FACTORS RELATED TO ACCEPTANCE OF TUBERCULOSIS CASE DETECTION AMONG URBAN SLUM POPULATION IN MOHAMMADPUR, DHAKA CITY CORPORATION, BANGLADESH

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ABSTRACT

A cross sectional descriptive study was conducted of two hundred and forty eight household populations living in Ali's Pora slum in Mohammadpur, Dhaka, Bangladesh. The objective was to identify factors related to acceptance of tuberculosis case detection among the urban slum population. Data was collected from January 26-29, 2008, by interview using structured questionnaires. Data was analyzed by descriptive statistics and Chi-square test was used for association analysis (α=0.05).

100 percent of the respondents accepted tuberculosis case detection. This meant they all said they wanted to go to a TB-DOTS center for sputum examination, if they developed a persistent cough for 3 weeks or more or would advice a family member to go, or take a family member there, if they developed a persistent cough for 3 weeks or more.

Results showed that 62.50% of the respondents were in the 15-30 years age-group; 79.84% were female, 82.66% were married, 59.68% had no education, and 63.71% were housewives and house-maids. 100%were Muslim and 59.68% had a monthly family income less than 3000 Taka.

Half of them (50.40%) had 'Poor' knowledge (<60% score) and 'Poor' attitude (51.21%) towards tuberculosis disease (≤Median=19.0), and 43.58% did not know a nearby TB-DOTS center. Television-Radio was the main source of information for 71.77%. A significant association was found between knowledge of tuberculosis and education, occupation, monthly family income, and level of attitude (p-value < 0.001) using Chi-square test.

A community-based slum-friendly health education program on tuberculosis with some income-generating initiatives should be considered for implementation for this poorest and vulnerable community with their participation. A future study might usefully evaluate such a program after a period of implementation.

KEY WORDS: TUBERCULOSIS / ACCEPTANCE / CASE DETECTION / DOTS

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LIST OF ABBREVIATIONS

TB	:	Tuberculosis
MDG	:	Millennium Development Goal
DOTS	:	Directly Observed Treatment Short course
WHO	:	World Health Organization
NGOs	:	Non-Government Organizations
BRAC	:	Bangladesh Rural Advancement Committee
DFB	:	Damien Foundation Bangladesh
UPHCP	:	Urban Primary Health Care Project
SSFP	:	Smiling Sun Franchising Program
NSDP	:	NGO Service Delivery Program
NTP	:	National Tuberculosis Program, Bangladesh
TV	:	Television
CNG	:	Concentrated Nitrogen Gas
MTB	:	Mycobacterium Tuberculosis
INH	:	Isoniazid
HIV	:	Human Immunodeficiency Virus
AIDS	:	Acquired Immune Deficiency Syndrome
DOT	:	Directly Observed Treatment
LTBI	:	Latent Tuberculosis Infection
RIF	:	Rifampicin
PZA	:	Pyrazinamide
PPM	:	Public-Private Mix
FDC	:	Fixed Dose Combinations
ICDDR,B	:	International Center for Diarrhoeal Disease Research, Bangladesh
BCG	:	Bacillus Calmette-Guerin
CDC	:	Chest Diseases Clinic
UHC	:	Upazila Health Complex

CHAPTER 1
INTRODUCTION

The following subjects discussed in this chapter:

- Rationale and justification of the study
- Research Objective
- Research questions
- Conceptual framework
- Operational definition
- Limitation of the study
- Expected outcome

1.1 Rationale and justification of the study

The target and indicators for TB control, defined within the framework of the Millennium Development Goals (MDG), have been supplemented and endorsed by the Stop TB Partnership. These will be used to measure progress made under the Stop TB Strategy which extends and enhances the Directly Observed Treatment Short course (DOTS) strategy. “A world free of TB” is the vision of The Stop TB Strategy and the goal is to dramatically reduce the burden of TB by 2015 in line with the Millennium Development Goals (MDG) and the Stop TB Partnership targets. Targets linked to the MDGs and endorsed by the Stop TB Partnership are a) by 2005: detect at least 70% of infectious TB cases and cure at least 85% of these cases, b) by 2015: reduce TB prevalence and deaths rates by 50% relative to 1990, c) by 2050: eliminate TB as a public health problem (≤ 1 case per million population) (1).

Much of the data submitted to WHO Report and analysis and interpretation focus on 22 high burden countries and six WHO regions. The 22 high burden countries account for approximately 80% of the estimated number of new TB cases arising worldwide each year. These countries are the focus of intensified efforts of

DOTS expansion. Comparing different parts of the world, South-East Asia region accounted 35% of all notified new and relapse cases and similar proportion of new smear-positive cases in 2004 (1,15). Countries in the South East Asia Region have continued to make steady progress with TB control during the past year. During the year 2006, more than 2 million TB patients were initiated on treatment in the Region. Based on data from the annual reports from National TB programs in Member countries in 2007, six countries in the Region have now achieved both the 70% case detection and 85% treatment success rates. As a result, the overall case detection rate in the Region is now 70%. The treatment success rate for the cohort of new smear positive TB patient initiated on treatment during 2005 was 87%. All countries are in the process of implementing the new Stop TB Strategy launched in 2006. A major achievement during the year was establishment and scaling up of interventions for TB/HIV and multi drug-resistant TB in Member countries (20).

Tuberculosis is a major public health problem in Bangladesh. Based on estimates, approximately 300,000 people develop TB each year and 70,000 die among them (5). Bangladesh is the 6th among 22 high TB burden countries in the world (1,15).

Bangladesh has made significant progress in cure rate which in 2005 was more than 89% of the cases detected and thus achieved the Millennium goal but case detection rate remained roughly stable for the past 4 years. The new smear-positive case detection rate by the program in 2004 was 46% and increased in 2005 to 61% (15). This is very low, given that DOTS population coverage is 99% in 2004 (1,15).

On the other hand, only 465 HIV cases were reported officially till December 2004, of these, 87 have developed AIDS, and 44 have died (18).

In order to control TB successfully, Bangladesh is implementing WHO recommended Directly Observed Treatment Short course (DOTS) nationwide since 1993. It started in 4 pilot upazila in two districts. By the year 2003, the National Tuberculosis Program established in 460 upazila, 45 chest clinics, 4 metropolitan

cities (Dhaka, Chittagong, Khulna, Rajshahi). Most DOTS implementation in Bangladesh has been done by NGOs, and during 2004 their involvement has increased. The main NGO partners include the Bangladesh Rural Advancement Committee (BRAC) and Damien Foundation Bangladesh (DFB), who together cover most of the rural districts in the country. Urban and peri-urban areas in the city corporations, municipalities are covered mainly by other NGOs i.e. SSFP (ex-NSDP) partners as Smiling Sun clinics, UPHCP partners as Marie Stopes Society, BRAC etc. There are a number of Public-Private Mix-DOTS initiatives in Bangladesh. Several private chest physicians in Dhaka have become involved in DOTS services, and the participation of more private practitioners is needed (5).

Recently, the National Tuberculosis Program (NTP) under Director-General, Health Services with assistance from WHO, have begun to include medical colleges, prison health services and the private corporate sector in DOTS activities (5). NTP with its national media campaign through TV commercial for the mass awareness to TB as a curable disease and the treatment including the drugs are free of cost.

NTP continues its TV advertisement on TB (1) and NGOs also engaged in providing health education on TB through house visits, group meetings, poster display, billboard etc.

A major factor affecting health in the Dhaka slums, and particularly in the slums known as “Bosti” is, the unacceptable state of the environment. Overcrowding is a major problem with extremely high population density and houses squashed closely together. House quality is generally better in the urban areas, and especially Dhaka, than in rural Bangladesh. However, the bosties are exceptional in their lack of security of tenure, which means that there is little incentive either for house-owners or tenants to improve housing conditions. Many of the houses are extremely small and poorly built. More generally, environmental conditions are unhygienic, especially in the bosties. Drainage is extremely poor, sanitation inadequate and non-existent, and rubbish, including faeces, uncollected and indeed scattered underfoot. Bosties, as illegal settlements, are often located in areas regarded as unsuitable for housing, for

example areas subject to flooding. More critically, because they are illegal settlements, bosties receive few or no government services, such as paved roads, paved footpaths, drains, sewerage, piped water or rubbish collection. A lack of paved roads and footpaths, and a lack of drains together with poor housing mean that bostie dwellers are in a poor position to cope with the effects of flooding. Lack of sanitation results in a large proportion of the population using open latrines or in some cases no latrines at all. In cases where households do have access to sanitary latrines, up to 10 households or 50 individuals may share one. Young children rarely bother: their faeces are collected and thrown onto rubbish heaps, or where these are absent, simply into the open, a point that highlights the importance of municipal rubbish collection. The lack of piped water means that most households have to share wells (themselves generally safe, but having to queue for water and carry it over a distance reduces the amount of water available for cleanliness, and storage raises the potential for contamination). The result of such poor environmental conditions is that such infections as pneumonia and diarrhea remain major killers of children, and tuberculosis of adults (3).

The poor who cannot afford health services use other alternatives, the most important of which is simply to ask the salesman at drug shop for medicine. In addition, people use untrained (quack) doctors, or obtain medicine from traditional or alternative traditional medical providers such as kobiraj, fakirs or homeopaths. These providers are preferred as being cheap, convenient and polite, and in the case of traditional providers, more in keeping with the understanding of appropriate treatment of clients (3).

Treatment varies according to gender. For persistent illness, doctors were eventually consulted mainly by males but few by females. This reflects, no doubt, a male preference, a concern for the well-being of the household head, usually the main breadwinner, as well as female privacy and modesty, which makes it difficult for women to go to male doctors, but also to female doctors in the case of reproductive tract infections and sexually transmitted diseases. Furthermore, men usually control the family finances and while women can in emergencies take some initiative with regard to their children, they usually do not for their own health, for to do so might be

regarded as putting their own interests before that of their households. A final factor is a belief that many problems that affect women specifically are natural, and hence are not to be interfered with. Many women who had lost children had not sought appropriate care in time. The women felt that childbirth was natural and were reluctant, until too late, to seek support from health-care workers, and especially male doctors (3).

Bangladesh, where 58.9% with no education and 71.7% in lowest wealth index among women population and 35.3% with no education and 35.8% in lowest wealth index among men population have no access to mass media (4).

1.2 Research questions:

1.2.1 What is the acceptance rate of Tuberculosis case detection among urban slum population?

1.2.2 What are the factors related to the acceptance of Tuberculosis case detection among urban slum population?

1.3 Research Objective

1.3.1 General Objective:

To identify the factors related to the acceptance of Tuberculosis case detection among urban slum population.

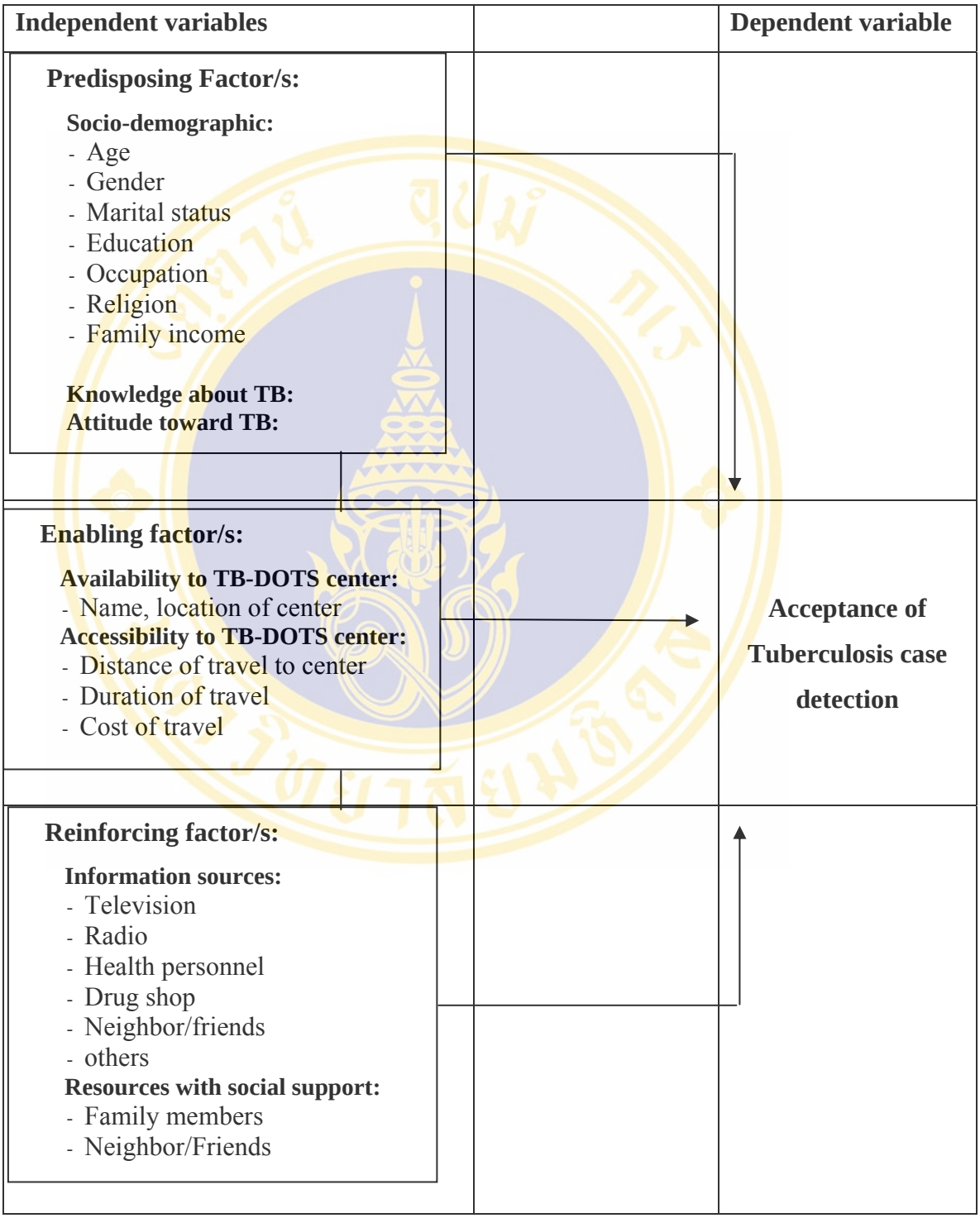
1.3.2 Specific Objective:

1.3.2.1. To explain the characteristics of the acceptance of Tuberculosis case detection among urban slum population.

1.3.2.2. To explain the characteristics of the predisposing, enabling and reinforcing factors related to the acceptance of Tuberculosis case detection among urban slum population.

1.3.2.3. To determine the relationship between knowledge, attitude, availability (name, location) of TB_DOTS center and socio-demographic factors.

1.4 Conceptual framework



1.5 Operational definition

Dependent/Outcome variable:

Acceptance of TB case detection: refers to the understanding of the those respondents, currently not under TB-DOTS treatment, willingly agree or want themselves or help any of their family member, with persistent cough for 3 weeks or more, to go to a TB facility for detection, either on their own initiative or referred by another health center, medical doctor, health worker or other non-medical persons. Those who do not agree or want to go will be regarded as non-acceptance.

Independent variables:

Predisposing factors:

Marital status: refers to marital status of respondent, as married, single, divorced or separated, widowed.

Education: Refers to no education, primary incomplete (Primary refers to grade 5), primary completed, secondary and higher, others.

Occupation: Refers to labor, rickshaw/Van/CNG driver, sales person, Business, technician worker, garment worker, housewife, housemaid, others.

Religion: Refers to Muslim, Hindu, Buddhist, Christian.

Family income: refers to total income per month of all the family members of each household, categorized into three group (in Taka): 0-3000, 3001-6000, >6000

Knowledge about TB: Refers to the understanding of the respondents about what is the main cause of TB, main symptoms, how TB spread, what laboratory examination needed to detect TB, Laboratory examination cost, treatment and duration, How to prevent spread.

Attitude toward tuberculosis: This refers that the respondents will be asked their opinion about tuberculosis regarding his/her chance of TB while close contact with, chance of developing TB in family members, TB is not a serious disease even untreated, not marry TB patients who are currently cured, fatal if not completed treatment, TB patients are hated by community as having TB disease is a curse of the god, TB treatment are free of cost.

Enabling factors: Availability and accessibility to TB center:

Availability (Name, location) of TB center: Refers to the respondents' knowledge about those nearby TB-DOTS centers where there are provisions for sputum microscopy for TB case detection and availability of TB drugs, both is free of cost. They are Chest diseases clinic, Shyamoli (government); National Chest diseases hospital, Mohakhali (government); UPHCP partners-Marie Stopes clinic, Bashbari (NGO); BRAC, Gabtoli (NGO); SSFP (ex-NSDP) partners-Smiling Sun clinic, Chaderhat field, Johuri Moholla, (NGO).

Accessibility (Distance) to TB center: Refers to the distance from the TB-DOTS center to the respondent's house. Distance was classified as: < 3 km, 3-6 km, > 6 km.

Accessibility (Duration of travel) to TB center: Refers to the time requires going to the TB-DOTS center from the respondent's house. Duration was classified as: < 30 minutes, 30-60 minutes, > 60 minutes.

Accessibility (Cost of travel) to TB center: Refers to the expense (in taka) requires to go to the TB-DOTS center from the respondent's house and return from the TB center to their house. Expense was classified as: 0 taka (if on foot), <30 taka, 30-50 taka, > 50 taka.

Reinforcing factors: Source of information and social support:

Information sources and resources with social support: Refers to those sources from where the respondents get information about TB, i.e. Television, Radio,

Health Personnel visit to home, Drug shop, Neighbor/Friends, other sources etc. Social support refers to family members/friends/neighbor advice/encouragement to go to TB-DOTS center for detection, and accompany the respondent to TB-DOTS center for detection.

1.6 Limitation of the study

The study was designed to interview the head of the households as the key respondent, who are commonly the males according to the country situation, but they were in their working place during the time of interview by three trained female interviewers. If a male interviewer could be recruited and also sufficient or sponsored fund was available, the interview sessions could be scheduled at evening / night, when the head of the household are present at their houses.

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CHAPTER 2
LITERATURE REVIEW

The following literatures discussed in this chapter:

- Review about Tuberculosis
- National Tuberculosis Program (NTP), Bangladesh
- Characteristics of urban slum in Dhaka
- Bangladesh NGO and Public Sector Tuberculosis Service Delivery
- Theoretical model : THE PRECEDE/PROCEED MODEL
- HIV/AIDS Situation in Bangladesh
- Related studies

2.1 Review about Tuberculosis

2.1.1 Tuberculosis and its cause (5):

Tuberculosis is an infectious disease, caused by bacilli Mycobacterium tuberculosis (MTB). The bacilli usually enter the body by inhalation through the lungs and spread to other parts of the body via blood stream, the lymphatic system, or through direct extension to other organs.

Tuberculosis of the lungs or pulmonary tuberculosis is the most common form of TB and occurs in about 80% of cases. This is the only form that may be infectious. Extra-pulmonary tuberculosis can affect any part of the body other than lungs such as bones, glands, pleura, lymph nodes, spine, joints, genitor-urinary tract, nervous system and intestine (5).

2.1.2 Difference between TB infection and TB disease (5)

In the majority of the cases persons become infected after inhalation of TB bacilli, which can not multiply and remain dormant if the immune system of the body is strong enough to prevent them from developing disease. People with TB infection usually 1) do not have symptoms; 2) do not feel sick; 3) can not spread TB to others 4) have a positive skin test (Mantoux test).

The dormant bacilli can be reactivated if the body immune system is weakened and consequently bacilli begin to multiply in the body and the patient develops TB disease (5).

2.1.3 Spread of tuberculous bacilli (5)

An infectious tuberculosis patient expels TB bacilli into the air through tiny droplets during coughing, sneezing. These droplets dry quickly, become droplet nuclei carrying the bacilli, and remain suspended in the air for several hours, Infection occurs if the inhaled bacilli in these droplet nuclei enter and settle in the lungs of a healthy person and begin to multiply.

The degree of exposure is extensive for those who are in close and prolonged contact with an infectious case (i.e. the persons who are living in the same household with infectious TB cases). The chance of becoming infected from a single contact is comparatively small. Most individuals who become infected have no signs/symptoms of illness. The bacilli are rapidly destroyed by exposure to sunlight and their concentration in the air is reduced by good ventilation.

Patients with pulmonary tuberculosis are prone to spread TB bacilli through coughing, sneezing and spitting, and if bacilli are identified on microscopic examination of sputum specimens such patients are known as smear positive cases. If the bacilli can not be identified on microscopic examination of sputum specimens of pulmonary cases, these patients are known as smear negative cases. In comparison to smear positive cases, smear negative cases are less infectious and the disease is usually less

severe. Extra-pulmonary cases are almost never infectious, unless they have pulmonary tuberculosis as well (5)

2.1.4 Signs and symptoms of Tuberculosis (5)

The highest priority for TB control is identification and successful treatment of patients who are suffering from sputum smear-positive pulmonary tuberculosis.

A pulmonary TB suspect is any person who presents with:

- Persistent cough for 3 weeks or more.

Often a patient with pulmonary TB has one or more of the following symptoms in addition to cough:

- Chest pain
- Shortness of breath
- Coughing up of blood
- Loss of weight
- Loss of appetite
- Fever
- Night sweats

Sputum microscopy should always be requested for patient, who has persistent cough for 3 weeks or more, even in the absence of any other symptom. Signs and symptoms of extra-pulmonary TB depend on the site involved:

- Swelling of lymph nodes (TB lymph adenitis)
- Pain and swelling of joints (TB arthritis)
- Radiological findings with or without loss of function (TB spine)
- Headache, fever, stiffness of neck and subsequent mental confusion (TB meningitis)

The diagnosis of extra-pulmonary TB should always be made by qualified physician and X-ray examinations, biopsies (5).

2.1.5 Tools for diagnosis of TB (5)

2.1.5.1 Sputum smear examination: The most cost-effective tool for screening pulmonary TB suspects is microscopic examination of their sputum by the Ziehl-Neelsen method. Microscopy should be performed on three sputum specimens, as follows:

- "On-the-spot" specimen: The first specimen is collected on the spot when a patient is identified as a pulmonary suspect (Spot-1 specimen)
- Early morning specimen: The patient is given a sputum container to collect the second specimen at home on the following morning
- A second "On-the-spot" specimen: the third specimen is collected when the patient returns to the health facility with the early morning specimen (Spot-2 specimen)

The responsible medical officer or paramedic should give clear and detailed instructions on how to collect the sputum: in the open air and as far as possible away from other people.

2.1.5.2 X-Ray examination of the lungs: Chest X-Ray findings suggestive of pulmonary tuberculosis in patients with smear negative microscopy should always be supported by clinical findings and qualified physicians should decide on the diagnosis of TB. Chest X-Ray findings do not specially indicate pulmonary tuberculosis because there are other chest diseases which may show the same changes on X-Ray.

2.1.5.3 Mantoux test: This test is only used for supporting TB diagnosis in young children. For all other persons Mantoux testing is not used as a tool to diagnose TB. The test does not differentiate between TB infection, TB disease and BCG vaccination.

2.1.5.4 Culture of TB bacilli: Culture is more sensitive than smear microscopy, detecting a higher proportion of patients among suspects. However, it

takes about 6 weeks to provide definite result, and is not accessible to most patients. So, it is unsuitable for routine procedure.

2.1.6 How is TB disease treated? (5)

2.1.6.1 Tuberculosis disease can almost always be cured with medicine, but the medicine must be taken as per the instruction of the responsible doctor. The most common drugs used for TB treatment are: Isoniazid (INH), Rifampicin, Pyrazinamide, Ethambutol and Streptomycin.

2.1.6.2 The TB cases are divided into three categories: category-I, category-II, category-III.

Category	TB cases
Category-I	- New smear-positive pulmonary TB patients - New smear-negative pulmonary TB with extensive parenchymal involvement - Concomitant HIV/AIDS - Severe forms of extrapulmonary TB e.g. meningeal, military, pericardial, peritoneal, massive unilateral/bilateral pleural effusion, spinal, intestinal, genitourinary and multi-organ TB
Category-II	- Previously treated more than 1 month sputum smear-positive Pulmonary TB - Relapse - Treatment after interruption/default - Treatment failure
Category-III	- New smear-negative pulmonary TB (other than Category-I) - Less severe forms of extrapulmonary TB e.g. lymph node, pleural effusion (unilateral), bone (excluding spine), peripheral joint, skin TB

Effective treatment phases consist of two phases:

A) The initial intensive phase of drugs administered daily for 2 months in new cases and 3 months for retreatment cases. The aim of this phase is to rapidly reduce and eliminate the multiplying bacilli without allowing the development of acquired resistance to the prescribed drugs. This is the vital stage of the treatment.

B) The continuation phase is essential to eliminate the remaining bacterial population. Intermittent, 3 times weekly, treatment has proven as effective as daily treatment.

The treatment duration for TB cases is usually 6-8 month (6 month for Category-I, III and 8 months for category-II). The duration is divided into two phases for Category-I, III: a) intensive phase is first 2 months (for Category-II 3 months) b) continuation phase is the next 4 months (for Category-II 5 months) (5).

2.1.7 Adherence to treatment (5)

Strict adherence to treatment should be ensured to cure the patients and prevent the development of drug resistance in smear-positive patients.

Directly Observed Treatment (DOT) is a very important component of the DOTS strategy. DOT implies that an observer watches a patient swallowing the drugs, which is essential for completion of treatment and recovery from TB. This ensures that the patient takes the right anti-TB drugs, in the right doses, at the right intervals and for the right period. All patients, irrespective of the category, should receive all doses of the anti-TB drugs under DOT.

2.1.8 Pregnancy, breastfeeding and TB (6)

Untreated tuberculosis (TB) represents a greater hazard to a pregnant woman and her fetus than does its treatment. Treatment of pregnant women should be initiated whenever the probability of TB is moderate to high. Infants born to women with untreated TB may be of lower birth weight than those born to women without TB and, rarely, the infant may be born with TB. Although the drugs used in the initial

treatment regimen cross the placenta, they do not appear to have harmful effects on the fetus.

Latent TB Infection (LTBI) – Isoniazid (INH) administered either daily or twice weekly for 9 months is the preferred regimen for the treatment of LTBI in pregnant women. Women taking INH should also take pyridoxine (vitamin B_6) supplementation.

TB Disease - Pregnant women should start treatment as soon as TB is suspected. The preferred initial treatment regimen is Isoniazid (INH), Rifampicin (RIF), and Ethambutol daily for 2 months, followed by INH & RIF daily or twice weekly for 7 months, for 9months of total treatment. Streptomycin should not be used because it has been shown to have harmful effects on the fetus. In most cases, Pyrazinamide (PZA) is not recommended to be used because its effect on the fetus is unknown.

Breastfeeding - should not be discouraged for women being treated with the first-line anti-tuberculosis drugs because the concentrations of these drugs in breast milk are too small to produce toxicity in the nursing newborn(6) with the exception of Streptomycin which is ototoxic to the fetus. The mother and baby should stay together and breast feeding should be continued(5). For the same reason, drugs in breast milk are not an effective treatment for TB disease or LTBI in a nursing infant. Breastfeeding women taking INH should also take Pyridoxine (vitamin B_6) supplementation (6).

2.1.9 **Tuberculosis and HIV** (5,20)

Infection with human immunodeficiency virus (HIV) leads to suppression of the immune mechanisms of the body and increases the chances of reactivation of dormant bacilli many fold as compared to those without HIV infection. Furthermore, due to low immunity, infection caused by other microorganisms may further lead to immuno-suppression and cause TB disease. So, HIV infected persons are increasingly

prone to develop numerous opportunistic infections including TB. HIV infection is therefore considered the most important risk factor for TB.

Though not all HIV infected persons develop TB, it is the most common opportunistic infection in such persons almost everywhere in the world.

The impact of TB on HIV with shorter survival attributable to death from TB and has been observed equally in both developing and developed countries. TB may accelerate progression of HIV by a six to seven fold increase in the HIV load as compared to those without TB. TB can also accelerate decline in CD4+ lymphocytes counts among people living with HIV infection .

Treatment is the same for TB patients with or without HIV infection. Death during treatment, partly due to YB itself and partly due to other HIV-related diseases, is more frequent in HIV-infected patients, particularly in the advanced stages of immunodeficiency. If a pregnant woman is known to HIV-positive, treatment with anti-retroviral drugs, if available, should be given to prevent mother-to-child transmission (5).

In sub-Saharan Africa HIV/AIDS is dramatically fuelling the spread of TB. TB is a major cause of death among people living with HIV. MDR-TB and XDR-TB are highly lethal in people living with HIV -- studies show case fatality rates of over 90%. Drug-resistant TB is therefore a major threat to the effectiveness of both TB treatment and anti-retroviral treatment programs (20).

2.1.10 Drug resistance and its development

There are two types of drug resistance:

Acquired resistance - is defined as resistance to one or more anti-TB drugs, which arises during the course of treatment, usually due to non-adherence to the recommended regimen or due to incorrect drug prescription and intake.

Primary resistance - is defined as the presence of resistant strains of Mycobacterium tuberculosis in patients, who have been infected with resistant bacilli by another patient and subsequently develop the disease (it should be ascertained that the patient did not receive previous treatment with anti-TB drugs).

The bacteria responsible for TB become resistant when people ill with TB are not provided with or do not complete a full course of medication. Drug-resistant TB, like drug-sensitive TB, can also be transmitted through the air from an infected person to a non-infected person.

Bacilli that are resistant to the two most powerful anti-tuberculosis drugs, Isoniazid and Rifampicin, are termed “Multi-resistant (MDR)” and the form of tuberculosis is called ‘MDR-tuberculosis’.

A smear-positive patient treated with Category-II regimen, who has become or remains smear-positive at 5 months or more is suspected of MDR-TB. This patient should be referred to Chest Diseases Clinic at Shyamoli in Dhaka or Damien Foundation hospitals in Netrokona, Mymensingh and Jalchatra (if coming from the area that is covered by the foundation).

World health organization reports highest rates of drug-resistant tuberculosis to date(22): Washington DC /Geneva – Multi drug-resistant tuberculosis (MDR-TB) has been recorded at the highest rates ever, according to a new World Health Organization (WHO) report that presents findings from the largest survey to date on the scale of drug resistance in tuberculosis.

The report, anti-tuberculosis drug resistance in the world, is based on information collected between 2002 and 2006 on 90000 TB patients in 81 countries. It also found that extensively drug-resistant tuberculosis (XDR-TB), a virtually untreatable form of the respiratory disease, has been recorded in 45 countries (5).

The report also found a link between HIV infection and MDR-TB. Surveys in Latvia and Donetsk, Ukraine found nearly twice the level of MDR-TB among TB patients living with HIV compared with TB patients without HIV (20).

Based on analysis of the survey data, WHO estimates there are nearly half a million new cases of MDR-TB--about 5% of the total nine million new TB cases--worldwide each year. The highest rate was recorded in Baku, the capital of Azerbaijan, where nearly a quarter of all new TB cases (22.3%) were reported as multi drug-resistant. Proportions of MDR-TB among new TB cases were 19.4% in Moldova, 16% in Donetsk in Ukraine, 15% in Tomsk Oblast in the Russian Federation and 14.8% in Tashkent in Uzbekistan. These rates surpass the highest levels of drug resistance published in the last WHO report in 2004. Surveys in China also suggest that MDR-TB is widespread in that country.

MDR-TB is a form of TB that does not respond to the standard six month treatment using first line-drugs (i.e. resistant to Isoniazid and Rifampicin). It can take two years to treat with drugs that are 100 times more expensive than first-line treatment.

Extensively drug-resistant tuberculosis (XDR-TB) is a form of TB caused by bacteria resistant to virtually all the most effective anti-TB drugs (i.e. MDR-TB plus resistance to any Fluoroquinolones and any one of the second-line anti-TB injectable drugs: Amikacin, Kanamycin or Capreomycin) (20).

2.2 National Tuberculosis Program (NTP), Bangladesh (7,8)

The overall goal of the NTP is to reduce morbidity, mortality and transmission of TB until the disease is no longer a public health problem. The objectives are to detect 70% of new smear-positive pulmonary TB cases and cure at least 85 % of them by the year 2005 and be maintained thereafter to reach the MDG by 2015 (7).

The NTP adopted the WHO recommended strategy of Directly Observed Treatment Short-course (DOTS) in 1993. NGOs have been involved since 1994. The DOTS strategy consists of five components (7):

- Political commitment (Government commitment to sustained TB control activities)

- Diagnosis by direct microscopy (Case detection by sputum smear microscopy among symptomatic patients self-reporting to health services)
- Directly Observed Treatment (DOT) (Standardized regimens of 6-8 months treatment at least for all confirmed sputum smear positive cases, with directly observed treatment for the initial two months)
- Uninterrupted supply of all essential anti-TB drugs
- Standard recording and monitoring of detection and treatment results

The NTP is recognized as a priority in the revised Health, Nutrition and Population Sector Program. Under the guidance of the Director-General of Health Services, the NTP manager is responsible for the NTP at central level. At the sub-national level, the NTP is integrated into the divisional, district and upazila (sub-district) general health services. Chest disease clinics, located in district capitals and metropolitan cities, support the NTP by offering diagnostic and treatment services for surrounding areas and serving as referral centers for entire districts. NGOs provide NTP services at upazila level in collaboration with the government; some have their own health-care infrastructure. At the peripheral level, health inspectors and assistants, medical assistants, village doctors and NGO community health workers provide basic services such as identification and referral of TB suspects, provision of DOT, tracing of defaulters and various behavior-change communication activities (8).

The NTP has established a network of nearly 600 sputum microscopy centers, each one covering a population of about 230,000 on average. There is one National level laboratory, which is part of the central public health laboratory, and 45 intermediary laboratories in chest disease clinics. Peripheral laboratories are found in upazila health complexes, in private urban facilities, medical colleges and in health services for special population groups including health services in prisons, the police and industry (8).

Most DOTS implementation in Bangladesh has been done by NGOs, and during 2004 their involvement has increased. The main NGO partners include the Bangladesh Rural Advancement Committee (BRAC) and DFB, who together cover most of the rural districts in the country; urban areas are covered mainly by other

NGOs. There are a number of PPM-DOTS initiatives in Bangladesh. Several private chest physicians in Dhaka have become involved in DOTS services, and the participation of more private practitioners is needed. DFB is expanding its cadre of private “village doctors”, who are currently responsible for the detection of about 10% of patients and the provision of DOT to 45% of patients in DFB areas. BRAC has started similar initiatives in periurban areas, while in rural areas they deliver DOT through a network of community workers (8).

Since the introduction of DOTS the NTP and its partners have achieved satisfactory treatment results in new smear-positive patients, 84% treatment success among the patients detected during 2001. However, case detection has remained under 35%. During 2004 the detection rate of new smear-positive patients was 46%. During 2005 the detection rate of new smear-positive patients was 61% and treatment success rate 89% (7).

Recent developments (7):

1. Treatment:

- Change in regimen for new smear-positive and for smear-negative and extra-pulmonary patients, as follows:
    - regimen for new smear-positive patients and other severely ill patients: Initial 2 months (INH, Rifampicin, Pyrazinamide, Ethambutol) / next 4 months (INH3 Rifampicin3)
    - regimen for relapses and failures : Initial 2 months (Streptomycin, INH, Rifampicin, Pyrazinamide, Ethambutol) / next 1 month (Rifampicin Ethambutol INH Pyrazinamide) / next 5 months (Rifampicin3 Ethambutol3 INH3)
    - regimen for smear-negative and extra-pulmonary patients: Initial 2 months (INH, Rifampicin, Pyrazinamide) / next 4 months (INH3 Rifampicin3).

- Change in formula of the drugs, from loose drugs to fixed dose combinations (FDC's) of 4 drugs (smear-positive patients), 3 drugs (smear-

negative and extra-pulmonary patients) and 2FDC's (all patients during the continuation phase of the treatment).

- Provision of FDC's in blister packs. After diagnosis the full treatment of the patient will be set aside.

2. Continuation of a pilot project on public-private partnership, involving 63 chest physicians and general practitioners in Dhaka City.
3. Public Private Partnership Project, an operational research project collaborated between NTP and Nuffield Institute for Health, University of LEEDS, United Kingdom started its activities in March, 2004. This project is aimed to develop an innovative partnership model for effective involvement of private practitioners in service delivery of the TB control activities in Bangladesh.
4. DOTS expansion in Dhaka and other metropolitan cities. After detailed preparation and training of staff, the number of diagnostic and treatment facilities in Dhaka and other city corporations has been increased.
5. Opening of new DOTS corners in medical colleges
6. Opening DOTS Centers at work places
7. Expansion of DOTS in prisons.

Major challenges to reaching the case detection target:

Major challenges include increasing and maintaining high levels of commitment at policy levels, improving the quality of the diagnostic services, intensifying partnership with NGOs, the private sector, academic institutes and workplaces, strengthening, monitoring and evaluation and implementation of TB Control (7).

Important events:

- NTP initiated dissemination of TB information since February 2005 through cable TV network at urban and periurban areas of Dhaka city. The

information is being displayed by courtesy of United Commercial Services (UCS) and Dhaka City Corporation Network (DCCN).

- NTP and BRAC participated at cricket carnival from 19th to 23rd February organized by Bangladesh Cricket Board to disseminate TB messages through display of banner at play ground and distribution of printed materials to the audiences.

- Bangladesh Scouts participated at 11th Rover Scout Moot from 25th February to 1st March, 2005 and actively participated to disseminate TB messages. More than 1000 rover scouts and leader from different colleges and universities all over Dhaka district participated at the scout camp. They worked at 3 villages to disseminate TB related information through distribution of poster/stickers and interpersonal communication.

- NTP organized a Strategic Planning workshop from 13th to 15th March 2005 at Training and Resources Center of BRAC at Savar. The objective of the workshop was to develop a draft strategic plan for 2006 to 2010. NTP and its partner NGOs (BRAC, NSDP, UPHCP, NATAB, Damien Foundation, ICDDR,B) and WHO attended at the workshop.

- World Stop Day-2005 was celebrated on 24th March in a befitting manner in Bangladesh. The slogan for World Stop TB Day-2005 for Bangladesh was ‘Stop TB-Ensure your participation. As a part of activities of World TB Day, conference, rally and discussion at national, divisional and district level were organized jointly by WHO, NTP and partner NGOs (7).

Printing and Publications:

- Revision of National Guidelines for Tuberculosis Control, third edition
- Revision of laboratory manual on smear microscopy for tuberculosis and its quality control in the NTP of Bangladesh, third edition
- Reprinting of Handbook on control of tuberculosis for village doctors
- Reprinting of Facilitators Guide for training of village doctors
- Annual report of the NTP for 2004
- Treatment and laboratory algorithm for DOT and Microscopic centers.

- Printing of laboratory manual on smear microscopy for tuberculosis and its quality control in the NTP of Bangladesh, Bengali version, first edition
- Printing of brochure, flip chart, posters, stickers
- Printing of Handbook on control of tuberculosis for scouts
- Printing of Handbook on control of tuberculosis for cured TB patients, village leaders and other volunteers
- Printing of fact sheet on the eve of world TB Day-2005
- Quarterly Report: 2nd and 3rd quarter, 2005
- Guidelines on Public Private Mix

2.3 Characteristics of urban slum in Dhaka (3)

Dhaka is the main destination in Bangladesh for rural-urban migrants and in contrast to most Asian cities, this source of growth continues to outstrip its own natural increase, resulting in an annual growth rate of nearly 6 percent. The growth has resulted in Dhaka being transformed from a small largely administrative town into a complex metropolis with a huge socioeconomic gradient from very wealthy elite to a vast urban poor population. This partly reflects the composition of the migrants who comprise a diverse group, some being educated individuals with skills in demand, but many being very poor families with little education, few skills, and usually little or no capital ---- it is the landless who have least reason to stay in the country and most to gain by migrating to the city (3).

The poorest live in squatter settlements known as ‘bosti’ (slum), and the penniless living on the streets of the main city as pavement-dwellers, both groups consisting predominantly of migrants. This enormous expansion and the growing diversity of the city have affected every aspect of the citizen’s lives, including their health. Indices of health, such as infant and child mortality, have been consistently better in urban than rural Bangladesh, but for the slums/bosties, mortality rates are in general above rural rates; a rate of 165 in the slums (bosties) and 115 in non-bostie slums. The key factors here are social composition, household and community environment, access to public services and health facilities. In terms of the

composition of the population, the key factors are their poverty, the lack of education and the fact that many slum-dwellers, including most bostie-dwellers and pavement-dwellers are migrant households. A number of factors may be involved. Firstly, the extremely poor may lack food security at some time in the past year they had no money to pay for food. Secondly, many find it difficult to afford health care, paying not only for a doctor's examination but also for medicine and for medical tests. Many also find it difficult to afford the time required to seek treatment from a hospital. Thirdly, the very poor live in the worst, most crowded and unhygienic housing.

40 per cent of males and 53 per cent of females aged six and over in the urban-slums (bosties) had never been to school. The mother's education was closely linked to whether the child had the full recommended schedule of immunizations. Education also contributed to better hygiene. Educated mothers were more likely to wash their hands prior to preparing food. Similarly, they were much more likely to ensure that their children used sanitary toilets.

However, locality and particularly living in an urban-slum (bosties) partly reflects the influence of neighbors in decisions making to seek health care. Young mothers were strongly influenced by the older women living in neighboring houses. These women are more experienced, but as older women they are generally less educated and more traditional than the young women they are advising. In the urban slums/bosties, the women can act to discourage women from seeking attention from hospitals and clinics and instead encourage them to seek attention from a 'kobiraj' (practitioner of 'Ayurvedic' medicine, often having many aspects of a folk healer) or other traditional healer (3).

Locality also affects health through its environment and its access to health services. A major factor affecting health, and particularly in the Dhaka urban slums/bosties and on the pavements, is overcrowding, a major problem with extremely high population density and houses squashed closely together, are extremely small and poorly built, more generally, environmental conditions are

unhygienic. Drainage is extremely poor, sanitation inadequate and non-existent, and rubbish, including faeces, uncollected and indeed scattered underfoot.

Bosties, as illegal settlements, are often located in areas regarded as unsuitable for housing, for example areas subject to flooding. More critically, because they are illegal settlements, bosties receive few or no government services, such as paved roads, paved footpaths, drains, sewerage, piped water or rubbish collection. A lack of paved roads and footpaths, and a lack of drains together with poor housing mean that bostie-dwellers are in a poor position to cope with the effects of flooding. Lack of sanitation results in a large proportion of the population using open latrines or in some cases no latrines at all. In cases where households do have access to sanitary latrines, up to 10 households or 50 individuals may share one. The lack of piped water means that most households have to share wells among themselves, generally safe but having to queue for water and carry it over a distance reduces the amount of water available for cleanliness, and storage raises the potential for contamination. The result of such poor environmental conditions is that such infections as pneumonia and diarrhea remain major killers of children, and tuberculosis of adults (3).

The poor who cannot afford health services use other alternatives, the most important of which is simply to ask the salesman at drug shop for medicine. In addition, people use untrained (quack) doctors, or obtain medicine from traditional or alternative traditional medical providers such as kobiraj, fakirs or homeopaths. These providers are preferred as being cheap, convenient, polite and, in the case of traditional providers, more in keeping with the understanding of appropriate treatment of clients (3).

Treatment varies according to gender. For persistent illness, doctors were eventually consulted mainly by males but few by females. This reflects, no doubt, a male preference, a concern for the well-being of the household head, usually the main breadwinner, as well as female privacy and modesty, which makes it difficult for women to go to male doctors, but also to female doctors in the case of reproductive tract infections and sexually transmitted diseases. Furthermore, men usually control

the family finances and while women can in emergencies take some initiative with regard to their children, they usually do not for their own health, for to do so might be regarded as putting their own interests before that of their households. A final factor is a belief that many problems that affect women specifically are natural, and hence are not to be interfered with. Many women who had lost children had not sought appropriate care in time. The women felt that childbirth was natural and were reluctant, until too late, to seek support from health-care workers, and especially male doctors.

Poverty is a threat to good health. In terms of health services, minimum safety nets have slowly been established in rural areas, while urban health has largely been left to the market. Such a system does not meet the needs of the very poor in the cities. Dhaka provides a good example of all these problems, being a huge and rapidly growing metropolis in Asia's most health-challenged region. The most disadvantaged are the slum (bostie)-dwellers, those in illegal shanty towns. They lack most services and are often a long way from hospitals and other health provision. They can be easily missed by public health programs (3).

2.4 Bangladesh NGO and Public Sector Tuberculosis Service Delivery (17)

2.4.1 Introduction

Tuberculosis (TB) is one of the most prevalent human infections and causes more deaths worldwide than any other infectious disease. Estimates show that approximately a third of the global population is infected with Mycobacterium tuberculosis and that 8 million new cases of TB occur each year, leading to nearly 3 million deaths annually. The World Health Organization (WHO) reports that TB is almost exclusively a disease of the developing world: 98% of TB-related deaths and 95% of TB cases occur in these countries.

However, TB is not life threatening if appropriate diagnosis (screening and case detection) and treatment are provided on time. WHO recommended strategy of

directly observed treatment, DOTS, has proven successful in many parts of the world and is considered cost-effective. Nevertheless, DOTS is still not used widely: Less than 15% of TB patients worldwide have been treated through DOTS. Furthermore, over the past decade, poly-, multi-drug-resistant forms of TB have become a significant threat to TB control. With increased use, misuse, and defaulting use, the number of multi-drug-resistant TB cases has risen dramatically and alarmingly (17).

2.4.2 Background

Several factors influence the way that the Government of Bangladesh (GOB) can address its TB burden. Information about that burden, the historic development of the National Tuberculosis Control Program (NTP), the structure under which TB services are delivered, and the newly developed goals for TB service delivery is provided in this section (17).

Burden Statistics (17)

While TB is a global concern, it is emerging as a major public health problem in Bangladesh, which now has the fifth highest burden of TB cases among all nations. Anecdotal evidence suggests that most Bangladeshi communities consider TB a greater threat than HIV/AIDS. NTP estimates that:

- There are 300,000 new cases annually; 137,000 are infectious, smear-positive cases;
- The annual incidence of TB is 99 per 100,000 population for smear-positive cases and 221 per 100,000 for all forms;
- TB causes 70,000 deaths per year;
- The case detection rate is 41% (NTP, 2003);
- The cure rate of detected cases under DOTS is 84% (with 300,000 new cases annually, those cured comprise only 3.2% of all new cases);
- Incidence is believed to be higher in densely populated, urban areas with poor living conditions; and
- The female: male is ratio 2:5 among new smear-positive cases registered for treatment.

Prior to the present assessment, several factors were believed to be contributing to Bangladesh's TB burden. First, low case detection was thought to be partly caused by an insufficient number of appropriately equipped microscopy centers. One microscopy center per 100,000 populations is recommended in high-burden countries, but a 2004 WHO report indicates that in Bangladesh each upazila (sub-districts with a population of approximately 300,000) is served by only one microscopy center: This proportion is a third that recommended. Second, the same report notes that only about half the population truly has access to DOTS services: Not covered are most urban areas, the district hospitals, academic institutions, private clinics, and certain other institutions (e.g., prisons, workplaces, corporate hospitals, armed forces). Third, quality assurance of smear microscopy was not implemented in about 70% of the microscopy centers in the DOTS program. Furthermore, NTP notes that many people (60–70% in urban areas) seek care from the private sector, which

maintains no record of patient numbers or treatment patterns: Such records are essential for TB control. NTP assumes that just over half of patients seek care from chest specialists, health centers, and nongovernmental organization (NGO) clinics. Most of these providers are not conversant with the DOTS strategy.

These wide-ranging deficiencies recommend a large-scale, coordinated effort to ensure the smooth implementation of prevention and care programs for TB at all levels. Such effort will involve resource allocation in various areas, including program management; financial support; efficient supervision and monitoring at all levels; improving technical competence; and other steps. This report provides data to guide such effort (17) .

TB Service Delivery Structure (17)

Under the NTP, DOTS services are delivered from more than 500 Government-run centers and NGO clinics in all upazila, districts, and city corporations. There are two types of Government facilities:

- Upazila health complexes (UHCs): There are 460 Upazila health complexes, each covering an average population of 270,000–300,000; UHCs are 31-bed hospitals with indoor facilities and field functionaries to deliver primary healthcare (PHC) services to the rural populations. UHCs are comprehensive sub-district-level facilities that provide TB care along with a wide range of other preventive and curative services, including both in- and out-patient care.
- Chest Disease Clinics (CDCs): The 45 Chest Disease Clinics are secondary-level care facilities in 44 district headquarters; they serve large populations whose sizes vary widely from one catchments' area to another. They are devoted specifically to the screening, diagnosis, and treatment of TB patients. They serve as DOTS centers and support the NTP through diagnosis of pulmonary tuberculosis cases, proper referral of patients for treatment to respective UHCs, and provision of technical advice according to national guidelines. They refer complicated cases to tertiary-level hospitals.

- There are also 11 major Non-Governmental Organizations (with sub-awardees), including BRAC, Bangladesh, that provide DOTS under the NTP umbrella. The NGO Service Delivery Program (NSDP) is one of them and is responsible for providing DOTS in the major urban areas, i.e., the city corporations. This is implemented through NGO clinics under the NSDP network; of course, not all NGO clinics in Bangladesh participate in the network of the NSDP. Although NSDP has both urban and rural NGO clinics, only some of the NGO clinics located in the city corporation areas provide DOTS support, in terms of diagnosis and care. This is because the NTP, besides its own 460 Upazila Health Complexes, also has a number of NGO partners to meet the needs of the rural populations.
- Acid-fast bacilli microscopy is provided free in all DOTS centers, while chest X ray is used for the diagnosis of smear-negative or complicated cases, mainly in the Chest Diseases Clinics. TB-DOTS treatment is provided free from all centers and, as much as possible, decentralized at the community level through community health workers, village doctors, the Government, and NGO staff.

New TB Service Delivery Goals (17)

Bangladesh recently became an awardees' of the Global Fund for AIDS, TB and Malaria, and the Government is determined to reach the global targets for TB control. The expected overall outcome is to "achieve sustained detection of 70% of new smear-positive patients and to cure 85% of them."

Through the Global Fund, the GOB hopes to achieve the following by the end of 2009:

- TB diagnostic services will have been expanded from the existing 534 to 664 facilities;
- TB treatment through DOTS will be delivered countrywide by:
  a. Skilled community health workers as well as doctors at healthcare delivery points, like UHCs, public hospitals, etc.;
  b. Skilled private doctors; and

c. Special services, such as those provided in prisons, the armed forces and police, academic institutions, and work places.

- At least 80% of diagnostic facilities will deliver high-quality microscopy services;
- Behavior change communication (BCC) strategies will be implemented countrywide to increase TB self-referrals; and
- Timely, complete, and accurate reports on case detection and treatment outcome will be received from all districts; quarterly and annual country reports will be compiled within three months of a quarter's end; monitoring surveys will occur annually; and external evaluation of the program will be performed every second year.

2.4.3 Quality Assurance Project (QAP) (17)**:**

The overall objective of Quality Assurance Project (QAP) activities in Bangladesh is to assist in developing a strategy for expanding access to and improving the quality of TB services supported by NTP Bangladesh. Such a strategy would be expected to:

1. Increase case detection;
2. Improve cure rate; and
3. Increase compliance with the drug regimen, resulting in fewer multiple-drug resistant strains.

To lay the groundwork for this effort, QAP commissioned a rapid assessment of TB-DOTS service delivery provided by Government clinics and the NGOs clinics participating in the NSDP.

2.4.4 QAP Study Results (17)**:**

a. NGO clinics:

Only five of the 15 NSDP NGO clinics offered diagnostic services, but all of them offered treatment, follow-up, and pulmonary TB patient referral services, as shown in Figure 2. These clinics serve an estimated catchments' population of 1.8 million. All the clinics apply both a self-referral/passive case finding and a

community active process to identify suspected pulmonary TB cases. Under the latter, community members identify TB suspects and send them to the clinic for screening and diagnosis. Based on the need to develop a cost-effective and sustainable process of suspect identification, NTP emphasizes the self-referral process more than the active one. Three clinics also receive referrals from Government facilities and general practitioners.

b. GOB clinics

All ten GOB facilities surveyed, as secondary-level Government healthcare facilities, offer the complete set of TB-DOTS services: diagnosis (including laboratory testing), treatment, follow-up, and pulmonary TB patient referral. The total catchments' population covered by this study cannot be stated because of the widely varying CDC catchments' sizes; however, the five Upazila Health Complexes combined serve a population of 1,519,592 in five sub-districts. All these facilities receive TB patients (both pulmonary and extra-pulmonary) referred from other health facilities: Government health centers, general practitioners, and the non-government sector (19).

2.5 Theoretical model: THE PRECEDE/PROCEED MODEL (9)

PRECEDE is an acronym for Predisposing, Reinforcing, Enabling, Causes in, Educational Diagnosis and Evaluation.

PROCEED is an acronym for Policy, Regulatory, Organizational Constructs in Educational and Environmental Development.

The PRECEDE model is a framework for the process of systematic development and evaluation of health education programs. An underlying premise of this model is that health education is dependent on voluntary cooperation and participation of the client in a process which allows personal determination of behavioral practices; and that the degree of change in knowledge and health practice is directly related to the degree of active participation of the client. Therefore, in this

model, appropriate health education is considered to be the intervention (treatment) for a properly diagnosed problem in a target population. This model is multidimensional, founded in the social/behavioral sciences, epidemiology, administration and education. As such, it recognizes that health and health behaviors have multiple causations which must be evaluated in order to assure appropriate intervention. The comprehensive nature of PRECEDE allows for application in a variety of settings such as school health education, patient education, community health education, and direct patient care settings.

PROCEED was added to the model in the late 1980s based on L. Green's experience with Marshall Krueter in recognition of the emergence of and need for health promotion interventions that go beyond traditional educational approaches to changing unhealthy behaviors. The administrative diagnosis is the final planning steps to "precede" implementation. From there "proceed" to promote the plan or policy, regulate the environment, and organize the resources and services, as required by the plan or policy.

The purpose of the PRECEDE/PROCEED model is to direct initial attention to outcomes rather than inputs. This forces planners to begin the planning from the outcome point of view. In other words, as a program planner begin with the desired outcome and work backwards to determine what causes it, what precedes the outcome. Intervention is targeted at the preceding factors that result in the outcome.

The overriding principle in this approach to health education is that health behavior must be voluntary behavior. Health means different things to different people, serves different purposes for different people, and is more or less important to different people. Because of this it is difficult to justify the imposition of rigid criteria of appropriate health behavior unless a behavior has been judged by society as a whole to be a sufficient hazard to the common good to warrant the curtailment of individual choice.

Description of the model: PRECEDE - the first 5 phases

Phase 1 - Social Diagnosis

Phase 2 - Epidemiological Diagnosis

Phase 3 - Behavioral & Environmental Diagnosis

Phase 4 - Education & Organizational Diagnosis

Phase 5 - Administrative & Policy Diagnosis

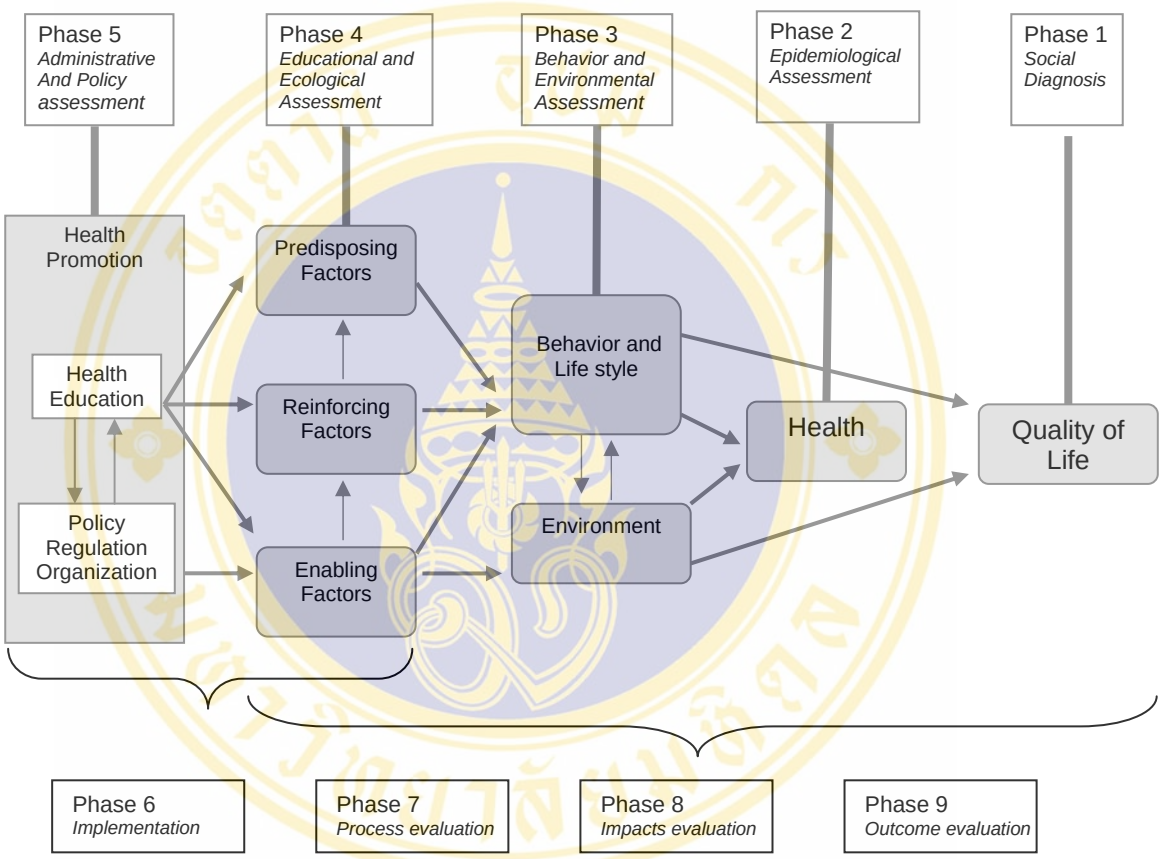

Figure-1 PRECEDE-PROCEED Model

PRECEDE:

Phase 1 - Social Diagnosis (9)

The focus of this phase is to identify and evaluate the social problems which impact the quality of life of a target population. This requires program planners to gain an understanding of the social problems which affects the quality of life of the patient, consumer, student, or community, as those populations see those problems. This followed by the establishment of a link between these problems and specific health problems which may become the focus of health education. The link is

essential in life and, in turn, how the quality of life affects social problems. Methods used for social diagnosis may be one or more of the following:

- Interviews
- Focus Groups
- Surveys
- Community Forums

Phase 2 - Epidemiological Diagnosis (9)

This phase helps determine health issues associated with the quality of life. It helps identify behavioral and environmental factors related to the quality of life issues. The focus of this phase is to identify specific health problem and non health factors which are associated with a poor quality of life. Describing these health problems can: 1) help establish relationships between health problems, other health conditions, and the quality of life; 2) lead to the setting of priorities which will guide the focus of program development and resources utilization; and 3) make possible the delineation of responsibilities between involved professionals and organizations and agencies. These priorities are defined as program objectives which define the target population (WHO), the desired outcome (WHAT), and HOW MUCH benefit the target population should benefit, and by WHEN that benefit should occur. From phase 1 and 2 program objectives are created - that is the goal or goals hope to achieve as a result of implementing the program

Phase 3 - Behavioral and Environmental Diagnosis (9)

This phase focuses on the systematic identification of health practices and other factors which seem to be linked to health problems defined in Phase 2. This includes non-behavioral causes (personal and environmental factors) that can contribute to health problems, but are not controlled by behavior. These could include genetic predisposition, age, gender, existing disease, climate, and workplace, the adequacy of health care facilities, etc. Also assessed are the behaviors which cause health problems in the target population. Another important component of this phase is the determination of the importance and relative changeability of each behavioral cause. It is critical that a behavioral diagnosis is completed for each health problem

identified on Phase 2. This will allow all the planners to choose target behaviors which will become the focus of specific educational interventions.

Behavioral Diagnosis is the analysis of behavioral links to the goals or problems that are identified in the epidemiological or social diagnosis.

Environmental Diagnosis is a parallel analysis of factors in the social and physical environment other than specific actions that could be linked to behaviors.

Phase 4 - Educational Diagnosis (9)

This phase assesses the causes of health behaviors which were identified in Phase 3. Three kinds of causes are identified - predisposing factors, enabling factors, and reinforcing factors. The critical element of this phase is the selection of the factors which if modified, will be most likely to result in behavior change. This selection process includes identifying and sorting (positive and negative) these factors in appropriate category, prioritizing factors among categories, and prioritizing with categories. Prioritization of factors is based on relative importance and changeability. Learning objectives are then developed which focus on these selected factors. Pinpoints the factors that must be changed to initiate and maintain behavioral change.

According to the PRECEDE framework, three categories: predisposing, enabling and reinforcing factors affect individual or collective behavior.

Predisposing Factors (9) - any characteristics of a person or population that motivates behavior prior to the occurrence of that behavior

- knowledge
- beliefs
- values
- attitudes

Enabling factors (9) - characteristic of the environment that facilitate action and any skill or resource required to attain specific behavior

- accessibility
- availability

- skills
- laws (local, state, federal)

Reinforcing factors (9) – rewards, incentive or punishments following or anticipated as a consequence of a behavior and contributes to its persistence or extinction, and includes social support, praise, reassurance and symptom relief. They serve to strengthen the motivation for behavior.

- family
- peers
- teacher.

Phase 5 - Administrative and Policy Diagnosis (9)

This phase focuses on the administrative and organizational concerns which must be addresses prior to program implementation. This includes the assessment of resources, budget development and allocation, development of an implementation timetable, organization or personnel within programs, and coordination of the program with all other departments, and institutional organizations and the community.

Administrative Diagnosis - the analysis of policies, resources and circumstances prevailing organizational situations that could hinder or facilitate the development of the health program.

Policy Diagnosis - to assess the compatibility of your program goals and objectives with those of the organization and its administration; does it fit into the mission statements, rules and regulations.

PROCEED - the second 4 phases (9)

Phase 6 - Implementation of the Program

Phase 7 - Process Evaluation is used to evaluate the process by which the program is being implemented.

Phase 8 - Impact Evaluation measures the program effectiveness in terms of intermediate objectives and changes in predisposing, enabling, and reinforcing factors.

Phase 9 - Outcome Evaluation measures change in terms of overall objectives and changes in health and social benefits or the quality of life. It takes a very long time to get results and it may take years before an actual change in the quality of life is seen(9).

2.6 HIV/AIDS Situation in Bangladesh (18)

With prevalence rate of less than 1% HIV/AIDS in Bangladesh may not look like a major threat. Yet nothing can be farther from truth. In a population of over 130 million, a mere 1% rise would mean an addition of more than a million to the numbers. The first case of HIV was detected in 1989. According to a 2004 UN study, HIV infections have tripled in the last six years. UNAIDS estimated that 13,000 adults and children were living with HIV at the end of 2002.

However officially, till December 2004, only 465 cases were reported. Of these, 87 have developed AIDS, and 44 have died. According to international funding agencies, significant underreporting of cases occurs because of the country's limited voluntary testing and counseling capacity. The social stigma attached to the disease is a further impediment.

Commercial sex workers (CSWs), men who have sex with men (MSM), migrant workers and injecting drug users (IDUs) are identified as the most-at-risk populations.

Sex workers in Bangladesh have a higher client turn-over rate than in any other south Asian country, and consistent condom use during paid sex is rare (depending on the region, 0–12% of sex workers said they used condoms with new clients), reports UNAIDS update of 2005. There are over 105,000 sex workers, both female and male, in the country. Brothel-based female sex workers reportedly see around 18 clients per week, while street-based and hotel-based workers see an average of 17 and 44 clients per week respectively.

Syphilis has been observed in 9.7 percent and 12 percent of female sex workers in central and south-eastern Bangladesh respectively. The high rates of syphilis and other STDs confirm the low level of condom use and the presence of other risky sexual behaviors that facilitate the spread of the HIV infection.

A national survey data indicates that HIV incidence among IDUs jumped from 1.8 % in 2001 to more than 4% in 2004. In one Dhaka “hotspot” the prevalence has jumped to 9%. A survey in Central Bangladesh revealed that more than 70% IDUs routinely share needles. Hepatitis C prevalence rates of 83 percent have been found among IDUs. This is comparable to levels in countries that are experiencing a concentrated and growing HIV epidemic. The most-at-risk population of IDUs often faces homelessness, unemployment and incarceration, further compounding their risk of HIV/AIDS. Illegal sale of blood by IDUs increases the threat of tainting the national blood supply.

A large proportion of drug injectors (as many as one in five in some regions) report buying sex and among them, fewer than one in ten consistently used a condom during commercial sex in the previous year (Ministry of Health and Family Welfare, 2004).

A large proportion of drug injectors (as many as one in five in some regions) report buying sex and among them, fewer than one in ten consistently used a condom during commercial sex in the previous year (Ministry of Health and Family Welfare, 2004)(18).

Table-1: HIV/AIDS Estimates in Bangladesh

Items	N	Year
Estimated Number of HIV cases (Adults and children)	11000	2005
Adults (15-49 years)	11000	2005
Women (15-49)	1400	2005
Children	-	-
Estimated number of deaths due to AIDS	<500	2005
Estimated Number of AIDS orphans	-	-

Source: UNAIDS Global AIDS Report 2006

The National Response

In view of the pandemic that started in the early 80s, Government of the People's Republic of Bangladesh formed a National AIDS Committee way back in October 1985 for prevention & control of HIV/ AIDS. The country's National Policy on HIV/AIDS and STD related issues was drafted in 1996 and adopted in 1997. The Government then issued a Plan of Action to address HIV/AIDS within the framework of the Health and Population Sector Programme. The Strategic Plan (1997-2002) envisaged involvement of community and religious leaders as well as student and youth leaders in HIV/AIDS prevention advocacy programs.

A new National Strategic Plan (2004-2010) has now been put in place. The government also works with the World Bank on a 40 million HIV/AIDS Prevention Project aimed at preventing HIV from gaining a larger foothold within high-risk populations and at limiting its spread into the general population.

Primary objectives include the rapid scale-up of successful nongovernmental organization (NGO) programs that focus on high-risk populations to raise awareness and expand advocacy among the general population, policymakers, and vulnerable populations; and to strengthen government capacity to respond to HIV/AIDS in blood safety, project management, and surveillance.

Starting in 2006, students in 21,000 secondary and upper secondary schools will be taught about HIV/AIDS issues. The program will introduce a “life skills” curriculum, including a chapter on HIV/AIDS drafted with assistance from the United Nations Children Fund.

Assessing Leadership for Confronting the HIV/AIDS Epidemic Across Asia, Policy Project which prepared a report for USAID has noted that many challenges hampered the country’s response to the epidemic. During in-depth interviews with representatives of various stakeholders in the country’s HIV/AIDS program, respondents identified lack of human resources and absorptive capacity as significant barriers to effective use of existing financial resources. High staff turnover, lack of training and staffing, a hierarchical and inefficient program structure, and lack of meaningful multi-sectoral participation were critical concerns.

More importantly, respondents noted that stigma and discrimination were prevalent in the Bangladeshi society—and top political leaders often remained silent on the issue or exacerbated the situation by misinterpreting surveillance data or adding to the perception that certain groups were “guilty” for the spread of HIV. Around 300 NGOs working in the area of STD/AIDS have formed a network, and about 135 are actively engaged in HIV/AIDS-related activities in the country, particularly in working with marginalized and hard-to-reach groups. NGOs are often in a better position than the public sector to reach high-risk groups, such as commercial sex workers and their clients and injecting drug users (18).

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Strategies:

The Strategic Plan focuses on five areas:

a. To provide necessary help and services to vulnerable groups like sex workers, injecting drug users, truckers, male homosexuals, prisoners.
b. Control the risk of spreading HIV infection.
c. Encourage safe behavior in health services.
d. To reduce the effect of HIV/AIDS epidemic.

To create awareness among youth and adolescents Ministry Of Health and Family Welfare and Save the Children have signed an agreement under the Global Fund to Fight AIDS, Tuberculosis and Malaria (GFATM), to provide management services for effective implementation of the project though sub recipients nationwide. The Bangladesh's Government hopes that by 2009 these activities will aim at yielding the following results for youth and adolescents:

- 80% will have knowledge about HIV/AIDS and know the way of how to protect them from infection.
- 60% will able to get access to STI services.
- 50% will be able to access condom when needed.

Besides these programs the government of Bangladesh decided to include HIV/AIDS prevention program in different continuous working plan of different ministries with proper importance. At present 16 Ministries/Department/Divisions are working for this purpose.

UN support:

The UN is providing management and technical support for HIV/AIDS Prevention Project mainly through UNFPA, UNICEF and WHO for institutional capacity strengthening of National AIDS/STI Programme (NASP), targeted interventions for vulnerable groups, advocacy and communication and blood safety (18).

Support By Others:

The World Bank has committed $20 million for an HIV/AIDS Prevention Project (HAPP), which became effective in February 2001. The project is scaling up interventions among groups at high risk in a rapid and focused manner, while strengthening overall program management. DFID has been supporting the Shaki project of CARE, which works mainly with vulnerable populations, but also provides technical and financial assistance to other NGOs. Through its regional approach, DFID seeks to sensitize policy-makers and focus on migration.

Improving sexually transmitted infection (STI) services for high-risk populations, enhancing NGO technical capabilities in HIV prevention, promoting condom use through social marketing and NGOs working with high-risk populations, initiating counseling, testing, and care for people infected with HIV, strengthening sero- and behavioral surveillance and conducting research on new approaches and strategies are the focus areas of USAID's assistance to Bangladesh with regard to spread of HIV/AIDS (18).

2.8 Related study (10,11)

2.8.1 Demographic characteristics:

In one study (10), majority of the respondents (79.3%) were in the age-group of 20-39 years, 95.5% were males, 71.5% were illiterates, 82.2% were smokers, and 64.6% consumed alcohol. Most workers had monthly family income of less than Rs. 3000(10).

In another study (11): Age 0-15 years: 5%, 16-45 years: 79%, 46 years and over: 16%. Gender: 53.7% male, 46.3% female. Religion: 81.5% Hindu (24.7% high caste, 56.8% low caste) and 16.8% Muslim, with other religions accounting for the remaining 1.6%. Education status: mostly illiterate. The survey revealed a much higher incidence of illiteracy among women (approximately 82% compared to approx. 38% among men).

2.8.2 Knowledge about TB:

In study (10): Only few (1.6%) workers knew that TB was caused by germs and 45.2% respondents had misconception that TB was a hereditary disease. This misconception was equally prevalent among literate subjects. Only 6.9% knew that this disease required prolonged treatment 6-8 months(12). Level of this knowledge was not significantly different between literates and illiterates. Only 56.4% thought TB is a curable disease. Knowledge of symptoms of TB among the

respondents, the commonest symptoms mentioned by the respondents were cough with expectoration for more than 21 days (45.2%); coughing out blood (44.1%) and low grade fever (28.9%). About two third of respondents were not aware of chest pain, loss of appetite, breathlessness and enlargement of neck glands (lymph nodes) in TB, though this knowledge was little better in literates than illiterate respondents (12).

In another study (11): An overwhelming majority (93.2%) of those interviewed had, at the very least, heard of TB disease. The majority of interviewees reported family, friends, or some other type of informal contact as their primary source of knowledge about TB.

Technically, the only correct answer to the question “what causes TB?” is “infection”, the answer produced by only 14% of respondents. It is interesting to note, however, that 52% of respondents said that smoking, weakness, malnutrition, or a poor diet were causes of TB. Though not technically correct, these are all factors that will predispose a person to develop TB disease. Knowledge among the sample population of predisposing factors is therefore significant.

The correct response(s) to the question how TB spread; cough, spit, or sputum, were given by only 21% of those interviewed, How do you keep from getting TB? The best answers to this question are “eat good food” (9%) and “don’t smoke” (7%). Thirty-two percent answered that staying away from those who had TB was the best method of prevention. The scientific validity of this claim is debatable. Moreover, this kind of behavior, which would lead to the social stigmatization of TB patients, is best not to be encouraged. It is also interesting that although 22% of respondents thought that smoking caused TB, only 7% claimed that in order to keep from getting TB one should not smoke. Acceptable answers to the question - If you had TB, how would you keep from giving it to others? include “take treatment” (33%), “cover your mouth when coughing” (17%), and “dispose of sputum properly” (11%). As TB is spread by the inhalation of tubercular bacilli that have been expelled from a TB carrier, the most important cost-free intervention is to cover one’s mouth when

coughing. From an epidemiological standpoint, however, the surest means of preventing the spread of TB is to produce bacilli-negative patients through treatment.

The most important criteria in assessing knowledge of tuberculosis were determined to be the answers to the questions: “what causes TB?”, “how is TB spread?”, and “if you had TB how would you keep from giving it to others?”. These three questions represent the most important factors in TB education as they are all directly related to prevention of the spread of the disease. From an epidemiological standpoint it is of dubious significance that a person knows that extra-pulmonary TB accounts for over 40% of all clinical TB cases. On the other hand, it is vital to TB prevention that people understand that infectious tubercular bacilli are launched into the air every time a person with TB fails to cover their mouth when they cough. A person was judged to have sufficient knowledge of TB if they 1) responded “infection” to the question “what causes TB?” or demonstrated a significant knowledge of predisposing factors, 2) responded “cough”, “spit”, or “sputum” to the question “how is TB spread?”, and 3) responded “cover your mouth when coughing” and “take treatment” when asked what they would do to keep from spreading TB if they had it. Judging from these criteria, only 20.5% of the sample population demonstrated sufficient knowledge of TB. Sufficient knowledge of TB was similarly proportionate across all age groups. It should be noted, however, that the only age group for which a large enough sample size was gathered to draw any meaningful conclusions was the “16-45 years” category. Incidence of sufficient knowledge of TB was found to be slightly higher amongst men (approximately 25%) than amongst women (approx. 18%). The more formal education a person has completed, the more likely the person is to demonstrate sufficient knowledge of TB. A non-literate person had an approximately 15% chance of having sufficient knowledge of TB, while the probability for one who had gone through middle school was approximately 28%, and that for someone having passed the 10th standard was approximately 43%.

The higher a person’s economic status, the more likely a person is to have sufficient knowledge of TB. Approximately 16% of those of low economic status had sufficient knowledge of TB, while approximately 20% of those of middle economic

status and approximately 32% of those of high economic status had sufficient knowledge of TB.

2.8.3 Attitude towards tuberculosis and patients of TB:

In one study (10): Majority of workers said that TB patients should be isolated from family and food should not be shared with them, though literate subjects were a little better informed. Respondent's agreement on quitting TB patients job (53.5%), separation of the baby from the tuberculous mother (41%), prohibition of the patient from getting married (27.6%) and shunning him from attending social functions (25.3%) were indicators of deep rooted social stigma and were similarly discriminated among literates and illiterates(12).

The present study showed that 66.5% respondents knew that drugs should not be discontinued even for a single day. Misconceptions and stigma associated with the dreaded nature of the disease are cultural barriers leading to undesirable behavior towards patients of TB thereby stopping them from attending social functions and segregating them from the family. Tendency to discriminate the patients was evident from the findings of the study. Irrespective of the literacy status, 72.6% respondents in the study either strongly agreed or agreed to isolate the TB patients from the family. This view was more prevalent in males than females, probably because females are financially dependent on males and could not afford to think of segregating the earning males. Such discriminatory act was also evident from the attitude of the respondents on certain situations, such as avoidance in sharing of food with the patient (among 80.6%), agreement on quitting his job (53.5%), separation of the baby from the mother (41%), prohibition of the patient from getting married (27.6%) and shunning him from attending social functions (25.3%). Such deep-rooted negative attitude needs to be dispelled through intensive health education campaigns so that the social acceptability of the persons suffering from TB improves and people come forward to support these patients (10).

In another study (11): 68.4% of respondents answered that TB was a “big problem”, 28.4% said it was not, and 3.2% did not answer. This also demonstrates that those with insufficient knowledge of TB are slightly more likely not to perceive TB as a “big problem” If you acquired TB, what would you do? The most frequent responses given (37% of respondents each) when asked what a person would do if they had TB were “go to Duncan Hospital” or “go to another health care provider in a large town or city”. 17% of respondents said that they would seek treatment at either a Champak or a Chetna project clinic. 7% cited local practitioners (village-level health care workers who are not necessarily qualified) as their recourse, while only 1% of interviewees responded that they would seek treatment the government Primary Health Care center (PHC). What is unfortunate about this final statistic is that the government of India has focused much attention and funding on TB treatment nationwide through its PHC system such that any patient producing a tubercular bacilli-positive slide can receive free treatment for TB.

When asked why a person would choose to go to the health care provider they gave as the answer to the previous question, the most frequent response (50%) was that they trusted those who would be treating them at that location. The next most important criteria (26% of responses) was the cost of treatment followed by the distance to the health care provider (19%).

Question was asked to those who did not respond that they would go to Duncan, Champak, or Chetna if they had TB. 41% of these felt that all three options were too far away, 29% thought them too costly, while 15% said they wouldn’t seek treatment at these locations because they didn’t trust those who worked there.

2.8.4 Source of information on tuberculosis:

In one study (10): Person to person communications were main sources of information about TB to the quarry workers as main sources were neighbors (50.5), friends (42.6%) or family members (37.2%). Television was next important source of information (28.7%) for them. Doctor (19.7%), nurse (1.6%), radio (16.5%), poster

(9.0%) and books/ magazines (3.2%) were better sources of information among literate respondents than illiterates (10).

CHAPTER 3
RESEARCH METHODOLOGY

The following methods discussed in this chapter:

- Research design
- Target population
- Place of study
- Sample size (household)
- Key respondent
- Sampling technique
- Instrument/tools for data collection
- Data collection procedure
- Data analysis procedure and statistics used

3.1 Research design

This research is a cross sectional study (descriptive). The data will be collected through interviews. The study will explore predisposing factors as socio-demographic factors, knowledge about tuberculosis, attitude towards tuberculosis, enabling factors as accessibility to TB-DOTS center for sputum microscopy examination for TB detection and reinforcing factors as information sources and resources with social support related to acceptance of TB case detection among urban slum population.

3.2 Study population

The target population of this study is urban slum population which is the minority group living in squatter settlements known as 'Bosti', houses squashed closely together, are extremely small and poorly built, lack of ventilation,

overcrowded, more generally, environmental conditions are unhygienic, using open latrines or in some cases no latrines at all; in cases where households do have access to sanitary latrines, up to 10 households or 50 individuals may share one. The lack of piped water means that most households have to share wells among themselves. Bosties receive few or no government services, such as paved roads, paved footpaths, drains, sewerage, piped water or rubbish collection. Based on some report showing in literature review and field experiences of researcher in working with local community, including this slum community, this study selected Mohammadpur Thana as purposive sample population.

3.3 Place of study

Mohammadpur Thana is situated in the western part of Dhaka, the capital of Bangladesh, near the historic 'National Parliament' building area. This Thana is surrounded by 'Gono Bhaban' (the official residence of the Prime Minister), National Institute of Cardiovascular Diseases, Suhrawardy General, National Institute of Kidney Diseases and Dhaka Shishu (children's') hospitals and Agargaon Thana area in the eastern part; Mohammadpur-Shyamoli link road and Adabor Thana area on the western side; Lalmatia Thana area on the southern side and Kalyanpur Thana area on the northern side. There are a total of 456,058 populations residing here in this Thana, among those 250,620 are males and 205,438 are females[14]. There are so many slums community living here in this Thana including Pakistani refugees known as 'Bihari'.

3.4 Sampling technique:

3.4.1 Systematic sampling:

As there is no registered data or complete sampling frame on the slum household or population living in the slums in Mohammadpur Thana, Ali's Pora slum was purposively selected and therefore, using systematic sampling in Ali's slum,

(1) the data collection team first counted all the households (541) in the slums,

(2) assigned numbers in sequential order and,

(3) as per class interval (k),every $k^{th} = 2^{nd}$ household was selected for interview,

(k=Total households in slum (N) / sample size (n)

= 541/246

= 2.199)

(4) Interviewing was conducted until the sample size had achieved,

(5) The first household, number 5 (five), was randomly selected by a member of the slum.

3.4.2 Sample size (household) : 246

Using the formula for sample size calculation, $n=z^2pq/d^2$

n= sample size

z= 1.96 (at 95% confidence interval)

p= proportion of new smear-positive case detection in Bangladesh is 61% in 2005(15)

q= 1-p

d= degree of accuracy

So, $n = (1.96)^2 \times (0.61)(0.39) / (0.061)^2 = 3.8416 \times 0.2379 / 0.003721 = 245.61$

The data was collected from a sample of 248 household respondents.

3.4.3 Key respondent:

Head of each household in the slum (Bosti).

Inclusion criteria: in case of non-availability of head of household at the time of interview, housewife or any household member aged 15 or more will be included for interview.

Exclusion criteria: household currently having TB patients under DOT at the time of interview.

3.5 Instrument/tools for data collection:

Data was collected by structured questionnaire designated by the researcher. Initially, the questionnaire was prepared in English, and then translated to Bengali language to make it user-friendly for the interviewers as well as the interviewees.

3.5.1 Pre-test

The questionnaire was first developed as a draft with 31 questions/statements, and then reviewed by experts, revised as per suggestions. To test the validity and reliability of the questionnaire, pre-testing was first done among 30 slum household in Bashbari slum (another slum of similar characteristics). During preliminary analysis of pre-tested data, the Kuder-Richardson-20 for knowledge part, Cronbach's Alpha Co-efficient for attitude part found not significant and also due to some feedback from the data collection team members regarding the responses, researcher changed/revised some questions (5, 7, 8, 9, 10, 11, 13, 14, 15, 20, 21, 22, 24, 25, 26, 27, 28); deleted and replaced two attitude statements with new statements (18, 23) and modified the three level of 'Likert scale' (from 'disagree, agree, strongly agree' to 'disagree, not sure, agree') for the level of attitude, added one new question (12) to the knowledge part of the questionnaire; had reviewed by the expert and thereafter pre-testing done again. Pre-test result was again analyzed for reliability using Kuder-Richardson-20 (0.64) for knowledge part, Cronbach's Alpha Co-efficient (0.609) for attitude part and as approved by the expert, the 32 item-questionnaire was then finalized for interview.

3.5.2 The questionnaire composed of six parts as follows:

Part-1: Socio-demographic factors and general information

Age, gender, marital status, education, occupation, religion, family income will be recorded.

Part-2: Knowledge about TB

The respondents were interviewed about their knowledge about whether they know the cause of the disease, important symptom of the TB, how TB spread, TB detection by sputum microscopy, cost of laboratory/sputum examination, treatment and duration and prevention of spread.

To measure the knowledge of respondents about TB, the correct answers to the questions asked were given '1' and incorrect answers '0'. Based on the percentage of total score of each respondent, the knowledge score was classified according to Bloom's classification in to three categories as following:

More than 80% score = 'Good'

60%-80% score = 'Moderate'

<60% score = 'Poor'

Part-3: Attitude toward tuberculosis

The respondents were asked their opinion of the statements about tuberculosis regarding his/her chance of TB while close contact with, chance of developing TB in family members, Life long immunity against TB if BCG vaccinated, not a serious disease even untreated, never marry a person who had TB in the past but currently cured, TB become fatal if not completed treatment, TB patients should be hated as having the disease is a curse of the god, TB treatment/drugs are free of cost.

The statements were prepared on a basic 3 level Likert scale (disagree, not sure, agree). The respondents score for each statement was ranked lowest "1" to highest "3" depending on whether the statement is positive or negative.

For 'positive attitude statements (16,17,21,24)' the scoring was given as follows:

Agree = 3 scores

Not sure = 2 scores

Disagree = 1 score

For 'negative attitude statements (18,19,20,23)' the scoring was given as follows:

Disagree = 3 scores

Not sure = 2 scores

Agree = 1 score

The frequency and percentage of the level of respondents' attitude towards tuberculosis was classified into 2 level based on median score (19.0):

> Median (> 19.0) = 'Good'

≤ Median (≤ 19.0) = 'Poor'

Part-4: Enabling factors: Availability and accessibility to TB center (for sputum examination)

In this part, questions were focused on availability knowledge (name and location) of nearby TB-DOTS center, and accessibility (distance, time and cost of traveling) to TB-DOTS center.

Part-5: Reinforcing factors

In this part, the questions will be focused on source of information about TB, support from family members, neighbor or friends to advice and accompany them to go to TB center if they develop persistent cough for 3 weeks or more.

Part-6: Acceptance of Tuberculosis case detection

Acceptance explains that the respondent willingly want to go to TB center by him/her or accompany or encourage any of the family members to go to TB center for sputum microscopy (which is free of cost) for TB detection, if they have symptom like persistent cough for 3 weeks or more. If agree or accept willingly then the answer was recorded as “yes” (acceptance) and if disagree or do not accept then the answer was recorded as “no” (non-acceptance).

3.6 Data collection procedure:

The researcher recruited three interviewers and one-day training was provided to them for collecting data by interview. The data was collected at the respondent’s houses by interviews using structured questionnaire by the trained interviewers. The researcher observed the data collection and also examined the quality of data collection as sample basis. Verbal consent had been taken from the respondents before the interview and confidentiality was maintained. Data was collected during 26-29 January 2008.

3.7 Data analysis procedure and statistics used:

After the data collection, the filled-in questionnaire was checked for any missing value or lacking. Collected data was then coded using coding table. Data entry was done using Epidata. During the data entry procedure, for any mistake or entering wrong data was checked/reviewed. Minitab software was used for analysis of data. For descriptive analysis, the frequency, percentage distribution, mean, median, standard deviation of variables were described. Association analyses between dependent and independent variables and also between independent variables were done by Chi-Square test. The critical significant level set at 0.05. The results were then interpreted and presented in the form of tabulated description.

CHAPTER 4
RESULTS

The following results discussed in this chapter:

- Descriptive analysis:
- Predisposing factors
- Enabling factors
- Reinforcing factors
- Dependent variable
- Association analysis:
- Predisposing factors
- Enabling factors

This study was a cross-sectional study to describe the factors related to acceptance of tuberculosis case detection among urban slum population in Mohammadpur, Dhaka city corporation, Bangladesh. The sample size was 248 respondents of the households with no TB patients under DOT. The findings showed 100 percent acceptance rate among respondents.

4.1 Descriptive Analysis

4.1.1 Predisposing factors: Socio-demographic factors and general information

The predisposing factors considered in this study are the respondent's socio-demographic factors and general information (age, gender, marital status, education, occupation, religion and monthly family income), knowledge about TB disease (cause, main symptom, common laboratory examination to detect TB, and its cost, treatment, and its minimum duration and how to prevent spread) and attitude

toward TB disease and related social stigma (his/her chance of TB while close contact with, chance of developing TB in family members, Life long immunity against TB if BCG vaccinated, not a serious disease even untreated, never marry a person who had TB in the past but currently cured, TB become fatal if not completed treatment, TB patients should be hated as having the disease is a curse of the god, TB treatment/drugs are free of cost).

Age of the respondents ranged from 15 to 70 years, with a mean age of 31.202 years. Respondents' age was classified into three groups shown in table-2: nearly two-third (62.50%) of the respondents in 15-30 year, and about one-third (30.65%) in 31-50 year age-groups, rest (6.85%) in more than 50 year age-group.

Gender distribution of the respondents indicated in table-2 that about three-fourth (79.84%) were female and one-fourth (20.16%) male.

Marital status, the result showed in table-2 that more than three-fourths (75.0%) of the respondents were married, rest of the respondents were single (6.45%), divorced/separated (3.23%) and widowed (7.66%).

Education of the respondents was divided into five groups showed in table-2 that about two-third (59.68%) respondents had no education, 12.10% primary (grade-5) incomplete, 15.73% primary completed, 12.10% have secondary and higher education and 0.40% have other education (Madrasa).

Occupation of the respondents were categorized into nine groups showed in table-2 that about two-thirds (63.71%) were house-wife and house-maids; 8.87% Rickshaw/Van/CNG drivers, 8.06% garment workers, 6.45% others (like student, Imams, Cook etc), 4.84% sales persons, 4.84% business, 2.42% labor and 0.81% technician workers.

Religion of the respondents was found 100% Muslim (Islam).

Total family income was showed in table-2 that about two-thirds (59.68%) of the respondents monthly family income was less than 3000 Taka, one-third (29.84%) between 3001-6000 Taka and 10.48% more than 6000 Taka.

Table-2 Frequency and percent distribution of respondents by Socio-demographic factors and general information

Factors	Frequency N=248	%
Age group (years)		
15-30	155	(62.50)
31-50	76	(30.65)
>50	17	(6.85)
Gender		
Male	50	(20.16)
Female	198	(79.84)
Marital status		
Single	16	(6.45)
Married	205	(82.66)
Divorced/separated	8	(3.23)
Widowed	19	(7.66)
Education		
No education	148	(59.68)
Primary (Gd-5) incomplete	30	(12.10)
Primary completed	39	(15.73)
Secondary and higher	30	(12.10)
others	1	(0.40)
Occupation		
Labor	6	(2.42)
Rickshaw/Van/CNG driver	22	(8.87)
Sales person	12	(4.84)
Business		(4.84)

Table-2 Frequency and percent distribution of respondents by Socio-demographic factors and general information (cont.)

Factors		Frequency	%
	Technician worker	2	(0.81)
	Garment worker	20	(8.06)
	Housewife	106	(42.74)
	Housemaid	52	(20.97)
	Others	16	(6.45)
Religion			
	Islam (Muslim)	248	(100.00)
	Hindu	0	0
	Buddhist	0	0
	Christian	0	0
Family Income (Taka)			
	<3000	148	(59.68)
	3001-6000	74	(29.84)
	>6000	26	(10.48)

4.1.2 Predisposing factors: Knowledge about tuberculosis disease

There were eight multiple choice questions concerning knowledge of the respondents about tuberculosis, with each correct answer given a score '1' and incorrect '0'; with a total minimum '0' to maximum score '8'. Results showed in table-3 that only about one-fifth (20.56%) of the respondents answered correctly that TB is caused by a germ/bacteria, about one-third (31.05%) mentioned how TB spread, nearly two-thirds (59.47%) of the respondents knew that the main symptom of having tuberculosis is chronic cough for 3 weeks or more, two-thirds (60.48%) answered that the commonly done laboratory examination to detect TB is sputum examination, little more than half (52.42%) of the respondents knew that the laboratory examination to detect TB is free of cost, the majority of the respondents (87.50%) knew that TB is treated by modern medicines, only about one-third (31.05%) answered that minimum

duration of TB treatment to become cure is usually six months, slightly over two-thirds (62.10%) knew that covering the mouth with tissue/handkerchief during coughing is the way to prevent spread of TB to others.

Table-3 Frequency and percent distribution of respondents classified by correct answers to the questions on knowledge about Tuberculosis

Questions	Correct answer	
	Freq. N=248	%
1. Do you know what the main cause of tuberculosis is?	51	(20.56)
2. How is tuberculosis spread?	77	(31.05)
3. What is the main symptom of tuberculosis?	145	(58.47)
4. Which the most common laboratory examination to detect tuberculosis is?	150	(60.48)
5. Is the laboratory examination for detection of tuberculosis free of cost?	130	(52.42)
6. How is the tuberculosis disease treated?	217	(87.50)
7. What is the minimum duration of tuberculosis treatment for complete cure?	77	(31.05)
8. How the spread of tuberculosis can be prevented?	154	(62.10)

From table-4, it is clearly understood that about half (50.40%) of the respondents have poor level of knowledge, 35.48% have moderate and only about 14.11% have good level of knowledge about tuberculosis.

Table-4 Frequency and percent distribution of respondents classified by level of knowledge about Tuberculosis

Knowledge level	Frequency N=248	%
Good (>80%)	35	(14.11)
Moderate (60%-80%)	88	(35.48)
Poor (<60%)	125	(50.40)

Among the females, 14.64% had 'Good' knowledge, comparing to 12% males. 25% of respondents with education had 'Good' knowledge, than 6.756% with 'no education'. 20% with other occupation had 'Good' knowledge, than 10.759% housewife-housemaids. 20% of respondents having monthly family income >3000 Taka had 'Good' knowledge, comparing to 10.135% of those having <3000 Taka.

4.1.3 Predisposing factors: Attitude towards tuberculosis disease

There were eight statements on attitude towards tuberculosis with a total minimum score '8' to maximum '24' and table-5 showed that in statement-1 (positive) nearly two-thirds (61.69%) of the respondents agreed, nearly one-third (31.45%) disagreed and 6.85% do not know / not sure. In statement-2 (positive), nearly two-thirds (61.69%) of the respondents agreed, 28.63% disagreed and 10.08% do not know / not sure. For statement-3 (negative), more than one-thirds (38.71%) of the respondents disagreed, 33.47% agreed and 27.82% do not know / not sure. For statement-4 (negative), three-fourths (38.71%) of the respondents disagreed, 15.32% agreed and 9.68% do not know / not sure. For statement-5 (negative), nearly two-thirds (63.71%) of the respondents disagreed, 33.87% agreed and 2.42% do not know / not sure. In statement-6 (positive), majority (85.89%) of the respondents agreed, 4.44% disagreed and 9.68% do not know / not sure. For statement-7 (negative), more than half (57.26%) of the respondents disagreed, more than one-thirds agreed (37.50%) and 5.24% do not know / not sure. In statement-8 (positive), 60.08% of the respondents agreed, 12.50% disagreed and 27.42% do not know / not sure.

Table-5 Frequency and percent distribution of respondents by attitude towards Tuberculosis

Statements	Disagree		Not sure		Agree	
	N	%	N	%	N	%
1.You can develop TB disease if you stay in close contact with TB patients	78	(31.45)	17	(6.85)	153	(61.69)
2.If any family members are infected with TB, other members will have the chance to develop the disease	71	(28.63)	25	(10.08)	152	(61.29)
3.If your children have vaccinated with BCG, they will never develop TB disease in their life	96	(38.71)	69	(27.82)	83	(33.47)
4.TB will not be a serious disease even untreated	186	(75.00)	24	(9.68)	38	(15.32)
5.You never marry a person who had TB in the past and cured	158	(63.71)	6	(2.42)	84	(33.87)
6.TB will become fatal if you do not complete the treatment	11	(4.44)	24	(9.68)	213	(85.89)
7.You will hate a TB patient because it is the curse of the God to be infected with disease	142	(57.26)	13	(5.24)	93	(37.50)
8.TB treatment/drugs are free of cost	31	(12.50)	68	(27.42)	149	(60.08)

Table-6 showed that 48.79% of the respondents had a ‘Good’ attitude towards tuberculosis disease (score from 19.01 to 24) and 51.21% of ‘Poor’ attitude (score from 11 to 19.0).

Table-6 Frequency and percent distribution of respondents by score level of attitude toward Tuberculosis

level of Attitude	Frequency N=248	%
Good *(> Median)*	121	(48.79)
Poor *(≤ Median)*	127	(51.21)
Mean=19.065, Median=19.00, SD=2.768, Min.=11, Max.=24, Q1=18, Q3=21		

4.1.4 Enabling factors: Availability and accessibility to TB-DOTS center

Enabling factors were divided into 2 groups: Availability (knowledge/name and location of a center from which TB services provided), and Accessibility **(**distance of respondent's home to that TB center, duration of traveling and cost of traveling both way). If the respondents could not mention/name a TB center then skipped to ask questions of reinforcing factors.

Table-7 showed that 108 i.e. 43.55% of the respondents could not mention/name a center from where TB service is provided, 140 i.e. nearly two-thirds (66.55%) mentioned/named a center from where TB service is provided, of which 23.79% named Chest Diseases clinic at Shyamoli, 22.58% Smiling Sun clinic at Johuri Moholla and only 8.87% Marie Stopes clinic at Bashbari, 1.21% BRAC at Gabtoli.

Among the respondents, the next questions were asked to those who mentioned a TB center's name and location. More than half (55.65%) of the respondents said that the distance of that TB center is less than 3 kilometer, 0.81% said 3 to 6 kilometer. More than half (52.02%) of the respondents said that the duration of travel to that TB center is less than 30 minutes, 4.03% said 30 to 60 minutes and 0.40% said more than 60 minutes. More than one-quarter (27.42%) of the respondents said that the cost of traveling is 0 Taka (as they go by foot), more than

one-quarter (27.82%) said less than 30 Taka, 0.81% said 31-50 Taka and 0.40% said more than 50 Taka.

Table-7 Frequency and percent distribution of respondents by availability and accessibility to TB-DOTS center

Questions	Frequency N=248	%
Availability (Name and location) of TB-DOTS center		
Do not know *(Skip to Q28)*	108	(43.55)
Chest Diseases clinic, Shyamoli	59	(23.79)
Chest Diseases clinic, Shyamoli	59	(23.79)
Marie Stopes clinic, Bashbari	22	(8.87)
BRAC, Gabtoli	3	(1.21)
Smiling Sun clinic, Johuri Moholla	56	(22.58)
Accessibility to center (Distance of center)		
< 3 Kilometer	138	(55.65)
3-6 Kilometer	2	(0.81)
> 6 Kilometer	0	(0)
missing	*108*	*(43.55)*
Accessibility to center (Duration of travel)		
< 30 minutes	129	(52.02)
30-60 minutes	10	(4.03)
> 60 minutes	1	(0.40)
missing	*108*	*(43.55)*
Accessibility to center (Cost of travel)		
0 Taka (if on foot)	68	(27.42)
< 30 Taka	69	(27.82)
31-50 Taka	2	(0.81)
> 50 Taka	1	(0.40)
missing	*108*	*(43.55)*

4.1.5 Reinforcing factors: Source of information about TB and social support

Reinforcing factors included source of information about TB and social support to facilitate tuberculosis case detection in cash or kind.

Table-8 showed that from television, nearly three-fourths (70.16%) of the respondents got information about TB. Other sources were Neighbor/Friends 16.13%, health Personnel visit to home 5.65%, others sources like relatives 4.84%, Radio 1.61%, drug shop 1.61%. About all the respondents (97.98%) mentioned that they get advice from their family members or friends or neighbor to go to TB center and majority of the respondents (83.47%) mentioned that if they develop symptoms of TB, their family members or neighbor or friends would take them to TB center for detection; while 14.11% said 'No' and 2.42% 'do not know'.

Table-8 Frequency and percent distribution of respondents by source of information and social support about Tuberculosis

Items	Frequency N=248	%
1. Source of information		
TV	174	(70.16)
Radio	4	(1.61)
Health Personnel visit to home	14	(5.65)
Drug shop	4	(1.61)
Neighbor/Friends	40	(16.13)
Others	12	(4.84)
2. Social support (advice)		
Yes	243	(97.98)
No	3	(1.21)
Do not know/not sure	2	(0.81)

Table-8 Frequency and percent distribution of respondents by source of information and social support about Tuberculosis (cont.)

Items	Frequency	%
3. Social support (accompany)		
Yes	207	(83.47)
No	35	(14.11)
Do not know/not sure	6	(2.42)

4.1.6 Dependent variable: Acceptance of TB case detection

Acceptance of TB case detection refers to the understanding of the those respondents who never had TB, willingly agree or want themselves or help any of their family member, with persistent cough for 3 weeks or more, to go to a TB facility for detection, either on their own initiative or referred by another health center, medical doctor, health worker or other non-medical persons. Those who do not agree or want to go will be regarded as non-acceptance. Table-9 showed that all the respondents (100%) accepted or agreed.

Table-9 Frequency and percent distribution of respondents by level of acceptance of Tuberculosis case detection

Items	Acceptance		Non-acceptance	
	Freq N=248	%	Freq N=248	%
If any of your family member develop symptoms of TB like cough for 3 weeks or more, would you advice him/her to go to or take him/her with you to TB center for detection of TB?	248	(100.0)	0	(0)
If you develop symptoms of TB like cough for 3 weeks or more, would u like to go to TB center for detection of TB?	248	(100.0)	0	(0)

4.2 Association analysis

Acceptance and non-acceptance of TB case detection of the respondents were cross tabulated with each of the predisposing, enabling and reinforcing factors and no association was found using Chi-Square test as all the respondents responses were in one direction. By human-nature, all the respondents living in this slum, wants to be in a tuberculosis-free state by timely diagnosis and appropriate treatment.

On the other hand, about half of these respondents had 'poor' knowledge, little more than half had 'poor' attitude towards tuberculosis and nearly half of them did not know the name, location of a TB-DOTS center;

Although nearly three-fourths main source of information about TB was Television-Radio where the advertisement informed that TB is a curable disease, complete cure if complete treatment by DOT, Free sputum examination and free TB-treatment including drugs.

Considering these results of the study, association analyses were done among independent variables. Important associations were found between knowledge about tuberculosis, attitude towards tuberculosis, with the respondents' socio-demographic factors.

4.2.1 Predisposing factors: Between level of knowledge about Tuberculosis and other independent variables

The results showed in table-10 that there is no significant association between age-groups (χ^2 = 7.057, p-value = 0.133), gender (χ^2 = 4.038, p-value = 0.116), marital status (χ^2 = 0.315, p-value = 0.575) and level of knowledge about tuberculosis.

The results seen in table-9 that there is significant association between education (χ^2 = 30.015, p-value = 0.000), occupation (χ^2 = 11.765, p-value = 0.019), monthly family income (χ^2 = 16.851, p-value = 0.002) and level of knowledge about tuberculosis.

Table-10 Association analysis between level of knowledge about TB and socio-demographic factors of respondents (α=0.05)

Socio-demographic factors	Level of knowledge about TB			χ^2	P-value
Age	Good	Moderate	Poor		
< 30 year	23 (21.88)	53 (55.00)	79 (78.13)	7.057	0.133
31-50 year	11 (10.73)	24 (26.97)	41 (38.31)		
> 50 year	1 (2.40)	11 (6.03)	5 (8.57)		
Gender					
Male	6 (7.06)	24 (17.74)	20 (25.20)	4.308	0.116
Female	29 (27.94)	64 (70.26)	105 (99.80)		
Marital status	Good-Moderate		Poor		
Married	100 (101.67)		105 (103.33)	0.315	0.575
others	23 (21.33)		20 (21.67)		
Education	Good	Moderate	Poor		
No Education	10 (20.89)	44 (52.52)	94 (74.60)	30.015	0.000*
Education	25 (14.11)	44 (35.48)	31 (50.60)		
Occupation					
House-wife	13 (14.96)	38 (37.61)	55 (53.43)	11.765	0.019
House-maid	4 (7.34)	13 (18.45)	35 (45.36)		
Others	18 (12.70)	37 (31.94)	35 (45.36)		
Family Income					
< 3000 Taka	15 (20.89)	47 (52.52)	86 (74.60)	16.851	0.002**
3001-6000 Taka	17 (10.44)	25 (26.26)	32 (37.30)		
> 6000 Taka	3 (3.67)	16 (9.23)	7 (13.10)		

** =P-value <0.001*
***=P-value <0.01*

During analyzing level of knowledge about tuberculosis and level of attitude towards tuberculosis, the results in table-11 showed that there is significant association between level of knowledge and level of attitude about tuberculosis (χ^2 =

30.174, p-value = 0.000). This means that the level of knowledge of the respondents had impact on the level of attitude towards tuberculosis.

Table-11 Association analysis between level of respondents' knowledge about TB and level of attitude towards TB (α=0.05)

	Level of knowledge about TB			χ^2	**P-value**
Level of Attitude	Good	Moderate	Poor		
Poor (≤ Median)	7 (17.92)	36 (45.06)	84 (64.01)	30.174	0.000*
Good (>Median)	28 (17.08)	52 (42.94)	41 (60.99)		

= P-value <0.001

From table-12 it is seen that there is significant association between level of knowledge about tuberculosis and respondents knowledge of a clinic where TB services provided (χ^2 = 40.416, p-value = 0.000). This means that the level of knowledge about tuberculosis had impact on respondents' knowledge of a clinic where TB services provided.

Table-12 Association analysis between level of respondents knowledge about TB and availability (Name, location) of TB-DOTS center (α=0.05)

	Level of knowledge about TB			χ^2	**P-value**
Name, location of TB center	Good	Moderate	Poor		
Know	29 (19.76)	65 (49.68)	46 (70.56)	40.416	0.000*
Don't know	6 (15.24)	23 (38.32)	79 (54.44)		

= P-value <0.001

The results showed in table-13 that there is no significant association between level of respondents knowledge about tuberculosis and source of information about TB (χ^2 = 1.814, p-value = 0.404). This means that the source of information about TB had no impact on the level of knowledge about tuberculosis of the respondents.

Table-13 Association analysis between level of respondents' knowledge about TB and source of information about TB (α=0.05)

	Level of knowledge about TB			χ^2	**P-value**
Source of information	Good	Moderate	Poor		
TV-Radio	26 (25.12)	67 (63.16)	85(89.72)	1.814	0.404
Other sources	9 (9.88)	21 (24.84)	40(35.28)		

4.2.2 Predisposing factors: Between level of attitude towards Tuberculosis and other independent variables

From table-14 showed that there is no significant association between respondents' age-group (χ2 =2.989, p-value = 0.224), gender (χ2 = 0.680, p-value = 0.409), marital status (χ2 = 1.784, p-value = 0.182), education (χ2 = 2.586, p-value = 0.108), occupation (χ2 = 0.200, p-value = 0.905), monthly family income (χ2 = 5.865, p-value = 0.053) and level of attitude towards tuberculosis. This means that the age, gender, marital status, education, occupation and monthly family income had no impact on respondents' level of attitude towards tuberculosis.

Table-14 Association analysis between respondents' level of respondents' attitude towards tuberculosis and socio-demographic factors (α=0.05)

Level of attitude	Age-group			χ^2	P-value
	15-30 yrs	31-50 yrs	>50 yrs		
Poor	85 (79.38)	36 (38.92)	6 (8.71)	2.989	0.224
Good	70 (75.63)	40 (37.08)	11 (8.29)		
	Gender				
	Female	Male			
Poor	104 (101.40)	23 (25.60)		0.680	0.409
Good	94 (96.60)	27 (24.40)			
	Marital status				
	Married	Others			
Poor	101 (104.98)	26 (22. 02)		1.784	0.182 F
Good	104 (100.02)	27 (20.98)			
	Education				
	No education	Education			
Poor	82 (75.79)	45 (51.21)		2.586	0.108 F
Good	66 (72.21)	55 (48.79)			
	Occupation				
	Housewife	House-Maid	Other		
Poor	54 (54.28)	28 (26.63)	45 (46.09)	0.200	0.905 F
Good	52 (51.72)	24 (25.37)	45 (43.91)		
	Family income				
	<3000 Tk	3000-6000 Tk	>6000 Tk		
Poor	85 (75.79)	32 (37.90)	10 (13.31)	5.865	0.053
Good	63 (72.21)	42 (36.10)	16 (12.69)		

F =*Fisher exact test*

From table-15 showed that there is significant association between level of attitude towards tuberculosis and respondents knowledge of a clinic provided TB services (χ^2 = 10.577, p-value = 0.001) but no significant association with source of information about tuberculosis (χ2 = 2.115, p-value = 0.146). This means that respondents' knowledge of a clinic provided TB services had impact on, but the

source of information about tuberculosis had no impact on level of attitude towards tuberculosis.

Table-15 Association analysis between respondents' level of attitude towards tuberculosis and source of information about TB, availability of TB center (α=0.05)

		Source of information		χ^2	P-value
Level of attitude		TV-Radio	Other		
	Poor	86 (91.15)	41 (35.85)	2.115	0.146 F
	Good	92 (86.85)	29 (34.15)		
		Availability of TB center			
		Know	Don't know		
	Poor	59 (71.69)	68 (55.31)	10.577	0.001**
	Good	81 (68.31)	40 (52.69)		

F =*Fisher exact test*
**=*P-value <0.01*

4.2.3 Enabling factors: Between availability (Name, location) of TB-DOTS center and other independent variables

Enabling factors as accessibility of the respondents to TB-DOTS center were divided into four groups: knowledge of a center from which TB services provided, distance of respondent's home to that TB center, duration of traveling and cost of traveling (both way).

From table-16 showed that there is significant association between respondents gender (χ^2 = 4.676, p-value = 0.031), education (χ^2 = 3.884, p-value = 0.049), monthly family income (χ2 = 12.713, p-value = 0.002) and source of information (χ2 = 10.600, p-value = 0.005) but there is no significant association between respondents age group (χ2 = 3.137, p-value = 0.208), marital status (χ^2 = 0.592, p-value = 0.442), occupation (χ^2 = 5.899, p-value = 0.052) and knowledge of a clinic where TB services provided. This means that the respondents' gender, education, monthly family income and source of information had impact on knowledge of a clinic where TB services provided. On

the other hand, age-group, marital status and occupation had no impact on knowledge of a clinic where TB services provided.

Table-16 Association analysis between Availability of TB-DOTS center and socio-demographic factors, source of information about TB (α=0.05)

Availability of TB center	**Age group**			χ^2	**P-value**
	15-30 yrs	31-50 yrs	>50 yrs		
Do not know	74 (67.50)	27 (33.10)	7 (7.40)	3.137	0.208
Know	81 (87.50)	49 (42.90)	10 (9.60)		
	Gender				
	Female	Male			
Do not know	93 (86.23)	15 (21.77)		4.676	0.031
Know	105 (111.77)	35 (28.23)			
	Marital status				
	Married	Other			
Do not know	87 (89.27)	21 (18.73)		0.592	0.442 F
Know	118 (115.73)	22 (24.27)			
	Education				
	No Education	Education			
Do not know	72 (64.45)	36 (43.55)		3.884	0.049F*
Know	76 (83.55)	64 (56.45)			
	Occupation				
	Housewife	House-maid	Other		
Do not know	48 (44.37)	27 (21.77)	33 (41.86)	5.899	0.052
Know	58 (61.63)	25 (30.23)	67 (58.14)		
	Family income				
	<3000 Tk	3000-6000 Tk	>6000 Tk		
Do not know	77 (64.45)	26 (32.23)	5 (11.32)	12.713	0.002**
Know	71 (83.55)	48 (41.77)	21 (14.68)		
Source of information					

F =*Fisher exact test*
* =*P-value<0.001* * *=*P-value <0.01*

Table-16 Association analysis between Availability of TB-DOTS center and socio-demographic factors, source of information about TB (α=0.05) (cont.)

Availability of TB center	**Age group**						χ^2	**P-value**
	TV-Radio		H. Personnel		Other			
Do not know	68	77.52	5	6.10	35	24.39	10.600	0.005**
Know	110	100.48	9	7.90	21	31.61		

F =*Fisher exact test*
** =P-value<0.001 * *=P-value <0.01*

CHAPTER 5
DISCUSSION

The following subjects were discussed in this chapter:

- Dependent variable
- Independent variables
  - Predisposing factors
  - Enabling factors
  - Reinforcing factors

This study was a cross-sectional study with the main objective of identifying the factors related to acceptance of tuberculosis case detection among urban slum population and the specific objectives were to explain a) the characteristics of the acceptance of Tuberculosis case detection among urban slum population, b) the characteristics of the predisposing, enabling and reinforcing factors related to the acceptance of Tuberculosis case detection among urban slum population and c) to determine the relationship between dependent and independent variables. Two hundred and forty eight household respondents of Ali's Pora Bosti (slum) in Mohammadpur Thana were interviewed at their houses for data collection by using a structured questionnaire by three trained interviewers.

5.1 Dependent variable

The results showed 100 percent rate of acceptance of tuberculosis case detection which means all the interviewed respondents, currently not under TB-DOTS treatment, willingly agreed or accepted to go to or help any of their family member, to go to a TB facility for detection if they develop persistent cough for 3 weeks or more, either on their own initiative or referred by another health center, medical doctor, health worker or other non-medical persons.

This was due to their human nature of being free of diseases by timely diagnosis and appropriate treatment.

The important points mentioned by few of these respondents that - even though they accepted to go to a TB center for detection but did not know – 'when to go' i.e. the main symptom of tuberculosis (persistent cough for 3 weeks or more), 'where to go' i.e. the name and location of TB-DOTS centers for getting proper services, the 'cost of laboratory examination' for detection and 'cost of treatment and drugs' etc. A many of the respondents have TV/Radio at their poorly built, squatter-houses and they enjoy it regularly for entertainment or news update purpose. More than 70% of the respondents mentioned that TV/Radio is their main source to get information about TB but they watch the 'TV advertisement on TB' by chance, i.e. irregularly and not critically. On the other hand, the females especially the younger women discussed on their health problems initially with the older females in their families/neighbor families/relatives before they inform their husbands. Some of them mentioned that they have fear of divorce/separation from their husbands, if their husbands come to know that they develop diseases like tuberculosis. This clearly reveals that the stigma and discrimination persist in the slum community. Regarding the respondents' belief towards tuberculosis was that, some of them believe that developing TB disease is the curse of the Almighty Allah i.e. The God. Few would definitely hate those TB-patients who are not their family members but do not hate who are their family members. Some said that if they come to know before marriage that their future husband/wife had TB in the past but currently cured, they would not prefer to marry that person because they believe that one day they will develop TB from their spouses as they share the houses, beds, foods, utensils etc.

The key respondent for the interview i.e. the head of the households who are commonly the males, were in their workplaces during the interview time but during data collection, it was seen that about 80% of the respondents interviewed were females and many of them were predominantly housewives, mentioned that they depend mainly on the decisions of the head of household for seeking health care whenever necessary because the head of their households are the key decision makers

of their families in general, which explains the male dominancy in this slum community. This also reflects the overall socio-cultural context/picture of the country.

Therefore, the study also examined the association among the predisposing, enabling and reinforcing factors i.e. the independent variables.

5.2 Predisposing factors

The results also showed that among the respondents, 62.50% were in young age-group (15-30 years), 79.84% were female, 82,66% married, 59.68% have no education, 63.71% were housewife and house-maids, 100% of them were Muslim and 59.68% respondents monthly family income was less than 3000 Taka. These explain that majority of the slum respondents were illiterate, married, housewives-housemaids with poor socio-economic status - have poor knowledge even though they all accepted to detect tuberculosis by sputum examination if develop any symptom. These are similar with the related studies conducted in Rajasthan and Bihar in India (10,11), except that majority of respondents in this study were females.

Concerning respondents' knowledge about tuberculosis disease, half (50.40%) of the respondents have 'Poor' knowledge (<60% score), 35.48% have 'Moderate' and only about 14.11% have 'Good' knowledge about tuberculosis.

Respondents 'did not know' that – 'cause of TB' is by germ/bacteria (79.44%), 'how TB spread' i.e. by air when coughing/sneezing/spitting (68.95 %), 'main symptom of TB' i.e. persistent/chronic cough for 3 weeks or more (41.53%), the most 'common laboratory examination for TB detection' i.e. sputum examination (39.52%), 'its cost' i.e. free of cost (47.58%), 'minimum duration of TB-DOTS treatment' i.e. 6 months (68.95%) and 'how to prevent spread of TB' i.e. to cover the mouth with tissue/handkerchief when coughing (37.90%). Among the females, 14.64% had 'Good' knowledge, comparing to 12% males. 25% of respondents with education had 'Good' knowledge, than 6.756% with 'no education'. 20% with other occupation had 'Good' knowledge, than 10.759% housewife-housemaids. 20% of the

respondents having monthly family income >3000 Taka had 'Good' knowledge, comparing to 10.135% of those having <3000 Taka. These results on knowledge about TB in this study showed some similarity with one related study done in India except that female respondents of the study had 'Good' knowledge than the males[13]. In another related study in India, the level of knowledge about cause, main symptom and minimum treatment duration (6 months) of TB is much lower than that of the respondents in this study (10).

In association analysis (α=0.05), there is significant association found between level of knowledge about tuberculosis and education (p-value = 0.000), occupation (p-value = 0.019), monthly family income (p-value = 0.002) and therefore had impact on the level of knowledge about tuberculosis but there is no significant association between level of knowledge about tuberculosis and age-groups (p-value = 0.133), gender (p-value = 0.116), marital status (p-value = 0.575) and had no impact on the level of knowledge about tuberculosis.

These suggest that the higher the formal education, the better the occupation and the higher the economic condition, the more likely the person to demonstrate 'Good' knowledge about tuberculosis.

Regarding respondents' attitude towards tuberculosis disease, Half (51.21%) of the respondents have 'Poor' attitude toward tuberculosis. Respondents did not agree on and not know/sure on the positive statements that – they could develop TB if they stay in close contact with TB patients (31.45% and 6.85%), If any family members are infected with TB, other members will have the chance to develop the disease (28.63% and 10.08%), TB will become fatal if you do not complete the treatment (4.44% and 9.68%),TB treatment/drugs are free of cost (12.50% and 27.42%). On the other hand, they agreed and did not know on the negative statements that - If their children vaccinated with BCG, will never develop TB disease in their life (33.47% and 27.82%),TB will not be a serious disease even untreated (15.32% and 9.68%), he/she never marry a person who had TB in the past and cured (33.87% and 2.42%),You will hate a TB patient because it is the curse of the God to be

infected with disease (37.50% and 5.24%).These indicate that there is misconception; social stigma and discrimination exist within this population, though all the respondents had accepted to detect tuberculosis by sputum examination. The related studies conducted in India also showed the similar characteristics in attitude towards tuberculosis disease and patients i.e. 'Poor' attitude due to stigma, misconception, social and gender discrimination (10,11).

As there is significant association between respondents level of attitude towards tuberculosis and age-group (p-value = 0.224), gender (p-value = 0.409), marital status (p-value = 0.182), education (p-value = 0.108), occupation (p-value = 0.905), monthly family income (p-value = 0.053).

While there is significant association between level of knowledge and level of attitude about tuberculosis (p-value = 0.000). This means that the level of knowledge of the respondents had impact on the level of attitude towards tuberculosis. This explains that the more a person knows about TB the more 'Good' will be his/her attitude towards TB and the patients.

There is significant association between level of attitude towards tuberculosis and availability (name, location) of TB-DOTS center (p-value = 0.001) but no significant association with source of information about tuberculosis (p-value = 0.146).

These suggest that the more the level of knowledge of the respondents about tuberculosis, the more their knowledge about the name and location of the TB-DOTS centers, the more would be the level of their attitude towards tuberculosis to be demonstrated to 'Good'.

5.3 Enabling factors

The results showed that 108 (43.55%) among 248 of the respondents did not have knowledge (name, location) about a center from where TB service is provided.

Nearly two-thirds (66.55%) mentioned/named a center from where TB service is provided, of those 23.79% named Chest Diseases clinic at Shyamoli, 22.58% Smiling Sun clinic at Johuri Moholla and only 8.87% named Marie Stopes clinic at Bashbari, 1.21% BRAC at Gabtoli. This means that nearly half of the respondents did not know 'where to go' to receive services if they develop TB.

In the results, there is significant association between knowledge of a clinic where TB services provided and respondents gender (p-value = 0.031), education (p-value = 0.049), monthly family income (p-value = 0.002) and source of information (p-value = 0.005) but there is no significant association between respondents age group (p-value = 0.208), marital status (p-value = 0.442), occupation (p-value = 0.052).

These suggest that the respondents' gender, education, monthly family income and source of information had impact on availability / respondents' knowledge (name, location) of a clinic where TB services provided. On the other hand, age-group, marital status and occupation had no impact.

5.4 Reinforcing factors

The results showed that, nearly three-fourths (71.77%) of the respondents got information about TB from mass-media (Television, Radio). Other sources were Neighbor/Friends/relatives 20.97%, health Personnel visit to home 5.65%, drug shop 1.61%. This means that Television-Radio and Neighbor/friends/relatives were the main source to provide information about tuberculosis to these slum populations. While the respondents mentioned that they are not regular to see the television or in listening the radio and mostly they enjoyed these media for entertainment purpose and news. In related studies done in India, the results are not similar. Neighbor, friends or family members are the main source of information about tuberculosis, while TV-Radio are the next main sources (10,11).

As there is no association between source of information and level of respondents' knowledge (p-value=0.404), attitude (p-value=0.146) but there is significant association with availability (name, location) of centers where TB services provided (p-value = 0.005). This means that source of information had impact on respondents' knowledge of centers where TB services provided. Infact, the advertisement in Television focused on complete cure of TB, regular intake of drugs and free of cost sputum examination and treatment. Health personnel visits to home to discuss on various aspects of TB were a small percentage. After the mass media, they were getting information from their Neighbor/Friends/relatives but who knows whether they have the appropriate information or not.

About all the respondents (97.98%) mentioned that if they develop symptoms of TB, they would get advice from their family members or friends or neighbor to go to TB center. 83.47% respondents said that their family members or neighbor or friends would take them to TB center for detection; while 14.11% said 'No' and 2.42% 'do not know'. This means a strong social bonding is present in that community to provide support among these slum population whenever they seek or necessary.

CHAPTER 6
CONCLUSION AND RECOMMENDATION

The following subjects were discussed in this chapter:

- Conclusion
- Recommendation

6.1 Conclusion

- This cross sectional descriptive study was conducted among two hundred forty eight household populations living in slum in Mohammadpur, Dhaka, Bangladesh. The objective was to identify the factors related to acceptance of tuberculosis case detection among urban slum population.

- Mohammadpur Thana was purposively selected among other Thanas in Dhaka City Corporation because presence of a many slums. Pre-testing of the questionnaire was done in 30 households in Bashbari Bosti (slum) but the study was conducted in Ali's Pora Bosti (slum). Sample of 248 households were selected by systematic sampling and data was collected from January 26-29, 2008 by interview using structured questionnaire by three trained interviewer.

- 100 percent of the respondents accepted tuberculosis case detection based on the results of this study i.e. if they or any of their family members develop symptom like persistent cough for 3 weeks or more, they want to go to, or advice or take their family members to tuberculosis center for sputum examination. Among these respondents, nearly two-thirds (62.50%) of the respondents were young age-group (15-30 years), 79.84% female, 82.66% married, 59.68% illiterate, 63.71% Housewife and house-maids, all were Muslim (100%) and 59.68% respondents' monthly family income less than 3000 Taka. The important point to these characteristics were that the

- majority of the respondents are females, illiterate and in poor socio-economic condition.
- 71.77 % of the respondents got information from television-radio, neighbor/friends/relatives 20.97%, health Personnel visit to home 5.65%, drug shop 1.61% but half (50.40%) of the respondents had 'Poor' knowledge (<60% score) about tuberculosis disease.

- The association between level of knowledge about TB with respondents' education, occupation, monthly family income, level of attitude, suggest that higher the formal education, better the occupation and higher the economic condition, the more likely the person to demonstrate sufficient knowledge about tuberculosis.

- The study showed that 79.44% respondents did not know that – TB is caused by germ/bacteria, sputum examination is the common laboratory examination for TB detection (39.52%) and it is free of cost (47.58%), minimum duration of TB-treatment is 6 months (68.95%). 43.58% of the respondents did not know a TB-DOTS center.

- Half (51.21%) of the respondents had 'low' attitude towards tuberculosis disease because misconception, stigma, social and gender discrimination still exist in the slum population,

- The association between respondents' level of attitude towards TB with level of knowledge about TB, availability of TB-DOTS centers (knowledge of a center where TB services provided), suggest that more the level of knowledge of the respondents about tuberculosis, more their knowledge about the name and location of the TB-DOTS centers, the more would be the level of their attitude towards tuberculosis to be demonstrated to 'high'.

- The study identified that 39.92% disagreed (or not sure) that - TB treatment including drugs is free of cost, to marry a person who had TB in the past and cured (36.29%). 42.74% agreed (or not sure) to hate a TB patient, as they believe developing TB disease is the curse of the God. This is obviously due to the stigma,

misconception; social and gender discrimination persists in the marginalized slum population.

- The interesting point is that the main source of information about TB among this slum community is TV-Radio but they by chance see the 'TV advertisement on Tuberculosis', i.e. irregularly and not critically. Moreover, TV advertisements on Tuberculosis are focused on TB is a curable disease, completely cured by DOT if taken regularly, sputum examination and treatment including drugs are free for all, but lack in information about the duration of TB-treatment, the name and location of the TB-DOTS centers from where these slum-poorest populations can get TB services whenever they need. The posters, billboards included the symptoms of TB but illiterate persons could not be able to read the information and aware of the disease.

- A strong social bonding is present in the study slum community, to provide support among these slum population, whenever they seek or necessary because almost all the respondents (97.98%) mentioned that if they develop symptoms of TB, they would get advice from their family members or friends or neighbor to go to TB center. 83.47% respondents said that their family members or neighbor or friends would take them to TB center for detection

- Although the study found no association between acceptance of TB case detection with predisposing, enabling and reinforcing factors but in reality to make the acceptance rate of TB case detection to be truly 100%, there is a need to improve the level of knowledge about tuberculosis and to change the level of attitude towards tuberculosis in the urban slum population.

6.2 Recommendation

On the basis of the results of the study, the following recommendations are made to improve the knowledge, to change their attitude to 'high' about tuberculosis in the urban slum population, and to have more access of these marginalized

population to TB-DOTS center for free sputum examination and free treatment including drugs:

For future implementation

1. A slum-friendly comprehensive community based heath education program on tuberculosis for the urban slum population including these local community's participation might be implemented by the Government or the NGOs where leaders, active young adults of this slum community group will be trained as 'Volunteer Educators' for their vulnerable community to tuberculosis and other communicable diseases and also making provision of financial incentives for these 'Volunteer job' will enhance income generation of the slum community.
2. Health personnel could be engaged more in the slum areas by the TB facilities to discuss in persons on various aspects of tuberculosis especially 'when to go to (symptoms)', 'where to go (TB centers name, location)', 'facts and risks of TB', 'free sputum examination and treatment including free drugs till the treatment completed'.
3. Cured TB patients living in the slums could involve themselves as 'Volunteer Educator' in motivating their surrounding neighbor, friends, and relatives about tuberculosis in order to prevent TB diseases among themselves.

6.2.2 For future study

1. A future study can be undertaken in this slum population, to evaluate slum-friendly comprehensive community based health education program/intervention focusing on tuberculosis, after implementation for a certain period of time, by assessment of the knowledge, attitude, access to TB-DOTS centers etc. considering these study data as the base line data.
2. Study on the factors associated with perception of implementation TB health education program in slum population.

3. Those who want to do similar kind of study, suggested to take more than one target population in the sample like – head of households who are suffering from persistent cough for 3 weeks or more, TB patients under DOT, slum community leaders, volunteers, family-members/relatives/ neighbor who are involved in DOT supervision.
4. Comparison study in homogeneous and heterogeneous urban slum population
5. Study of the stigma associated with tuberculosis disease in urban slum population
6. Study of the factors associated with MDR-TB in Bangladesh
7. Study the role of community in TB case detection in Bangladesh.

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APPENDIX

APPENDIX A
QUESTIONNAIRE

FACTORS RELATED TO ACCEPTANCE OF TUBERCULOSIS CASE DETECTION AMONG URBAN SLUM POPULATION IN MOHAMMADPUR, DHAKA CITY CORPORATION, BANGLADESH

Household #:

Date of interview:_____/____/_____Time of Interview: (From:_____To:_____)

Name of the Interviewer:_____ Signature: _____

Part-1: Socio-demographic factors and General Information

(Please put a tick [√] in the appropriate box according to the respondents' answer of the question. Choose one for each question. Please write the number in the blank space where appropriate)

1. Age _____ years

2. Gender
   - □ Male
   - □ Female

3. Marital status
   - □ Single
   - □ Married
   - □ Divorced/separated
   - □ Widowed

4. Education
   - ☐ no education
   - ☐ primary (grade 5) incomplete
   - ☐ primary (grade 5) completed
   - ☐ secondary completed and higher
   - ☐ others: (please specify)_____

5. Occupation
   - ☐ labor
   - ☐ rickshaw/van/CNG driver
   - ☐ sales person
   - ☐ business
   - ☐ technician worker
   - ☐ garment worker
   - ☐ housewife
   - ☐ house-maid
   - ☐ others: (please specify)_____

6. Religion
   - ☐ Islam (Muslim)
   - ☐ Hindu
   - ☐ Buddhist
   - ☐ Christian

7. How much is your monthly family income?
   - ☐ 0-3000 Taka
   - ☐ 3001-6000 Taka
   - ☐ > 6000 Taka

Part-2: Knowledge about Tuberculosis disease

(Please put a tick [√] in the appropriate box to answer the question. Choose one for each question)

8. Do you know what the main cause of tuberculosis is?
   - □ Hereditary
   - □ Alcohol drinking
   - □ Eating betel leaves
   - □ Germ/Bacteria (correct)
   - □ Do not know/not sure

9. How is tuberculosis spread?
   - □ By air when coughing/spitting/sneezing ©
   - □ By food when eating together
   - □ By mosquito bites
   - □ By water using same water-tap/Tubewell
   - □ Do not know/not sure

10. What is the main symptom of tuberculosis?
   - □ Headache
   - □ Vomiting
   - □ Back pain
   - □ Chronic cough for 3 weeks or more ©
   - □ Do not know/not sure

11. Which the most common laboratory examination to detect tuberculosis is?
   - □ Sputum examination ©
   - □ Blood examination
   - □ Stool examination
   - □ Urine examination
   - □ Do not know/not sure

12. Is the laboratory examination for detection of tuberculosis free of cost?

- Yes ©
- No
- Do not know/not sure

13. How is the tuberculosis disease treated?

- Specific modern drugs/medicines ©
- Kobiraj (traditional) drugs/medicines
- Recover by self
- With spiritual magic
- Do not know/not sure

14. What is the minimum duration of tuberculosis treatment for complete cure?

- 3 months
- 4 months
- 5 months
- 6 months ©
- Do not know/not sure

15. How the spread of tuberculosis can be prevented?

- Always cover mouth with a tissue/handkerchief when cough ©
- Stay in overcrowded, poor-ventilated house
- Do not shake hands
- Do not eat food together
- Do not know/not sure

Part-3: Attitude toward Tuberculosis disease

(Please put a tick [√] in one of the following column as per the respondents' opinion on the following statements):

#	Statement	Disagree	Do not know/ not sure	Agree
16.	You can develop TB disease if you stay in close contact with TB patients (P)			
17.	If any family members are infected with TB, other members will have the chance to develop the disease (P)			
18.	If your children have vaccinated with BCG, they will never develop TB disease in their life (N)			
19.	TB will not be a serious disease even untreated (N)			
20.	You never marry a person who had TB in the past and cured (N)			
21.	TB will become fatal if you do not complete the treatment (P)			
22.	You will hate a TB patient because it is the curse of the God to be infected with disease (N)			
23.	TB treatment/drugs are free of cost (P)			

Part-4: Accessibility to Tuberculosis/DOTS center

(Please put a tick [√] in the appropriate box of the following questions as per the answer of the respondents. Choose one for each question)

24. Do you know from which of the following health center you can TB service?

- Chest diseases clinic, Shyamoli ©
- Marie Stopes clinic, Bashbari ©

- BRAC, Gabtoli ©
- Smiling Sun clinic, Chaderhat Field, Johuri Moholla ©
- Do not know/not sure *(Skip to Question 28)*

25. How far is this TB center from your home?
    - < 3 km
    - 3-6 km
    - >6 km
    - Do not know/not sure

26. How long it will take to travel from your home to this TB center?
    - < 30 minutes
    - 30 minutes -1 hour
    - > 1 hour
    - Do not know/not sure

27. How much money you will need to travel from your home to this TB center (both way)?
    - 0 taka (on foot)
    - < 30 taka
    - 30-50 taka
    - > 50 taka
    - Do not know/not sure

Part-5: Source of information and social support about Tuberculosis

(Please put a tick [√] in the appropriate box of the following questions as per the answer of the respondents. Choose one for each question)

28. From where you got information about TB?
    - Television
    - Radio

- Health personnel visit to your home
- Drug shop
- Neighbor/Friends
- Others: (please specify)_____

29. If you develop symptoms of TB, do your family members or friends or neighbor advice you to go to TB center for detection?
    - Yes
    - No
    - Do not know/not sure

30. If you develop symptoms of TB, do your family members or friends or neighbor take you to TB center for detection?
    - Yes
    - No
    - Do not know/not sure

Part-6: Acceptance of Tuberculosis case detection

(Please put a tick [√] in the appropriate box of the following questions as per the answer of the respondents. Choose one for each question)

31. If any of your family member develop symptoms of TB like cough for 3 weeks or more, would you advice him/her to go or take him/her with you to TB center for detection of TB?
    - Yes
    - No

32. If you develop symptoms of TB like cough for 3 weeks or more, would u like to go to TB center for detection of TB?
    - Yes
    - No

APPENDIX B

BANGLADESH AT A GLANCE

Official Name: The People's Republic of Bangladesh

Government: Republic

Administrative Divisions: Six divisions: Barisal, Chittagong, Dhaka, Khulna, Rajshahi and Sylhet. 64 Districts and 507 Thanas. City Corporations - 6; Municipalities - 223 and Union Parishads - 4,553

Religions: Islam are tha majority; others- Hinduism; Buddhism; Christianity;

EXECUTIVE	
Head of State	President Prof. Iajuddin Ahmed
Head of Government	Chief Advisor Dr. Fakhruddin Ahmed (currently in 2008)
Cabinet	Cabinet selected by the Prime Minister and appointed by the President
Elections	President elected by National Parliament for a five-year term; elections last held in October 2001 (next to be held before October 2006)
LEGISLATURE	Unicameral National Parliament or Jatiya Sangsad; 300 seats elected by popular vote from single territorial constituencies (the constitutional amendment reserving 30 seats for women)
Elections	Elections: last held 1 October 2001 (next to be held before October 2006) election results: the election of October 2001 brought a majority BNP government aligned with three other smaller parties - Jamaat-i-Islami, Islami Oikya Jote, and Jatiya Party (Naziur)
JUDICIARY	Supreme Court is the apex body. The Chief Justice and other judges are appointed by the President
SPECIAL FACTORS	• Eighth most populous country in the world. Most densely populated country in the world. • Agriculture is the mainstay of economy. Although the country has achieved near self-sufficiency in food production, the incidence of malnutrition in Bangladesh remains the highest in the world. • Growing incidence of HIV/AIDS and naturally occurring arsenic in groundwater are among the new challenges faced by the country. • Bangladesh's topography makes it highly vulnerable to

devastating cyclones and floods, which combined with high population densities, make the damage and loss of life from natural disasters high.

Indicators	*Estimate*	*Year*	*Source*
Population (millions)	146.73	2003	WHO
Population growth (1991-2001)	NA	NA	NA
Annual Population Growth (percent)	2.7	2002	UNDP HDR 2005
Population Density (per sq. km)	1042	2002	World Dev. Report-2004
Sex Ratio (females per 1,000 males)	NA	NA	NA
Crude Birth Rate (per 1000 population)	29	2002	UNICEF
Crude Death Rate	8	2002	UNICEF
Total Fertility Rate	3.1	2000	WHO
Infant Mortality (per 1000)	46	2003	UNDP HDR 2005
Maternal Mortality Ratio	380	1985-2003	UNDP HDR 2005
Human Development Index Ranking	139	2003	UNDP HDR 2005
Literacy (Total)	41.1	2003	UNDP HDR 2005
- Males	50.3	2003	UNDP HDR 2005
- Females	31.4	2003	UNDP HDR 2005
Increase in literacy	NA	NA	NA
People below poverty line (%)	49.8	1990-2002	UNDP HDR 2005
Urban Population (%)	24.3	2003	UNDP HDR 2005
Growth of Urban population (annual)	NA	NA	NA
Life expectancy at Birth	63	2004	UNICEF
Per capita GDP (US $)	440	2004	WHO
Population with access to proper sanitation (%)	48	2002	UNDP HDR 2005
Population with access to improved water sourc	75	2002	UNDP HDR 2005
Health Expenditure-Public (% of GDP)	0.8	2002	UNDP HDR 2005
Health Expenditure - Private (% of GDP)	2.3	2002	UNDP HDR 2005
Physicians per 100,000 population	23	1990-2004	UNDP HDR 2005
Population with Access to Essential Drugs (%)	50 - 79	1999	UNDP HDR 2003

APPENDIX C
AREA MAP

Figure-2 ALI'S PORA BOSTI (SLUM), MOHAMMADPUR, DHAKA

Source: Google Earth

BIOGRAPHY

NAME	(Dr.) Kazi Asadur Rahman
DATE OF BIRTH	December 15, 1968
PLACE OF BIRTH	Dhaka, Bangladesh
INSTITUTION ATTENDED	University of Dhaka, Bangladesh Sir Salimullah Medical College, M.B.B.S.(Graduate of Medicine and graduate in Surgery), 1987-1994 University of New Castle, USA Bangladesh Campus, Dhaka, M.P.H. (Masters in Public health), 2004-2006 Mahidol University, Thailand ASEAN Institute for Health Development, M.P.H.M. (Masters in Primary Healthcare Management), 2007-2008
FELLOWSHIP / RESEARCH-GRANT	Own funded / self-financed
PRESENT POSITION	Student, Masters of Primary Healthcare Management, ASEAN Institute for Health Development, Mahidol University, Salaya, Phutthamonthon, Thailand