311	55	177	30
Referred				
Antenatal care visit				
1 <sup>st</sup>	56	-	37	-
2 <sup>nd</sup>	33	-	22	-
3 <sup>rd</sup>	27	-	16	-
>3 <sup>rd</sup>	14	-	12	-
Prenatal care visit (within 42 days)				
1 <sup>st</sup>	18	-	19	-
2 <sup>nd</sup>	17	-	10	-
3 <sup>rd</sup>	4	-	2	-
Contraceptives				
Condom	125	57	73	19
Pill	56	-	67	-
Injectables	176	-	89	-
Referred				
Child immunization				
BCG	16	18	10	9
Pentavalant				
1	35	35	17	18
2	29	39	25	16
3	26	31	23	8
Measles	11	15	11	4

RTI=Reproductive tract infection; STI=Sexually transmitted infection

were analyzed. Table 9 shows the status of patients received treatment from the model clinics during the study period. The table shows that 4,601 female and 5,487 male street-dwellers were provided general healthcare services from the model 1 clinic. On the other hand, 2,974 female and 3,279 male street-dwellers were treated for their general healthcare problems at the model 2 clinic. The main general health problems included: gastritis, general weakness, hypertension, anaemia, pain (headache and others), common cold and cough, fever, asthma, scabies, infections (any), injury (any), diarrhoea, and dysentery. The table further shows the number of street-dwellers who received services on sexually transmitted diseases (STDs), ANC, PNC, contraceptives, and child health.

Qualitative data showed that each female and each male who participated in in-depth interviews received treatment from the clinics at least twice.

One woman who participated in in-depth interviews in the model 1 clinic area informed that she went to the pharmacy once after establishing the model clinics. She said that she had high fever and was unable to walk and reach the clinic. One male informant of the model 1 clinic said,

After the establishment of the clinic for us, most of the time we visit the clinic for treatment while suffering from diseases and bring medicines from there. The treatment is free in this clinic, and we received services without money.

### Status of retention of family health card

A family health card containing particulars of all family members of the street-dweller was provided from the model 1 and 2 clinics, and the street-dwellers were supposed to bring the card to the clinics during their subsequent visits. Table 10 shows the status of retention of the card among the street-dwellers. The table also shows that, although all the street-dwellers reported that they received the card, more than 80% retained it.

Table 10. Retention status of family health card among street-dwellers who visited model clinics								
Family health card	Females (%)				Males (%)			
	Model 1		Model 2		Model 1		Model 2	
	Baseline (n=0)	Endline (n=98)	Baseline (n=0)	Endline (n=77)	Baseline (n=0)	Endline (n=153)	Baseline (n=0)	Endline (n=100)
Received card	0	100	0	100	0	100	0	100
Status of card retention								
Received and has card	0	80	0	84	0	82	0	86
Received but does not have card	0	20	0	16	0	18	0	14

### Reproductive and maternal health

#### *Pregnancy, antenatal care, and childbirth*

Table 11 shows the status of pregnancy care and ANC received by mothers. Of the female



street-dwellers, 4-6% were currently pregnant of six months or above in both the model clinic areas (Table 11). The use of ANC by the pregnant mothers substantially increased at endline compared to baseline in both the model clinic areas.

Table 11. Information relating to pregnancy				
Status	Percentage of street-women			
	Model 1		Model 2	
	Baselin (n=203)	Endline (n=200)	Baselin (n=200)	Endline (n=201)
Currently pregnant				
Yes	4	6	5	6
No	96	94	95	94
Received antenatal care				
Yes	50	100	62	77
No	50	0	28	33

At endline, 100% of the mothers in the model 1 clinic and 50% in the model 2 clinic areas visited the NGO clinics for ANC while only 13% visited the model 1 clinic but none visited the model 2 clinic at baseline (Table 12). The NGO clinics where mothers visited for ANC were the referral points of the model clinics. The attendance in the clinics increased at endline as the mothers were referred by the providers of the two model clinics. The table also shows that the use of ANC from the model 1 and 2 clinics was 88% and 50% respectively at endline. Data on receiving at least two doses of TT vaccine were collected, and the findings revealed that the status of receiving two doses of TT vaccine increased from 11% at baseline to 58% at endline in the model 1 clinic area. The status of receiving TT vaccine among the mothers in the model 2 clinic area increased from 30% to 62%.

Table 12. Facilities visited for antenatal care of current pregnancy				
Antenatal care*	Percentage of pregnant women			
	Model 1		Model 2	
	Baseline (n=4)	Endline (n=12)	Baseline (n=6)	Endline (n=9)
Facilities visited				
NGO clinic	13	100	0	50
ICDDR,B static clinic (model 1 clinic)	0	88	0	0
ICDDR,B satellite clinic (model 2 clinic)	0	0	0	50
Received TT vaccine during current pregnancy (two doses)				
Yes	11	58	30	62
No	89	42	70	38

\*Multiple answers; TT=Tetanus toxoid

Clinic data showed that the number of mothers received 1<sup>st</sup>, 2<sup>nd</sup>, 3<sup>rd</sup>, and >3<sup>rd</sup> ANC visits from the model 1 clinic were 56, 33, 27, and 14 respectively (Table 13). On the other hand, the number of mothers received 1<sup>st</sup>, 2<sup>nd</sup>, 3<sup>rd</sup>, and >3<sup>rd</sup> ANC visits from the model 2 clinic were 37, 22, 16, and 12 respectively during the study period.

Table 13. Status of ANC received by mothers from model 1 and model 2 clinics		
ANC visit	No. of mothers received ANC	
	Model 1	Model 2
1 <sup>st</sup>	56	37
2 <sup>nd</sup>	33	22
3 <sup>rd</sup>	27	16
>3 <sup>rd</sup>	14	12

ANC=Antenatal care

### Childbirth

The street-women who were not currently pregnant were asked if they had given birth during the last 12 months preceding data-collection. The findings revealed that 18% and 17% of the mothers at baseline and endline gave births in the model 1 clinic areas respectively (Table 14). On the other hand, in the model 2 clinic area, 11% and 13% of the mothers gave births at baseline and endline respectively.

Table 14 shows that 65% of the deliveries were conducted in the street in the model 1 clinic area before the implementation of the model clinics while there was zero delivery in the street after the implementation of the clinic in the area. The rate of deliveries in the street decreased from 50% to 20% after the implementation of the model 2 clinic in its area. The findings revealed that the number of deliveries in clinics, such as public, NGO, and private clinics, increased after the implementation of the model clinics compared to before their implementation, except public facilities in the model 2 clinic area. The table also shows that the rate of deliveries attended by relatives came down from 59% at baseline to 0% at endline in the model 1 clinic area. The rate of deliveries attended by relatives decreased from 40% at baseline to 24% at endline in the model 2 clinic area. The number of deliveries conducted by trained personnel, such as nurses/midwives, and MBBS doctors, increased at endline compared to baseline in both the model clinic areas.

In absence of any delivery facility at the model clinics, the pregnant mothers were referred to the nearby government and NGO clinics for delivery. Information about the referred mothers



**Table 14. Status of delivery and delivery care among street-women who gave birth during the previous 12 months**

Delivery and delivery care	Percentage			
	Model 1		Model 2	
	Baseline (n=194)	Endline (n=188)	Baseline (N=190)	Endline (n=190)
Gave birth during the last 12 months				
Yes	18	17	11	13
No	82	84	90	87
Place of delivery				
Street	65	0	50	20
At home (village home or rented home in slums at that time)	29	52	40	40
Public facilities	3	32	5	0
NGO clinic	3	6	5	40
Private hospital/clinic	0	10	0	0
Delivery attended by				
Relatives and neighbours	59	0	40	24
birth attendant	32	44	45	36
Nurses/midwives	6	36	10	24
MBBS doctor	0	13	0	8
Nobody (self)	3	0	5	0
Trained birth attendants	0	7	0	8

was recorded, and the project staff subsequently followed up to know about their delivery status and to motivate them to receive PNC. Table 15 shows the status of deliveries as per the clinic records of the mothers during the project period. The findings showed that 31 and 21 mothers were referred from the model 1 and 2 clinics respectively to the referral points. In the model 1 clinic area, of 31 mothers referred, 20 (65%) deliveries were conducted either in the public facility or in the NGO hospitals. On the other hand, of 21 mothers referred, 17 (81%) deliveries were conducted in hospital. The clinic records showed that midwives/nurses conducted most deliveries. Two deliveries required session caesarian section that were attended by MBBS doctors. The deliveries in the referral centres (public and NGO clinics) were conducted free of charge.

**Table 15. Delivery status of pregnant mothers who were referred from the model clinics**

Delivery care	No. of mothers	
	Model 1	Model 2
Total no. of pregnant mothers referred	31	21
Place of delivery		
Public facilities (Dhaka Medical College)	9	3
NGO (Ad-din, BRAC, PSTC, Nari Maitree)	11	14
Village home	6	1
Sleeping place/street	5	3
Delivery attended by		
MBBS doctors	2	0
Midwives/nurses	18	17
Untrained TBAs	7	2
Relatives	4	2

The mothers were asked if they faced any problem during delivery. The findings revealed that the problems faced by the mothers at endline significantly decreased in the model 1 clinic area compared to baseline (Table 16). The table also shows that the problems faced by the mothers during delivery at endline decreased from 60% at baseline to 38% at endline in the model 2 clinic areas. An increased number of deliveries by the trained providers may be the reason for decreasing problems during delivery.

The most common problems experienced during delivery by the mothers were severe weakness, excessive bleeding, prolonged labour, severe abdominal pain, high fever, severe headache, premature rupture of the membrane, losing of consciousness, convulsion, obstructed labour, and swelling of hands, face, and legs (Table 16). The findings also showed that the problems during delivery were substantially decreased at endline compared to baseline in both the model clinic areas in the case of all the problems mentioned above, except severe weakness.

**Table 16. Problems experienced by street-women during delivery and types of problems experienced**

Problems encountered	Percentage			
	Model 1		Model 2	
	Baseline (n=34)	Endline (n=31)	Baseline (n=20)	Endline (n=25)
Experienced any problem during delivery				
Yes	94	39**	60	38
No	6	61	32	40
Type of problem faced*				
Severe weakness	38	44	41	33
Excessive bleeding	28	0	33	17
Prolonged labour	35	23	41	24
Severe abdominal pain	22	0	16	8
High fever	19	13	16	8
Severe headache	18	3	11	8
Premature rupture of the membrane	13	8	8	3
Obstructed labour	13	12	42	23
Losing of consciousness	9	3	3	2
Convulsion	6	0	0	0
Swelling (hands, face, legs)	6	4	0	8

\*Multiple responses; \*\*p<0.001

### ***Postpartum morbidity***

Data on postpartum morbidity of the women were also collected and analyzed. The findings revealed that postpartum morbidity decreased among mothers from 74% at baseline to 52% at endline in the model 1 clinic area and 60% to 50% in the model 2 clinic areas (Table 17). The reasons for decreasing postpartum morbidity among the mothers may be due to the increased number of deliveries in the hospital, deliveries conducted by the trained personnel, and health education provided from the clinics to the mothers about maternal care.

Survey data showed that the problems experienced by the mothers within 42 days of delivery decreased substantially, except lower abdominal pain, in both the clinic areas after the implementation of clinic services compared to before their implementation.

**Table 17. Problems experienced by mothers after delivery**

Problem experienced	Percentage of mothers			
	Model 1		Model 2	
	Baseline (n=34)	Endline (n=31)	Baseline (n=20)	Endline (n=25)
Experienced any problem after delivery (during 42 days)				
Yes	74	52	60	50
No	26	48	40	50
Type of problems after delivery (during 42 days)*				
Weakness	36	6	30	7
Fever	28	0	30	7
Headache	20	6	10	0
Severe lower abdominal pain	12	12	0	13
Excessive bleeding	0	0	10	7
Cough	12	0	10	0
Perineal tear	8	0	20	0
Back pain	8	6	10	0
*Multiple answers				

### ***Postnatal care***

Mothers who gave birth during the last 12 months of data-collection were asked if they sought PNC. The findings revealed that PNC significantly increased in the model 1 clinic area at endline compared to baseline (Table 18). PNC also increased at endline compared to baseline in the model 2 clinic areas, although the change was not significant.

Facilities visited by mothers for PNC at endline were mostly included model 1 and 2 clinics (Table 18). Fifty-three percent of the mothers of the model 1 clinic and 71% of the mothers of the model 2 clinic areas received treatment from the two clinics. On the other hand, visits to public and NGO clinics by mothers for PNC decreased at endline compared to baseline. This may be due to the availability of services at the model clinics which are nearer to their residents and at their convenient time.

The clinic records showed that mothers who gave births during the last one year visited the model clinics for PNC. The number of visits ranged from 2 to 3 (data not shown).

### ***Use of family-planning methods among street-dwellers***

Table 19 shows the use of family-planning methods by married female and male street-dwellers. The use of family-planning methods among the female respondents significantly increased at endline compared to baseline in both model 1 clinic and model 2 clinic areas. The use of family-planning methods by males also significantly increased at endline compared to baseline in the model 1 clinic area.

The findings revealed that the use of temporary methods among female street-dwellers slightly decreased at endline compared to baseline in both the model areas. On the other hand, the use of semi-permanent and permanent methods among females slightly increased at endline compared to baseline in both the model clinic areas, except permanent methods in the model 2 clinic areas. The table shows that the use of temporary methods among males slightly increased at endline compared to baseline in both the model clinic areas. The use of semi-permanent and permanent methods among males remained almost same at endline in both the model clinic areas.

Table 18. Status of postnatal care				
Status	Percentage			
	Area 1		Area 2	
	Baseline (n=25)	Endline (n=16)	Baseline (n=10)	Endline (n=15)
Treatment sought for postnatal care				
Yes	28	100**	30	87
No	72	0	70	13
Facilities visited*				
Public clinics/facilities	57	13	16	15
Pharmacy/drug store	43	19	71	8
Homeopath and Ayurvedic pharmacy	14	19	0	0
ICDDR,B static clinic	0	53	0	0
ICDDR,B satellite clinic	0	0	0	71
NGO clinic	0	0	43	15

\*Multiple answers; \*\*p<0.001

Table 19. Status of use of family-planning methods by females and males						
Use of family-planning methods	Females (%)					
	Model 1			Model 2		
	Baseline (n=194)	Endline (n=188)	Absolute difference (% point)	Baseline (n=190)	Endline (n=190)	Absolute difference (% point)
Used methods	35	67**	32	18	74**	56
Type of method used						
Temporary	30	23	7	51	48	3
Semi-permanent	55	60	5	23	36	13
Permanent	12	14	2	17	12	5
Traditional	3	3	0	9	4	5
Use of family-planning methods	Males (%)					
	Model 1			Model 2		
	Baseline (n=194)	Endline (n=188)	Absolute difference (% point)	Baseline (n=190)	Endline (n=190)	Absolute difference (% point)
Used methods	33	77**	44	30	41	11
Type of method used						
Temporary	52	54	2	48	55	7
Semi-permanent	41	39	-2	32	33	1
Permanent	7	7	0	18	12	-6
Traditional	0	0		2	0	

\*\*p<0.001

The clinic data showed that 125 female and 57 male street-dwellers received condoms from the model 1 clinic during the study period (Table 20). In total, 56 females received oral contraceptive pills, and 176 received injectables from the model 1 clinic during the project period. The table also shows that 73% of females and 19% of males received condoms from the model 2 clinic. The use of injectables among females was higher in both the clinics compared to other methods.

**Table 20. Distribution of contraceptives among street-dwellers from the model clinics**

Family-planning methods	No. of street-dwellers received contraceptives			
	Model 1		Model 2	
	Female	Male	Female	Male
Condom	125	57	73	19
Pill	56	-	67	-
Injectables	176	-	89	-
Referred for higher methods				
Norplant	5	-	3	-
Tubectomy	2		2	-

The model 1 and 2 clinics were mostly the supply sources for family-planning methods of females and males at endline (Table 21). The use of pharmacy by females and males for having supply of family-planning methods substantially decreased at endline compared to baseline in both the clinic areas. The use of public and NGO facilities by females and males also decreased after the introduction of the model 1 and model 2 clinics.

**Table 21. Sources of family-planning methods**

Source of family-planning methods*	Females (%)				Males (%)			
	Model 1		Model 2		Model 1		Model 2	
	Baseline (n=67)	Endline (n=125)	Baseline (n=35)	Endline (n=86)	Baseline (n=56)	Endline (n=136)	Baseline (n=50)	Endline (n=73)
Public facilities	36	18	23	14	25	21	38	37
NGO clinics	36	12	37	16	27	22	28	15
Pharmacy	28	6	40	8	48	21	34	22
ICDDR,B static clinic (model 1)	0	64	0	0	0	66	0	0
ICDDR,B satel-lite clinic (model 2)	0	0	0	62	0	0	0	48

\*Multiple answers

## Sexually transmitted diseases

### *Knowledge about sexually transmitted diseases*

The street-dwellers were asked if they heard about sexually transmitted diseases (STDs). Table 22 shows that most females and males heard about STDs in both the model clinic areas before and after the implementation of the models. The table also shows that knowledge about STDs among females and males significantly increased at endline compared to baseline in both the model clinic areas. Health education was an important component of service-delivery of the model clinics. Increase in knowledge of the street-dwellers about STDs at endline may be the effects of health education.

The street-dwellers were asked if they were aware of any symptom of STDs. The symptoms mentioned by the street-dwellers included vaginal/urethral discharge, genital ulcer/sores, smelly discharge, and lower abdominal pain (Table 22).

Table 22. Knowledge about STDs								
Knowledge	Females (%)				Males (%)			
	Model 1		Model 2		Model 1		Model 2	
	Baseline (n=203)	Endline (n=200)	Baseline (n=200)	Endline (n=201)	Baseline (n=203)	Endline (n=200)	Baseline (n=200)	Endline (n=201)
Heard about STDs	85	99**	75	100**	85	99**	72	98**
No	15	1	25	0	15	1	28	2
Vaginal/urethral discharge	82	22	61	62	77	60	60	61
Genital ulcer/sores	38	62	44	77	85	63	51	85
Smelly discharge	3	56	6	59	3	19	5	2
Lower abdominal pain	8	2	7	38	1	1	0	0
Others (burning, vaginal bleeding, pain in cervix)	2	1	7	1	2	2	6	2
*Multiple answers; **p<0.001								

In response to a question if they experienced any of the symptoms mentioned by them during the last one year, a good percentage of females and males gave affirmative answer (Table 23). The table shows that status of STDs experienced by females decreased at endline compared to baseline in the model clinic 1 area, and the difference was highly significant. Although not significant, the experience of STDs among males also decreased at endline compared to baseline in both the model clinic areas. The street-dwellers who experienced STDs were asked if they sought any treatment. The table shows that treatment sought by females and males increased at endline compared to baseline in both the model clinic areas, and the difference was highly significant.

Table 23. Experienced any symptom of sexually transmitted diseases by street-dwellers during the last one year								
Experienced any symptom of STD	Females (%)				Males (%)			
	Model 1		Model 2		Model 1		Model 2	
	Baseline (n=203)	Endline (n=200)	Baseline (n=200)	Endline (n=201)	Baseline (n=203)	Endline (n=200)	Baseline (n=200)	Endline (n=201)
Experienced any symptom of STDs								
Yes	69	36**	53	59**	27	21	31	22
No	31	64	47	40	73	79	69	78
Sought treatment for STDs								
Yes	26	84**	36	69**	80	100*	52	91**
No	74	16	64	31	20	0	48	9
**p<0.001; *p<0.005								

According to the clinic records, 311 and 55 female street-dwellers received treatment for STDs from the model 1 and 2 clinics respectively during project period (Table 24). On the other hand, 277 and 30 male street-dwellers received treatment for STDs from the model 1 and 2 clinics respectively. STDs reported by the street-dwellers included: gonorrhoea (whitish discharge from urethra, burning sensation during micturation, dysuria), syphilis (ulcer in genital organ/painless, swelling in inguinal lymphnode), candidiasis (whitish vaginal discharge, itching in valve, soreness in valve-swelling), trichomoniasis (vaginal infection), itching in valve, painful micturation), and pelvic inflammatory disease (lower abdominal pain with back pain, vaginal discharge, pelvic tenderness). The street-dwellers had these problems for three months to two years.

Survey data showed that the model clinics were mainly the facilities visited by females and males for the treatment of STDs at endline. The use of homeopath and Ayurvedic pharmacy and pharmacy (drug stores) for the treatment of STDs by females and males substantially decreased at endline compared to baseline in both the model clinic areas. The use of public and NGO facilities by females and males also decreased after the introduction of the model 1 and model 2 clinics.

Table 24. Facilities visited by street-dwellers for treatment of STDs								
Facilities visited*	Females (%)				Males (%)			
	Model 1		Model 2		Model 1		Model 2	
	Baseline (n=37)	Endline (n=61)	Baseline (n=38)	Endline (n=82)	Baseline (n=44)	Endline (n=42)	Baseline (n=32)	Endline (n=41)
Homeopath and Ayurvedic pharmacy	50	5	45	24	57	29	41	10
Public facilities	19	0	3	4	7	9	3	2
Pharmacy	14	10	11	1	23	2	38	17
ICDDR,B static clinic (model 1 clinic)	0	73	0		0	60	0	0
ICDDR,B satellite clinic (model 2 clinic)	0	0	0	60	0	0	0	30
NGO clinic	5	8	32	10	5	2	13	15
Doctors' chamber	8	2	3	2	9	2	3	17
Others (street vendors/traditional healers)	5	3	10	0	6	0	3	0

The findings revealed that knowledge of the street-dwellers about the prevention of STDs also increased after the implementation of the model clinics compared to before their implementation. Table 25 shows that knowledge among both female and male street-dwellers about the prevention of STDs increased after the implementation of clinic services compared to before their implementation. This may be due to health education provided from the model clinics.

Table 25. Knowledge of street-dwellers about prevention of STDs								
Knowledge about prevention of STDs*	Females (%)				Males (%)			
	Model 1		Model 2		Model 1		Model 2	
	Baseline (n=203)	Endline (n=200)	Baseline (n=200)	Endline (n=201)	Baseline (n=203)	Endline (n=200)	Baseline (n=200)	Endline (n=201)
Use of condom	12	79	11	70	6	62	2	36
Abstain sex from sex worker	7	27	8	59	48	69	18	88
Know nothing	5	0	5	0	0	0	0	0
Use of medicines	61	33	55	30	56	18	55	19
Wash sex organ with detol or urine	4	0	11	2	0	0	24	0
Stay clean	2	0	12	0	6	18	2	0
Use of traditional (kobirajee) treatment	15	0	11	2	0	0	0	0

STDs=Sexually transmitted diseases

## Child Health

### Childhood immunization

Respondents with children aged 12-23 months were asked about the vaccination status of those children. Table 26 shows the vaccination status of the children. Although not large, the coverage of child immunization increased at endline compared to baseline in both the model clinic areas. Mention may be made here that the status of coverage presented at baseline was the reported coverage—because none of the respondents could show any vaccination card; however, all the respondents showed the EPI card at endline.

Table 26. Reported status of immunization of children aged 12-23 months								
Received vaccines (any dose)	Females (%)				Males (%)			
	Model 1		Model 2		Model 1		Model 2	
	Baseline (n=203)	Endline (n=200)	Baseline (n=200)	Endline (n=201)	Baseline (n=203)	Endline (n=200)	Baseline (n=200)	Endline (n=201)
Yes	10	14	7	13	6	8	4	8
No	2	1	2	2	5	0	2	0
Not applicable	88	85	91	85	89	92	94	93

Table 27 shows the antigen-wise vaccination status of children. The table shows that the coverage of BCG, DPT3, pentavalant 3, and measles vaccine increased among children at endline compared to baseline in both the model clinic areas.

Child immunization was also a component of services provided from the model clinics. Table 28 shows the number of 12-23-month-old children who received vaccines from the model clinics during the project period. Mention may be made here that pentavalant was introduced before the starting of the study activities.





**Table 27. Antigen-wise reported child immunization coverage**

Antigen-wise coverage	Females (%)				Males (%)			
	Model 1		Model 2		Model 1		Model 2	
	Baseline (n=24)	Endline (n=29)	Baseline (n=18)	Endline (n=28)	Baseline (n=23)	Endline (n=19)	Baseline (n=12)	Endline (n=15)
BCG	83	93	72	94	60	100	66	100
DPT3	29	79	7	57	35	88	41	53
Pentavalant 3	-	3	-	14	-	9	-	13
Measles	25	83	6	75	30	100	25	100

**Table 28. Number of children aged 12-23 months received vaccines from the model clinics**

Antigen	Vaccines received by children from	
	Model 1	Model 2
BCG	34	19
Pentavalant 1	70	37
Pentavalant 3	59	35
OPV 4	27	12
Measles	26	15

OPV=Oral Polio Vaccine

### ***Vitamin A supplementation to children aged less than five years***

The street-dwellers were asked if their under-five children had received vitamin A capsule during the last six months. Table 29 shows that the status of vitamin A supplementation to under-five female children at endline compared to baseline in both the clinic areas was highly significant ( $p<0.001$ ). On the other hand, the status of vitamin A supplementation to under-five male children also increased in both the clinic areas, although the change was not significant. The table also shows that the use of public and NGO clinics for the supply of vitamin A decreased at endline compared to baseline. On the other hand, the use of model 1 and 2 clinics for vitamin A supplementation to children was high.

<b>Table 29. Status of vitamin A supplementation to under-five children</b>								
Status of vitamin A supplementation	Females (%)				Males (%)			
	Model 1		Model 2		Model 1		Model 2	
	Baseline (n=203)	Endline (n=200)	Baseline (n=200)	Endline (n=201)	Baseline (n=203)	Endline (n=200)	Baseline (n=200)	Endline (n=201)
Provided vitamin A to the last child during the last six months								
Yes	20	54**	19	36**	15	26	18	27
No	27	7	12	10	10	3	9	11
Not applicable	53	39	69	54	75	71	73	82
Sources of supply								
NGO clinic	60	47	79	40**	100	25**	97	41**
Public facilities	40	0	21	4	0	6	3	18
ICDDR,B static clinic (model 1)	0	53	0	0	0	69	0	0
ICDDR,B satellite clinic (model 2)	0	0	0	56	0	0	0	41
** $p<0.001$								

### ***Acute respiratory infection***

To assess the prevalence of acute respiratory infection (ARI) among the street under-five children, data were collected and analyzed. The street-dwellers were asked if their youngest under-five child had breathing difficulties during the last two weeks preceding data-collection. The findings revealed that ARI among under-five children accompanied with females in the model 1 clinic area decreased significantly ( $p<0.001$ ) at endline compared to baseline (Table 30). Although not significant, ARI among under-five children accompanied with males also decreased at endline compared to baseline in both the model clinic areas.

<b>Table 30. Status of ARI among under-five children</b>								
Breathing difficulties of the last child during last two weeks	Females (%)				Males (%)			
	Model 1		Model 2		Model 1		Model 2	
	Baseline (n=203)	Endline (n=200)	Baseline (n=200)	Endline (n=201)	Baseline (n=203)	Endline (n=200)	Baseline (n=200)	Endline (n=201)
Yes	39	13**	21	2**	19	18	16	9
No	7	52	10	46	6	11	13	20
Not applicable	54	35	69	52	75	71	71	71
** $p<0.001$ ; ARI=Acute respiratory infection								

The street-dwellers who accompanied under-five children reported breathing difficulties during the last two weeks and were asked if their children had specific symptoms of ARI during the last two weeks. The common symptoms mentioned by them were cough, fever, breathing difficulties, rapid breathing, and chest indrawing (Table 31). Both female and male respondents of both the model clinic areas reported that the symptoms of cough, fever, breathing difficulties, rapid breathing, and chest indrawing among their last child substantially decreased at endline compared to baseline.

Table 31. Symptoms of ARI among street-children								
Symptoms of ARI among street-children*	Females (%)				Males (%)			
	Model 1		Model 2		Model 1		Model 2	
	Baseline (n=94)	Endline (n=129)	Baseline (n=62)	Endline (n=97)	Baseline (n=51)	Endline (n=58)	Baseline (n=53)	Endline (n=59)
Cough	79	45	58	29	62	57	45	34
Fever	77	50	61	28	71	62	52	27
Breathing difficulty	33	6	24	3	22	16	21	19
Rapid breathing	15	5	16	7	19	6	9	10
Chest indrawing	9	5	3	2	21	12	13	10
*Multiple answers; ARI=Acute respiratory infection								

The findings revealed that 39% of the female street-dwellers sought treatment for ARI of their children in the model 1 clinic area at baseline while at endline it increased to 90%, and the difference was highly significant (Table 32). Sixty-one percent of the female street-dwellers of the model 2 clinic areas sought treatment for ARI of their children at baseline while at endline the rate of seeking treatment increased to 74%. Eighty-four percent of the male street-dwellers of the model 1 clinic area sought treatment for ARI of their children at baseline while at endline it was 98%. Similarly, the rate of seeking of treatment for ARI increased from 66% at baseline to 83% at endline in the model 2 clinics areas as reported by the male respondents.

Of those street-dwellers who sought treatment at endline, most visited the model 1 and 2 clinics. Table 32 also shows that the number of visits to pharmacy/drug stores, homeopath and Ayurvedic pharmacy decreased substantially after the implementation of the model clinics compared to before their implementation. Similarly, the number of visits to the public and NGO clinics by the street-dwellers for services also decreased after the implementation of the two models compared to before their implementation, which may be due to the availability of the two new model clinics.

Table 32. Status of treatment for ARI of children and facilities visited								
Status of treatment	Females (%)				Males (%)			
	Model 1		Model 2		Model 1		Model 2	
	Baseline (n=80)	Endline (n=73)	Baseline (n=44)	Endline (n=31)	Baseline (n=38)	Endline (n=45)	Baseline (n=32)	Endline (n=29)
Sought treatment								
Yes	39	90**	61	74	84	98	66	83
No	61	10	39	26	16	2	34	17
Type of facility visited*								
Pharmacy/drug store	65	32	66	17	91	15	81	42
<b>Contd.</b>								

Status of treatment	Females (%)				Males (%)			
	Model 1		Model 2		Model 1		Model 2	
	Baseline (n=80)	Endline (n=73)	Baseline (n=44)	Endline (n=31)	Baseline (n=38)	Endline (n=45)	Baseline (n=32)	Endline (n=29)
ICDDR,B static clinic (model 1 clinic)	0	56	0	0	0	85	0	0
ICDDR,B satellite clinic (model 2 clinic)	0	0	0	62	0	0	0	59
NGO clinic	10	8	26	13	3	0	19	8
Homeopath and Ayurvedic pharmacy	10	2	15	9	5	0	0	0
Doctors' chambers	10	3	4	0	0	0	5	0
Public health-care facilities	7	0	3	0	3	2	5	0

\*Multiple answers; \*\*p<0.001

### ***Diarrhoea among children***

To assess the prevalence of diarrhoea among under-five children before and after the implementation of the two model clinics, the respondents were asked if their youngest under-five child had watery stool three or more times daily during the past week. The findings revealed that the prevalence of diarrhoea decreased after the implementation of the model clinics compared to before their implementation. Thirty percent and 13% of the females of the model 1 and model 2 clinic areas respectively reported at baseline that their children who accompanied with them had diarrhoea during the preceding two weeks (Table 33). On the other hand, only 18% and 8% of the females of both the model clinic areas reported that children accompanied with them had diarrhoea during the past two weeks. Similarly, 14% and 10% of the males of both the model clinic areas reported that their accompanied children had diarrhoea at baseline while at endline only 7% and 4% in the model 1 and model 2 clinic areas reported that their accompanied children had diarrhoea.

Had watery stool for 3 or more times daily during the last two weeks	Females (%)				Males (%)			
	Model 1		Model 2		Model 1		Model 2	
	Baseline (n=203)	Endline (n=200)	Baseline (n=200)	Endline (n=201)	Baseline (n=203)	Endline (n=200)	Baseline (n=200)	Endline (n=201)
Yes	30	18*	13	8	14	7	10	4
No	16	45	18	39	11	22	16	25
Not applicable	54	37	69	53	75	72	74	71

\*p<0.005

For the treatment of diarrhoea-affected children, the use of packet oral saline and zinc tablet greatly increased in both the model clinic areas at endline compared to baseline (Table 34). The

table shows that the use of pharmacy/drug stores, homeopath and ayurbadic pharmacy by the street-dwellers for the treatment of diarrhoea of their accompanied children decreased in both the model clinic areas at endline compared to baseline. They mostly visited the model clinics at the endline for the treatment of diarrhoea of their accompanied children.

Table 34. Type of treatment given for diarrhoea								
Type of treatment given*	Females (%)				Males (%)			
	Model 1		Model 2		Model 1		Model 2	
	Baseline (n=61)	Endline (n=38)	Baseline (n=26)	Endline (n=16)	Baseline (n=29)	Endline (n=14)	Baseline (n=20)	Endline (n=8)
Packet oral saline	56	92	60	80	76	93	51	75
Zinc tablet	26	70	16	53	31	38	33	38
Plain water	10	3	24	13	34	42	10	38
Other liquid foods	9	3	24	13	35	86	14	50
Home-made saline	0	3	0	13	10	0	0	13
Facilities visited for treatment of diarrhoea*								
Pharmacy	90	0	84	30	100	20	91	86
ICDDR,B static clinic (model 1)	0	61	0	0	0	90	0	0
ICDDR,B satellite clinic (model 2)	0	0	0	42	0	0	0	35
Doctor's chamber	15	8	0	20	4	0	9	0
Public facilities	10	8	0	0	0	0	0	0
Homeopath and Ayurvedic pharmacy	23	10	5	0	0	0	0	0
NGO clinic	0	0	16	10	0	0	9	0

\*Multiple answers

The clinic data showed that a large number of under-five children accompanied by females and males received child-health services for ARI, diarrhoea, severe diarrhoea, helminthiasis, and scabies from the model clinics (Table 35). The table shows that the number of children received treatment for ARI was high, followed by diarrhoea, in both the model clinic areas.

Table 35. Number of children, aged less than five years, received services during the study period				
Service	No. of under-five children received services			
	Model 1		Model 2	
	Female	Male	Female	Male
ARI	391	447	317	311
Diarrhoea	63	82	50	43
Severe diarrhoea	8	3	7	9
Helminthiasis	8	27	6	28
Scabies	7	11	8	4

ARI=Acute respiratory infection

## Environmental issues

### *Water use*

To assess the household water-use practices of the street-dwellers, data were collected and analyzed. The findings revealed that most street-dwellers interviewed used tap water for drinking, washing hands/face, bathing, washing plates/utensils/cooking, and washing cloths at both baseline and endline in the model 1 and model 2 clinic areas (Table 36). They managed tap water from public utilities. There was no notable difference between baseline and endline in the use of water by the street-dwellers for their household work.

Table 36. Street-dwellers' sources of household water								
Purpose and source of water	Females (%)				Males (%)			
	Model 1		Model 2		Model 1		Model 2	
	Baseline (n=203)	Endline (n=200)	Baseline (n=200)	Endline (n=201)	Baseline (n=203)	Endline (n=200)	Baseline (n=200)	Endline (n=201)
Drinking-water								
Tap	100	100	100	100	100	100	100	100
Washing of hands/face								
Tap	100	100	100	100	100	100	100	100
Bath								
Tap	100	91	92	99	99	100	88	100
Pons/river	0	9	8	1	1	0	12	0
Washing of plates/utensils/cooking								
Tap	99	99	90	97	50	70	62	100
Pond/river	0	0	8	0	0	0	3	0
Not applicable	1	1	2	3	50	30	35	0
Washing of clothes								
Tap	100	91	87	99	97	100	88	100
Pond/river	0	9	13	1	3	0	12	0

### *Practice of defaecation*

Data on the street-dwellers' practices relating to defaecation and after defaecation were also collected and analyzed. Table 37 shows the place of defaecation mentioned by the street-dwellers. The table further shows that around 90% of the street-dwellers used road side/open space for defaecation before the implementation of the model clinics in both the areas. On the other hand, the use of road side/open space by the street-dwellers after the implementation of the clinics dramatically reduced in both the model clinic areas. The table further shows that the use of toilet/latrine by the street-dwellers dramatically increased after the implementation of the clinics in both the model clinic areas. Mention may be made here that health education of the two models was an important component of services. This behavioural change happened among the street-dwellers due to effective health education provided from the model clinics to the street-dwellers.

**Table 37. Place of defaecation by street-dwellers**

Place of defaecation*	Females (%)				Males (%)			
	Model 1		Model 2		Model 1		Model 2	
	Baseline (n=203)	Endline (n=200)	Baseline (n=200)	Endline (n=201)	Baseline (n=203)	Endline (n=200)	Baseline (n=200)	Endline (n=201)
Road side/open space	97	3	89	19	93	5	91	0
Drain	56	0	26	3	54	2	21	0
Toilet/latrine of city corporation	8	54	1	4	41	88	3	4
Toilet/latrine of the nearest locality	7	46	7	88	23	25	15	97
*Multiple answers								

### ***Handwashing practices of street-dwellers***

The respondents were asked if they washed their hands before meals and after defaecation. The findings revealed that the practice of handwashing before meals increased among the female street-dwellers of the model 1 and 2 clinic areas at endline compared to baseline, and the difference was highly significant (Table 38). Hand-washing practices before meals among the street-dwellers increased from 96% at baseline to 100% at endline in the model 1 clinic areas, and the difference was also significant.

The table also shows that the handwashing practices after defaecation among the females and males increased at endline compared to baseline in both the model clinic areas, and the difference was highly significant.

**Table 38. Handwashing practice before meal and after defaecation**

Washing hands	Females (%)				Males (%)			
	Model 1		Model 2		Model 1		Model 2	
	Baseline (n=203)	Endline (n=200)	Baseline (n=200)	Endline (n=201)	Baseline (n=203)	Endline (n=200)	Baseline (n=200)	Endline (n=201)
Before meal								
Yes	71	100**	88	100**	96	100*	98	100
No	29	0	11	0	4	0	2	0
After defaecation								
Yes	30	100**	64	100**	78	97**	91	100**
No	70	0	36	0	22	4	9	0
*p<0.005; **p<0.001								

The respondents were asked about the type of substance used for handwashing before meals and after defaecation. Table 39 shows that a good percentage of the females and males used soap for handwashing before meals in both the model clinic areas at endline. On the other hand, not a single respondent reported about the use of soap at baseline. The table also shows that the use of soap by both female and male street-dwellers in handwashing after defaecation in both the model clinic areas substantially increased at endline compared to baseline. Health education provided from the model clinics might have influenced them to change the practice.

Table 39. Material/substance used for handwashing before meal and after defaecation								
Material/sub- stance used*	Females (%)				Males (%)			
	Model 1		Model 2		Model 1		Model 2	
	Baseline (n=203)	Endline (n=200)	Baseline (n=200)	Endline (n=201)	Baseline (n=203)	Endline (n=200)	Baseline (n=200)	Endline (n=201)
Before meal								
Water only	100	73	100	80	100	99	100	75
Soap	0	29	0	21	0	36	0	37
Ash	1	0	2	0	0	0	0	0
After defaecation								
Water only	56	41	26	5	100	97	100	39
Soap	7	63	14	42	1	32	1	61
Ash	7	18	45	28	64	20	13	12
Rubbing hand on earth	39	21	53	50	34	0	46	28
*Multiple responses								

### Cost information

The frequency distribution of functional work-days of the two models suggests that the model 1 clinic was operational for 60% of the total time while the model 2 clinic was operational for the remaining 40% of the total time (Table 40). This variation in work days had direct implications on the consumption of resources and was considered for the proportionate allocation of cost of common inputs into model 1 and model 2.

Table 40. Proportion of sessions by model 1 and model 2 clinics		
Type of model	Functional work-days (no. of sessions)	%
Model 1	145	60
Model 2	95	40
Total	240	100

Applying these percentages as allocation factor for combined costs, i.e. staff, medicines, medical appliances, stationeries, contraceptives and van, and considering cost of other inputs along with shadow price for donated goods, i.e. space, EPI vaccines, contraceptives, the total cost of model 1 stood at Tk 7,66,028.92 (US\$ 11,265) equivalent to 56% of the combined cost. The recurrent cost of model 1 was high (97%) compared to its capital expenditure (3%). However, the capital cost of model 1 was higher than that of model 2. Staff cost was the highest (68%) among all recurrent costs of model 1 (Table 41). Considering the actual number of patients provided with essential healthcare, the average cost per patient was Tk 117.14 (US\$ 1.72) only at model 1 (Table 42 and 43). These investments eventually contributed to a significant reduction in morbidity and increased use of essential healthcare services by the target population of the model clinic 1 as found at endline compared to baseline evaluation (Table 4 and 7).



**Table 41. Total cost (Model 1, Model 2, and combined) by cost components**

Cost category	Total cost				Combined cost	
	Model 1		Model 2		Taka	US\$
	Taka	*US\$	Taka	US\$		
<b>Capital costs</b>						
Furniture and fixtures	4,964.79	73.01	6,482.66	95.33	11,447.45	168.34
Medical appliances	1,577.19	23.19	1,051.61	15.46	2,628.80	38.65
Renovation expenses	4,774.14	70.20	2,177.56	32.02	6,951.70	102.23
Family health card	9,313.50	136.96	5,233.83	76.96	14,547.33	213.93
Subtotal	20,629.62	303.36	14,945.66	219.77	35,575.28	523.15
<b>Recurrent costs</b>						
Medicines	99,425.67	1,462.14	66,283.78	974.76	1,65,709.45	2,436.90
Contraceptives	5,508.79	81.01	3,672.53	54.00	9,181.32	135.01
Child immunization	31,306.44	460.38	23,717.00	348.77	55,023.44	809.16
Staff cost	5,05,478.40	7,433.50	3,36,985.60 + 9,600.00	4,955.67 +141.17	8,52064.00	12,530.35
Stationeries	2,880.00	42.35	1,920.00	28.23	4,800.00	70.58
Van rent	28,800.00	423.52	19,200.00	282.35	48,000.00	705.88
Shadow price of floor space	72,000.00	1,058.82	120,000.00	1,764.70	1,92000.00	2,823.52
Subtotal	7,45,399.30	10,961.72	5,81,378.91	8,549.65	13,26,778.21	19,511.40
Total	7,66,028.92	11,265.08	5,96,324.57	8,769.42	13,62,353.49	20,034.40
*Exchange rate as in 2010: US\$ 1=Tk 68						

**Table 42. Total cost and outcome by model 1 and 2**

Model	Total cost		Outcome (no. of patient treated)
	Tk	US\$	
Model 1	7,66,028.92	11,265.08	6,539
Model 2	5,96,324.57	8,769.42	4,172
Total	13,62,353.49	20,034.40	10,711

The total cost of the model 2 clinic was Tk 5,96,325 (US\$ 8,769) which represented 44% of the combined cost (Table 42). The recurrent cost of the model 2 clinic was also higher (97.4%) compared to its capital cost (2.5%). Capital cost of the model 2 clinic was lower than that of the model 1 clinic. Clinic staff cost ranked the highest, with 60% of the total recurrent expenses in the model 2 clinic but it was lower compared to the model 1 clinic. Considering the actual number of patients provided with essential healthcare services, the average cost per patient at the model 2 clinic was Tk 143 (US\$ 2.10) only (Table 42 and 43).

**Table 43. Average cost per patient by cost criteria**

Average cost per patient			
Model 1		Model 2	
Tk	US\$	Tk	US\$
117.14	1.72	142.93	2.10
100.50	1.47	107.60	1.58

The combined cost of the model 1 and 2 clinics shows similar features with recurrent cost taking large share (97.4%) of the total cost compared to capital cost (2.6%). Staff cost was highest followed by shadow price for floor space and medicine (Table 41).

### ***Perceptions of street-dwellers about model clinics***

The respondents were asked if they received healthcare services during their last visit to the model clinics, and all of them who visited the model 1 or model 2 clinic received services from the clinics. The respondents were also asked if they were satisfied with services that they received from the clinics. In response, more than 83% in both the areas reported that they were satisfied with services received from the clinics (Table 44).

<b>Table 44. Perceptions of street-dwellers about services of ICCDR,B clinics</b>				
Perceptions about service of ICDDR,B clinics	Females (%)		Males (%)	
	Model 1 (n=98)	Model 2 (n=77)	Model 1 (n=153)	Model 2 (n=100)
Satisfied	93	85	81	95
Not satisfied	7	15	19	5

All the street-dwellers who participated in in-depth interviews in the model 1 clinic area stated that the clinic was very much helpful for the people who live in the street at that area. Everybody said that the service providers behaved very well with them. They added that the behaviour of each person of the clinic was very good. Doctors (paramedics provide services) listened to the problems of patients attentively and explained them everything clearly. The doctors were very friendly with each patient, talked to them easily, and gave them treatment. The street-dwellers stated that they were very pleased with the service providers. They also added that, gradually, the number of patient load was increasing, and the management of the clinic was very good. The clinic maintained the serial number of patient for providing services which was very helpful. The street-dwellers said that the providers explained to everybody about the doses of medicines after providing treatment. They also informed that, besides giving medicines, the service providers gave different types of advice, such as handwashing before meals and after defaecation, not to keep food open, stay clean, not to use open space/drain for defaecation, use of family-planning methods, pregnancy care, delivery and post-delivery care. More specifically, the female and male street-dwellers said that:

- The clinics were very helpful for them as the services were free of charge. They added that nobody returned from the clinics without getting any service.
- The service providers were very friendly, polite, and helpful which attracted them to visit the clinics for services.
- The clinics were very close to their living place.
- The treatment and medicines were very effective—they were cured after taking treatment from the clinics.
- Privacy was maintained in the clinics. There are separate arrangements for providing services to male and female patients.
- The static and satellite clinics were held in the evening which was very convenient for them as, they remain busy with their work in day time.
- The providers carefully and attentively checked the patients.

- The providers gave valuable advice to the patients on maintaining hygiene, use of clinics for treatment, pregnancy, delivery and post-delivery care, benefits of use of family-planning methods, STDs and child healthcare.
- If necessary, the providers of the clinics referred street-dwellers to other hospitals where they got services free of charge, showing the card provided from the model clinics.
- The quality of treatment and medicines provided from the clinics was very good and effective.
- The clinics strictly maintained schedules about organizing clinics, and the staff members of the clinics were very regular.
- The system of providing reminders to patients was very good.

The respondents who were not satisfied with the services of the model clinics were asked about the reasons for their dissatisfaction. They responded by stating that the medicines provided to them did not work; the providers did not provide vitamins to patients, although they wanted this frequently; and all types of services were not available in the clinics. The street-dwellers were also asked if they encountered any problems during their visits to the model clinics for services. Most of them gave a negative answer. One male respondent in the model 1 clinic area who participated in in-depth interviews said:

Doctors give medicines in their own hand that I don't like. I prefer to get medicines from the doctors in a packet. Sometime I had to wait for a long time in the clinic for services, and I think if I pull rickshaw on that time, I could earn more money.

Eight women stated that the waiting arrangement in the model 1 clinic was not sufficient. According to them, the sitting place was very small, and there was always gathering of patients. They said that the number of female patients was high in the clinic but their sitting arrangement was not good as there was only one bench for female patients. All the participants of the model 2 clinic stated that there was enough space in the clinic area, and there was no problem for waiting for services from the clinic. The respondents of both the areas stated that the service providers of the model clinics never refused anybody to provide any service and carefully listened to everybody, asked question to them about their problems, and gave treatment according to their requirements.

During in-depth interviews, the respondents were asked if they found any difference between the model clinics and other clinics they have visited so far. All the participants of both the clinics stated that the model clinics were different from other health facilities. They mentioned the following examples in terms of differences of the model clinics compared to other clinics:

Model clinics	Other clinics
The model clinics provide free treatment and medicines	Require money for getting services
The staff members of the model clinics come to them and call them to visit their clinics. The providers of the model clinics respect them, listen to them, and provide services carefully	There is nobody to call them to visit other clinics. The providers of other clinics avoid and discourage them to visit those clinics
There are male and female doctors for them at the model clinics, and services for female patients are provided by the female doctors	In most cases, there are no female doctors for female patients
	<b>Contd.</b>

Model clinics	Other clinics
Behaviour of the doctors of the model clinics are very good, and they are very polite	Other hospital doctors do not behave well with street-dwellers
The model clinics are very near to the place of their staying. There is no need of any money to visit the clinics	There is no other clinic/hospital near their living places.
The model clinics provide services in the evening which is very convenient for street-dwellers to get services	Other health centres open at day time when street-dwellers cannot go there as they become busy and remain out of their living places in search of their foods
There is very good discipline in the model clinics. There was no need to wait for a long time	Required much time to get treatment because the other clinics/hospitals provide services to street-dwellers after providing services to other groups of people, and the providers of that clinic neglect the street-dwellers

### Suggestions of street-dwellers for improving the health service-delivery system

The street-dwellers were asked if they had any suggestion to improve the health services-delivery system, In response, all of them provided the following suggestions:

- Need to add more components in the list of services of the clinics. They said that the service-delivery list should include treatment for complicated diseases, and there should be facilities to conduct deliveries in the clinics
- As the number of patients are rapidly increasing in the clinics, the service-delivery time and the number of doctors/providers need to be increased
- There should be good arrangement for patients for waiting in the model clinic 1
- Both the clinics should be kept open every day in a week, instead of one or two days
- There should be toilet facility in the clinic areas
- The clinics should not stop/should continue service-delivery
- The health card introduced in the model clinics should be used by all service provides for providing services

Data on the sources of information of the street-dwellers about the clinics (model 1 and model 2) were collected and analyzed. The findings revealed that, except the female street-dwellers of the model 1 clinic area, most street-dwellers in other areas knew about the clinic from ICDDR,B staff (Table 45). Sixty-eight percent of the female street-dwellers of the model 1 clinic area came to know about the clinic from other street-dwellers who visited the clinic earlier.

**Table 45. Sources of information about model 1 and 2 model clinics**

Source of information*	Females (%)		Males (%)	
	Model 1 (n=98)	Model 2 (n=77)	Model 1 (n=153)	Model 2 (n=100)
Other street-dwellers	68	17	11	19
ICDDR,B staff (paramedics/coordinator)	32	98	92	80
Volunteers	3	33	3	1
*Multiple answers				

### ***Knowledge and perceptions of service providers about model clinics***

All the service providers who participated in in-depth interviews were well aware of the model clinics. They said that, at the beginning of the model clinics, the clinic organizers arranged meetings with them and informed about activities of the clinics, objectives of establishing the clinics, clinic schedule, and types of services offered from the clinics. All of them could tell about types of services provided from the clinics, who are the providers in the clinics, clinic schedule, and the daily patient load in the clinics. The pharmacist and volunteers informed that they were used to send the street-dwellers to the model clinics for treatment. The service providers of NGOs said, "We are also the part of the new initiative". We provided services to the street-dwellers who were referred from the model clinics. When discussing about the patient load, they informed that, on average, 50 patients were visiting the model clinics daily. One paramedic from the model 1 clinic said,

Fifty street-dwellers came to the model clinics daily for healthcare services but females came in a large number than males. The unmarried people came in a less number. The highest number of mothers of children and middle-aged women came to get treatment for them and for their children.

The service providers of NGOs, pharmacist, and volunteers mentioned that the establishment of the model clinics for street-dwellers was very much helpful for the target people and for the service providers as well. One paramedic of an NGO said:

No, we did not face any problem with the model clinics. On the contrary, it was an advantage for us because when the street-dwellers come to us we usually avoid them. Despite our efforts to avoid the street-dwellers, they are often reluctant to leave without any medicines. As the poor people are unable to pay money for medicines, we had to give some medicines to them without money. Considering this circumstance, I think that the model clinics are supporting us. After establishing the clinics, we have been providing services to selected street-dwellers who are referred from the model clinics.

### ***Suggestions of service providers regarding model clinics***

The service providers of both the model clinic areas put forwarded, the following suggestions for improving the service-delivery strategies for street-dwellers:

The service providers of the model 1 clinic area said that the room used for providing services from the clinic is very small. Both service providers and street-dwellers faced problems to continue the clinic activities. Therefore, there should be enough space in the clinics for providing treatment.

All the respondents of both the clinic areas stated that the clinic hour should be extended. Some of them mentioned that the clinic hour should be from 6 pm to 11 pm. One of the pharmacists said:

The service-providing time of the clinics should be extended. Although they give service till 10 pm, it would be better to extend it up to 11 pm. Most street-dwellers return to their sleeping places at late evening and remain busy discussing with each other for sometime. Then they go to the clinics. So, the service-delivery time at the clinics should be extended.

All the respondents of both the clinic areas said that the clinics should be kept open everyday so that the street-dwellers can receive services whenever they require. One of the pharmacists of the model 1 clinic area said:

The clinic remains open three days a week but the patients also come to us in the remaining days. So, my suggestion is that the model clinics should remain open everyday.

Two pharmacists at the model 1 clinic area informed that all the street-dwellers are not aware of the model clinics. More publicity about the clinics is required.

Some respondents of both the clinic areas said that provision should be made for pathological tests in the clinics.

One pharmacist said that sometimes severe patients come to the clinics for treatment which are beyond the capacity of the paramedics for providing services from the model clinics. The rickshaw van of the clinics is used for taking patients to the nearby hospital but this is time-consuming. Therefore, any type of vehicle should be available in the clinics so that the patients can be quickly sent to the nearby hospitals.

All the respondents said that the number of patients is gradually increasing in the clinics, resulting in difficulty to manage the patient load by two providers. They suggested increasing the number of doctors/paramedics in the clinics.

## Conclusion and Recommendations

The findings of the study showed that both the model clinics contributed significantly to reducing morbidity, increased use of healthcare services, and improving reproductive, maternal and child health among street-dwellers in the selected areas of Dhaka city. The findings of cost analysis showed that low investment per patient through the model clinics has reduced morbidity significantly and increased the use of essential healthcare services among the street-dwellers. Therefore, the interventions tested can be considered effective models in improving the health status of street-dwellers that could be replicated in all the cities of Bangladesh. However, the following recommendations need to be considered in scaling up the model clinics:

- Both static and satellite clinics contributed equally to providing healthcare services to the street-dwellers. Therefore, both the models may be implemented to cover all the areas of a city in providing health services to street-dwellers.
- Since the patient load in the clinics has been increasing, the number of service providers needs to be increased in the clinics. Further, the clinics should provide services every day instead of the limited number of days.
- Service providers of both sexes should provide services in the clinics. Female providers should provide services to females and male providers to male patients.
- The findings of the study showed that the service-providing place and time are crucial in providing services to street-dwellers. Therefore, the clinics for street-dwellers should be nearer to the residing places of street-dwellers, and services should be provided in the evening when they are available at their residing places.
- Good behaviour of and proper attention by the service providers to the street-dwellers encouraged them to visit the service providers. Therefore, the providers should not neglect this group of people, rather they need to attend them and listen to their problems respectfully.
- The performance of referral centres was excellent in terms of providing services to the patients referred from the model clinics. This happened due to close collaboration between the study team and the referral centres. Therefore, maintaining close collaboration between the clinic management and the referral centres is highly important.
- The project management committee reviewed the project activities and provided feedbacks and guidance to the project team members, which helped manage the project activities properly. Thus, monitoring of clinic activities meant for street-dwellers may be carried out through the project management committee for the implementation of ESP.
- Supply-side average cost per patient was low (US\$ 2 only) in both the models tested.

- As the street-dwellers are extremely poor, services were provided free of charge from the model clinics. Their willingness to pay was not assessed. However, introduction of token money may be considered in the clinics on a pilot basis.

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## Annexure I. Inventory of material inputs and human resource\*

Inputs	Model 1	Model 2	Total quantity used
<b>Furniture and fixtures</b>			
Portable patient examination bed	1	1	2
Folding plastic chair	5	5	10
Folding table	2	2	4
Curtains	nil	9	9
Bench for waiting	1	1	2
Tool	nil	1	1
Water-pot for hand-washing	nil	1	1
Rechargeable light	Used by both models		2
Sign board	1	1	2
<b>Medical appliances</b>			
BP machine	Used by both models		2
Stethoscope	Used by both models		2
Weight machine	Used by both models		2
Stop watch	Used by both models		2
Thermometer	Used by both models		2
Torch	Used by both models		2
Measuring tape	Used by both models		2
EPI card	33	25	58
Family health card	1,162	653	1,815
Vaccine carrier	Used by both models		1
First-aid box	Used by both models		2
<b>Others</b>			
Covered van (rickshaw van)	Used by both models		1
Patient registers	Used by both models		15
Register books	Used by both models		9
Condom (pieces)	Used by both models		2,978
Oral pill (cycles)	Used by both models		123
Inj depo-provera (ampules)	Used by both models		269
Floor space (sq ft)	126	288	414
<b>Staff members</b>			
Senior Research Assistant	Worked in both models		1
Paramedics (male 1, female 1)	Worked in both models		2
Attendant	Worked in both models		1
Van-puller	Worked in both models		1
Community volunteer	nil	2	2
*List of medicines used is shown in Annexure 4			



## Annexure 2. Monthly rent: actual and shadow price

Item	Rent/month (Tk)	Total rent (Tk)
Actual van rent	4,000	48,000
Shadow price*: for rent of space used for static clinic at Karwanbazar	6,000	72,000
Shadow price*: for rent of space used for satellite clinics at Kamalapur Railway Station and Mughda Stadium	5,000 +	1,20,000
	5,000	
Total		2,40,000

\*Space used for the static and satellite clinics was actually free of charge: the rent was officially waived by the owners (e.g. DCC authority, DG, Bangladesh Railway, and Bangladesh Sports Council) for the study purpose. Local market price of similar floor space has been estimated here to capture the shadow price. DCC=Dhaka City Corporation; DG=Directorate General

## Annexure 3. Estimated cost for routine EPI vaccines per fully-immunized child

Vaccine	*Unit cost (US\$/Tk)	Dose/ampl. or vial	Dose/child	Total cost/child US\$/ Tk.
Pentavalent (DPT, Hep-B, Hib)	\$ 4	1 dose/ampl.	3 doses	12.00 816.00
BCG	\$ 2	20 dose/ampl.	1 dose	0.1 6.80
OPV	\$ 2	10 dose/ampl.	4 doses	0.8 54.40
Measles	\$ 4	10 dose/vial	1 dose	0.4 27.20
Subtotal				13.30 904.40
AD syringe-0.5 mL for penta and measles inj.	Tk 6	-----	4 pieces/child	0.35 24.00
AD syringe 0.05 mL for BCG injection	Tk. 7	-----	1piece/child	0.10 7.00
Subtotal				0.45 31.00
Total				13.75 935.40

\*Based on the latest consignment of EPI vaccines imported by the MoHFW in 2010; the unit cost of each type of vaccine has been calculated that includes the manufacturing cost, freight charge, UNICEF service charge (7.50% of total cost) and duty paid by Central Medical Stores Depo (7.50% of total cost)

Source: EPI Headquarters. EPI=Expanded Programme on Immunization; MoHFW=Ministry of Health and Family Welfare; UNICEF=United Nations Children's Fund

## Annexure 4. Annualized cost of vaccine carrier and EPI card per child (no. of children fully immunized=58)

Input	Total quantity (no.)	Unit price (Tk)	Total current value (Tk)	Useful lifetime (years)	Annualization factor*	Annualized cost (Tk)	% of use	Cost/child US\$/Tk
1	2	3	4	5	6	7	8	
Vaccine carrier	1	3,000	3,000	5	4.329	693.00	100	7 11.94
EPI card	58	2.50	145	2	1.859	77.99	100	2 1.34
Total								9 13.28

## Annexure 5. Cost of contraceptives distributed

Name of contraceptive	Unit price (Tk)	Quantity distributed	Total cost (Tk)
Condom*	2/dozen	2,978 pieces	496.33
Oral pill*	5/cycle	123 cycles	615.00
Inj. depo-provera*	30/ampule	269 amples	8,070.00
Total			9,181.33

\*NGO price

## Annexure 6. Capital costs: cost of capital items: Model I

Inputs	Total quantity (no.)	Unit price (Tk)	Total current value (Tk)	Useful lifetime (years)	Of annualization factor*	Of annualized cost** (Tk)	% of use	Total cost Tk
1	2	3	4	5	6	7	8	9
Model 1 (Static clinic at Karwanbazar)								
Furniture and fixtures								
Portable patient examination bed	1 pc	5,200	5,200.00	5	4.329	1,201.20	100	1,201.20
Folding plastic chair	5 pc	550	2,750.00	5	4.329	635.25	100	635.25
Folding table	2 pc	3500	7,000.00	5	4.329	1,617.00	100	1,617.00
Rechargable light	2 pc	2000	4,000.00	2	1.859	2,151.69	60	1,291.00
Bench for waiting	1 pc	600	600.00	3	2.723	220.34	100	220.34
Subtotal	-	-						4,964.79
Medical appliances								
Blood pressure machine	2 pc	900	1,800.00	3	2.723	661.03	60	396.61
Stethoscope	2 pc	450	900.00	3	2.723	330.51	60	198.30
Weight machine	2 pc	1,200	2,400.00	3	2.723	881.38	60	528.60
Stop watch	2 pc	300	600.00	3	2.723	110.17	60	66.10
Thermo meter	2 pc	40.00	80.00	2	1.859	43.00	60	25.80
Torch +measuring tape	2 pc	185	370.00	2	1.859	199.03	60	119.41
First-aid box	2 pc	550	1,100.00	3	2.723	403.96	60	242.37
Subtotal								1,577.19
Renovation expenditure								
Static clinic	1	5,000	5,000.00	3	2.723	1,836.21	100	1,836.21
Sign board	1	5,000	5,000.00	3	2.723	1,836.21	100	1,836.21
Van renovation	1	-	5,000.00	3	2.723	1,836.21	60	1,101.72
Subtotal								4,774.14
Family health card	1,162	14.90	1,7313.80	2	1.859	9,313.50	100	9,313.50
Total								20,629.62

\*Standard table, Andrew Creese and David Parker; Cost analysis in primary health care, WHO, 1994 at 5% discounting rate; \*\*Column 4÷6=Column 7

## Annexure 7. Capital costs: cost of capital items: Model 2

Inputs	Total quantity (no.)	Unit price (Tk)	Total current value (Tk)	Useful lifetime (years)	Annualization factor*	Annualized cost (Tk)**	% of use	Total cost Tk
1	2	3	4	5	6	7	8	9
Model 2 (Satellite clinics at Kamalapur Railway Station and Mughda Stadium)								
Furniture and fixtures								
Portable patient examination bed	1 pc	5,200	5,200	5	4.329	1,201.20	100	1,201.20
Folding plastic chair	5 pc	550	2,750	5	4.329	635.25	100	635.25
Folding table	2 pc	3,500	7,000	5	4.329	1,617	100	1,617.00
Rechargeable light	2 Pc	2,000	4,000	2	1.859	2,151.69	40	860.67
Curtains (yard)	105	41.00	4,305	3	2.723	1,580.97	100	1,580.97
Bench for waiting	1 pc	600	600	3	2.723	220.34	100	220.34
Tool	1 pc	200	200	3	2.723	73.44	100	73.44
Water-pot for hand-wash	1 pc	800	800	3	2.723	293.79	100	293.79
Subtotal	-	-						6,482.66
Medical appliances								
Blood pressure machine	2 pc	900	1,800	3	2.723	661.03	40	264.41
Stethoscope	2 pc	450	900	3	2.723	330.51	40	132.20
Weight machine	2 pc	1,200	2,400	3	2.723	881.38	40	352.55
Stopwatch	2 pc	300	600	3	2.723	110.17	40	44.06
Thermometer	2 pc	40.00	80	2	1.859	43	40	17.20
Torch + measuring tape	2 pc	185	370	2	1.859	199.03	40	79.61
First-aid box	2 pc	550	1100	3	2.723	403.96	40	161.58
Subtotal								1,051.61
Renovation expenditure								
Satellite clinics	2	1,000	2,000	2	1.859	1,075.84	100	1,075.84
Sign board	2	500	1,000	3	2.723	367.24	100	367.24
Van renovation	1	-	5,000	3	2.723	1,836.21	40	734.48
Subtotal								2,177.56
Family health card	653	14.90	9,729.70	2	1.859	5,233.83	100	5,233.83
Total								14,945.66
*Standard table, Andrew Creese and David Parker; Cost analysis in primary healthcare, WHO, 1994 at 5% discounting rate								
**Column 4÷6=Column 7								

## Annexure 8. Recurrent costs: total cost of medicines consumed

Generic name of medicine	*Unit price (Tk/ piece)	Quantity used**	Total cost (Tk)
Tab. paracetamol	0.47	21,013	9,876.11
Tab. albendazole-DS	1.70	1,444	2,454.80
Tab. co-trimoxazole-DS	4.96	2,970	14,731.20
Tab. chlorphenarmine melate	0.13	13,464	1,750.32
Tab. antacid	0.47	37,291	17,526.77
Tab. iron-folic acid	0.13	37,560	4,882.80
Tab. metronidazole	0.54	5,819	3,142.26
Cap. amoxicillin	2.00	4,154	8,308.00
Tab. ibuprofen	0.81	7,856	6,363.36
Oral rehydration salt	4.00	2,538	10,152.00
Tab. hyosine-N-butyl bromide	0.88	964.48	964.48
Tab. salbutamol	0.68	2,375	1,615.00
Tab. chlorperzine	0.13	170	22.00
Tab. clotrimazole cream	9.00	244	2,196.00
Permethrine cream 5%	21.00	124	2,604.00
Cap. flucloxacillin	2.50	5,454	13,635.00
Tab. calcium + vitamin D	0.88	14,800	13,024.00
Betamethason neomycine cream	19.00	75	1,425.00
Tab. diazepam	0.20	1,230	246.00
Chloramphenicol eye/ear drop	8.36	331	2,767.16
Neomycin bacitracin ointment	13.00	250	3,250.00
Tab. ciprofloxacin	3.12	508	1,585.00
Syp. paracetamol	13.00	512	6,656.00
Syp. mebendazole	10.50	129	1,354.50
Syp. co-trimoxazole	14.34	302	4,330.68
Syp. amoxicillin	30.46	156	4,751.76
Amoxicillin drop	28.00	26	728.00
Syp. histacin	10.26	889	9,121.14
Syp levosalbutamol	15.70	72	1,130.40
Syp. vitamine B complex	15.64	604	9,446.56
Tab. baby Zinc	1.00	2,220	2,220.00
Cap. doxycycline	1.00	423	423.00
Azithromycin	9.72	128	1,244.16
Cefexime	11.00	162	1,782.00
Total			1,65,709.46
* ICDDR,B procurement rate			
**Used by both the models			

### Annexure 9. Staff cost

Staff category	No.	Salary/month	Total cost (Tk)
Senior Research Assistant	1	19,644	2,35,728
Paramedic	2	19,000	4,56,000
Attendant	1	7,728	92,736
Van-puller	1	4,000	48,000
Refresher training	1	--	10,000
Subtotal	6		842,464
Volunteer for satellite clinics	2	50/vol/session*	9,600
Total	8		8,52,064

\*4 sessions/month/satellite clinic, i.e. 4x2x12=96 sessions

### Annexure 10. Cost of stationeries supplied

Item	Unit price (Tk)	Quantity	Total cost (Tk)
Patient register	200	15	3,000
Register book	200	9	1,800
Total			4,800

