

Mother knowledge and Health-seeking behavior towards childhood TB

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List of acronyms

DOTS	Directly Observed Treatment, Short-course
GoB	Government of Bangladesh
GFATM	Global Fund to Fight AIDS, Tuberculosis and Malaria
NGO	Non-governmental Organization
NTP	National Tuberculosis Programme
PI	Principal Investigator
RED	Research and Evaluation Division
SPSS	Statistical Package for Social Science
TB	Tuberculosis
WHO	World Health Organization

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Abstract

Introduction: BRAC in association with NTP recently started the community-based child TB programme. So far, no independent study has been conducted to explore the extent to which the objectives of the programme have been achieved in terms of raising knowledge about child TB, and changing health-seeking behavior. This study uses quantitative method to evaluate the knowledge, attitude and practices of mothers towards childhood TB.

Methods: The study was a cross-sectional in nature and it included mothers (257 in numbers) as respondents on behalf of child TB patients. Structured and semi-structured questionnaires were applied to elicit information. The study involved interviewing 157 BRAC health workers (*Shasthya Sebika*, SS) to explore their knowledge regarding childhood TB.

Results: Both BRAC health workers (47%) and mothers (35%) did not have adequate knowledge about the primary risk source for child TB (closeness of contact). The knowledge of SSs (13-38%) and mothers (7-40%) regarding BCG and isoniazid therapy as a preventive strategy of TB was inadequate and similar. Both the health workers and the mothers had comprehensive knowledge about sputum test (67-78%) and X-ray (63-77%) for detecting TB in children except about tuberculin test (27-28%). Clinical symptoms like low grade fever (80-88%) and chronic cough (73-83%) were well known to them, but weight loss was not noted profusely (20-54%). Majority of SSs (61%) and the mothers (47%) perceived that TB in children was dangerous. About half of SSs (50%) had high stigma. One-fourth of mothers (27%) did not want to disclose their child's TB due to fear and 35% of them became frustrated due to it. The time between the onset of symptoms and diagnosis of TB among children was 60 days (mean). The majority of child TB patients were aged between 11-14 years (46-65%) followed by 6-10 years (23-28%). More than one-third of the children (38%) had exposure to TB patients at home, and 16% to neighborhood TB patients. About 47% of mothers' children received treatment from informal providers at first time. The providers commonly prescribed cough syrup (41%), tablet for fever (40%) and antibiotics (37%). About 55% of mothers went to providers more than four times before diagnosis of her child's TB. The majority of detected cases were diagnosed at district (23%) and private hospitals (30%). A significant majority of children (85%) referred to BRAC for treatment. **Conclusion:** Programme should organize special training on child TB for awareness of health workers. Strong collaboration between NTP and local communities are required to develop social mobilization, and sensitization in disseminating childhood TB information. Healthcare providers need to set schedule to provide education, increase awareness of contact case screening, early identifying and treating TB infection and disease in children.

Executive summary

Childhood TB is an important public health problem worldwide and Bangladesh is no exception. About 10% of tuberculosis occurs in children under 15 years. Reported rates for childhood TB in Bangladesh are markedly lower (2.7%) than expectation. It has traditionally had a lower priority than adult TB within the National TB Programmes (NTPs) framework worldwide, because it is largely non-infectious, cases have been thought to be few, and the assumption that effective control of adult TB could prevent childhood TB. Bangladesh has already developed national guidelines for childhood TB control that is designed to complement existing WHO guidelines for managing TB in children and to provide standard recommendations and evidence-based best practices appropriate for the Bangladesh country context. BRAC in association with NTP recently started a community-based child TB programme from 2010. Though the programme started in 2010, there is paucity of information on its performance. So far, no independent study has been conducted to explore the extent to which the objectives of the programme have been achieved in terms of raising awareness about child TB, and changing health-seeking behavior of community mothers for appropriate and quick initiation of treatment. This study uses a quantitative method to evaluate the knowledge, attitude and health-seeking behaviour of mothers towards childhood TB as well as the knowledge of health workers. This is necessary because insufficient knowledge and poor health-seeking behavior may act as important barriers to service utilization and to successful control of childhood TB. The results from this study will help fine-tuning the programme in terms of resources allocation, programme modifications, etc. and provide a benchmark for future impact assessment.

Methods

The study was a cross-sectional in nature and it included mothers as respondents on behalf of child TB patients. A total of 257 mothers, of them 111 were male Child TB patients and 146 were female's patients' mothers. The information regarding knowledge and attitudes towards childhood TB, and pathways of health seeking for childhood TB were obtained through structured and semi-structured designed questionnaires. Face-to-face interview were done with the respondents. The study involved interviewing 157 BRAC health workers (*Shasthya Sebika*, SS), who were involved in DOTS implementation and supervised the sampled child TB patients.

Findings

1. Both BRAC health workers (47%) and mothers (35%) did not have adequate knowledge about the primary source for child TB (closeness of contact). The knowledge of SSs (13-38%) and mothers (7-40%) regarding BCG and isoniazid therapy as a preventive strategy of TB was inadequate and similar.
2. Both health workers and the mothers had comprehensive knowledge about sputum test (67-78%) and X-ray (63-77%) for detecting TB in children except tuberculin test (27-28%). Two clinical symptoms like low grade fever (80-88%) and chronic cough (73-83%) were well known to health workers and mothers, but weight loss was not noted profusely (20-5%). However, the knowledge about the six months duration of TB treatment, free policy of sputum test, and the free policy of TB treatment was well known among health workers and mothers.
3. Most of SSs (61%) perceived that TB in children was dangerous. A similar finding was observed among mothers (47%). About half of SSs (50.3%) had high stigma about it. One-fourth of mothers (27%) did not want to disclose their child TB due to fear. About 35% became frustrated and stopped thinking about their future.
4. The main sources of child TB information was BRAC SS (63%) followed by mass media (28%) and neighbor (26%). Both mothers (79%) and health workers (92%) perceived that interpersonal communication was the most effective media for disseminating child TB information.
5. Only 38% of mothers reported that they would bring their child (if they got TB) to health facility for quick treatment. Even less mothers (21%) would agree to go for any kind of tests (21%). Only one-third of mothers would bring their children under regular TB treatment.
6. The time gap between the onset of symptoms and diagnosis of TB among children was 60 days. Majority of child TB patients were aged between 11-14 years (46-65%) followed by 6-10 years (23-28%). The overall male to female child TB ratio was 1:1.32. Most child TB patients (65%) had Extra-Pulmonary TB. More than one-third (38%) had exposure history to TB patients at home and 16% reported outside home (neighbor) incidences. A great majority of mothers (98%) did not take initiative for preventive therapy to other children at home. The main symptoms of child TB patients were fever (76%) followed by neck pain (35%) and cough (26%). Near about half (47%) of the mothers brought their children to informal providers first time. The providers commonly prescribed cough syrup (41%), tablet for fever (40%) and antibiotics (37%) for relieving symptoms. About 55% of mothers went to provides more than four times. The most common places where TB among children was diagnosed were district hospitals (23%) and private hospitals (30%). Wherever they were diagnosed, they were majorly (85%) referred to BRAC for treatment. Average

Tk. 6,000 (median) was spent on treatment purposes before diagnosis (reported). Around 69% took medicines in front of health workers (SS). A vast majority of mothers (98%) did not take initiative or preventive therapy to other children despite of indication.

Conclusion

In conclusion it can be inerred that BRAC health workers had inadeqaute knowledge regarding preventive and diagnostic aspects of TB. The health workers were stigmatized. They were the main source of child TB information for the mothers. Similar knowledge deficiency was also observed among mothers and they were also stigmatized. Informal providers were also a major source of seeking treatment for child TB treatment. Antibiotic and cough syrup were commonly prescribed. Mothers had to visit providers more than four times before diagnosis and it cost around Tk. 6,000. Around 30% were diagnosed in private hospital.

Recommendation

1. Mothers' education and awareness is needed to improve knowledge, attitude, and practice about childhood tuberculosis. Collaboration between NTP and local communities is needed to develop social mobilization, and sensitization in disseminating childhood TB information.
2. Special training should be organized for BRAC health workers focusing various child TB issues and hence would encourage health workers to visit homes frequently.
3. Healthcare providers need to set schedule to provide education, increase awareness of contact case screening, early identifying and treating TB infection and disease in children.

Introduction

Childhood TB is an important public health problem worldwide since long (WHO 1989), Bangladesh is no exception (NTP 2012). However, the focus of National TB Control Programmes (NTP) has majority been on addressing adult TB (BRAC 2012). Adults with smear-positive pulmonary TB (PTB) are the main transmitters of infection in the community, and TB Control Programmes have concentrated efforts on identifying and treating adult patients in order to stop the spread of *Mycobacterium tuberculosis*. About 10% of tuberculosis occurs in children under 15 years of age (Corbett *et. al.* 2003, Nelson and Wells 2004, WHO 2003). Of the estimated 9.3 million annual TB incidences in the world in the year 2007, at-least 1 million are estimated to be less than 15 years of age (WHO 2009). Reported rates for childhood TB in Bangladesh are markedly lower (2.7%) than expectations (NTP 2012). Child TB is a significant cause of mortality and healthcare expenditure (Al-Marri 2001). These considerations justify that a focus on the proper management of childhood TB is necessary for the control of the hazard.

Children's access to National TB Control Programme (NTP) in most endemic areas remains poor. Largely due to difficulties in diagnosing TB in children (Mukadi 1997). Further, it has traditionally had a lower priority than adult TB within National TB Programmes (NTPs) worldwide, as it is largely non-infectious, cases have been thought to be few, and the assumption that effective control of adult TB could prevent childhood TB. The diagnosis of children suspected of having TB is difficult because they often cannot cough up enough sputum to be sent for laboratory investigations. Since their disease is primary paucibacillary in nature and diagnosis has to be based mostly on clinical features a documentation of history of close contact with an infectious adult TB patient is needed for proper treatment. Therefore, the new WHO Stop TB strategy and the launch of the global Plan to Stop TB, 2006-2015 aims to adjust the gross neglect to childhood TB and recommend that all children should be managed as the part of routine NTP operations and children who with close contacts of smear positive TB cases should have priority contact investigation (WHO 2006). However, NTPs—especially in resource limited settings—face numerous challenges in ensuring accurate TB diagnosis along with access to an organized child friendly treatment. Although detection and isolation of *Mycobacterium tuberculosis* by culture remains the corner stone for diagnosis, quality assured diagnostic tests other than sputum smear microscopy may not be universally available under the NTPs.

Bangladesh has already developed national guidelines for childhood TB control that is designed to complement existing WHO guidelines for managing TB in children and provide standard recommendations and evidence-based best practices appropriate for the Bangladesh country context (NTP 2012). BRAC in association with NTP recently started a community-based child TB programme from 2010. Young children who live with family members with tuberculosis are at high risk of contracting the infection. However, when an adult is diagnosed with tuberculosis, there is attempt to screen children in the household for the disease under TB National TB programme in Bangladesh. Isoniazid preventive therapy is already incorporated in NTP as daily medication for six months. Moreover, a better understanding of knowledge, attitudes and practices of childhood TB among the population will lead to a greater understanding and implementation of childhood TB screening management system.

Rationale

A lack of mothers' knowledge regarding child health problems often leads to poor care seeking (Khalili *et al.* 2013). Inadequate knowledge and poor health-seeking behavior impair the effective TB control (Mangesho *et al.* 2007). Though the programme started in 2010, there is paucity of information on its performance. So far, no independent study has been conducted to explore the extent to which the objectives of the programme have been achieved in terms of raising awareness about child TB, and changing health-seeking behavior of community mothers for appropriate and quick initiation of treatment. So, this study uses applicable quantitative methods to evaluate the knowledge, attitude and practices about childhood TB among mothers. This is necessary because insufficient knowledge and poor health-seeking behavior may act as important barriers to service utilization and to successful control of TB. The results from this study will help fine-tuning the programme in terms of resources allocation, programme modifications, etc. and provide a benchmark for future impact assessment.

General objective

Mothers' knowledge, attitudes and health seeking behavior towards Childhood TB

Specific objectives

- Health workers knowledge and attitudes towards childhood TB management
- Basic knowledge of mothers towards childhood TB
- Attitudes and practices towards childhood TB
- Health seeking behavior of mothers for seeking appropriate treatment for children

Methods

Design, settings and population

The research design was a cross-sectional study exploring knowledge, attitudes, practice and health seeking behavior towards childhood tuberculosis among mothers of patients in BRAC supported urban and rural TB Programme areas. The mothers were respondents on behalf of their children. According to definition of programmes child TB patients were < 15 years. The study also included health workers (*Shasthya Sebika*, SS) who were involved in implementing DOTS on sampled child TB patients.

Sample and Sampling

The samples were taken in two levels. First: All child TB patients (172 in number) in BRAC supported under urban TB programme areas such Dhaka, Chittagong, Shylhet, Khulna, and Rangpur, and all child TB patients (85 in number) in 42 Sadar sub-districts of 42 districts of BRAC supported rural TB programme areas. The mothers of children were then included to provide their child's TB information. During the study period patients were under DOTS treatment. Of the total of 257 child TB patients, 111 were males, and 146 were females. We obtained the list of child TB patients from local BRAC TB offices. The study also included 157 BRAC health workers (SS) who were engaged in TB programme and providing DOTS on sampled child TB patients.

Tools development

Structured and semi-structured designed questionnaires were used to collect information from the mothers having children with TB and from the health workers (SS) of BRAC. The questionnaires were pre-tested in outside our sample for ascertaining consistency, appropriateness of languages, sequencing of questions to have an insight into the field operation procedures in place. In addition, the final questionnaire was modified and updated on the basis of feedback received from field-testing.

We collected information on the following variables:

- 1) Socio-demographic profile of mothers and children: age, gender, level of education, monthly family income, economic status of household, etc.
- 2) Basic knowledge about TB: causes of TB, modes of transmission, risk sources, diagnosis, treatment, etc.
- 3) attitudes/perception towards TB (benefits, barriers, fear, etc.),
- 3) practice and 4) health seeking behavior (healthcare providers, delay in seeking care, types of treatment, etc.) in relation to chronic cough.

Data collection

A five-day intensive training programme was organized for the interviewers consisting of didactic lectures, mock interviews, role play and field practice in workplaces. Field trial was done outside study areas under guidance of research investigators. A training manual was developed to guide the interviewers in the field. Five teams were formed for data collection, each consisting of four interviewers. Before the actual survey, the team was deployed in the work places one day before the beginning of the survey for rapport building with community people. During this time, community people were briefed about the purpose and

activities of the survey and sought their cooperation for successful completion of the survey on mothers with children under TB treatment. We had taken a list of TB patients initially from BRAC TB control local offices. They entered the houses and talked to household heads and took permission before starting interviews. Households were visited at three repeated intervals if the first attempt was not successful. Effective and supportive supervision was ensured on a continuous basis at all levels of the study. The investigators supervised data collection, verified the validity, accuracy, and completeness of data through spot checking and revisiting the households and individuals at random. Apart from continuous close supervision, separate groups of monitors randomly visited households to check for accuracy and completeness of data and ensured regular feedback to the interviewers.

Data processing and analysis

Data were edited, coded and cleaned in the SPSSWIN (version 16.0) for analysis at Dhaka head office under the supervision of the principal investigator. Mean and median were computed for continuous variables such as age, schooling years, monthly income, etc. Multiple responses were considered during analysis. To deal with multiple questions with several parts to answer, one point was given for the question if the responses were completely correct to construct knowledge scores. Chi-square with corresponding 95% confidence intervals were calculated to assess statistical significance.

Ethical issue

The study was reviewed and approved by Research and Evaluation Division (RED) of BRAC. The institutional ethics committee does not have to be consulted in this regards as no intervention was involved. All respondents were informed that their responses would remain anonymous, confidential and verbal consent was obtained by the Helsinki Declaration.

Results

Knowledge of health workers (SS)

A significant majority of SSs (82%) were aware of child TB (Table 1). However, they lacked knowledge about germ cause (31%), and main risk source (close contact) for child TB (47%). Further, they seriously lacked knowledge on BCG (13%) and isoniazid preventive therapy (38%) as a preventive strategy of TB. The health workers (SS) had adequate knowledge about sputum test (78%) and X-ray (77%) for detecting TB in children except tuberculin test (28%). Again they displayed having comprehensive knowledge on chronic cough (83%) and fever (88%) but they lacked knowledge about the loss of weight (54%) being a main clinical symptom.

Table 1. Knowledge of health workers (SS) towards childhood TB (%)

Knowledge variables	Study areas			P value
	Urban	Rural	All	
Had knowledge about child TB	79.2	87.5	82.2	0.194
Knowledge about the main risk source for child TB	52.5	37.5	47.1	0.072
Knowledge about the germ cause of TB	33.7	26.8	31.2	0.373
Knowledge about main symptoms of childhood TB				
Low grade fever	84.2	94.6	87.9	0.054
Persistent cough	82.2	85.7	83.4	0.568
Loss of appetite	73.3	57.1	67.5	0.039
Loss of weight	59.4	44.6	54.1	0.075
Knowledge about the age at which TB is getting				
1-5 Years	37.6	23.2	32.5	0.138
6-10 years	40.6	44.6	42.0	
11-15 years	21.8	32.1	25.5	
Knowledge about most common site for child TB				
Lungs	84.2	80.4	82.8	0.129
Neck glands	69.3	58.9	65.6	0.035
Bones	26.7	35.7	29.9	0.046
Abdomen	22.8	17.9	21.0	0.052
Knowledge about BCG as prevention strategy of TB	10.9	16.1	12.7	0.351
Knowledge about isoniazide preventive therapy	37.6	39.3	38.2	0.837
Knowledge about tuberculin test for detecting child TB	33.7	17.9	28.0	0.035
Knowledge about X-ray for detecting child TB	84.2	66.1	77.7	0.009
Knowledge about sputum test	75.2	80.4	77.1	0.466
Knowledge about six months TB treatment duration	98.0	96.4	97.5	0.544
Knowledge about MDR TB	53.5	23.2	42.7	0.0001
N	101	56	157	

Attitudes of SSs towards childhood TB

Most SSs in rural (52%) and urban areas (77%) perceived that TB was dangerous (Table 2). Though very less was afraid of child TB (11%) and would be shameful (5%) if her child got TB. However, many of them (33%) did not want to express the information on her

child's TB disease. Further, they perceived that community people would neglect (29%) and would avoid (29%) them if they found that their children had TB. The mean stigma score was 1.84 (Table 3). About half of SSs (50.3%) had high stigma (Table 3).

Table 2. Attitudes of health workers (SS) towards childhood TB (%)

	Study areas			P value
	Urban	Rural	All	
TB was perceived as dangerous	51.5	76.8	60.5	0.002
Afraid of child TB	12.9	7.1	10.8	0.269
SSs would be shameful if her child got TB	5.9	3.6	5.1	0.518
SSs did not want to express her child's TB information	34.7	28.6	32.5	0.436
SSs perceived that community would neglect her if her child TB had TB	34.7	17.9	28.7	0.026
SSs perceived that community would avoid her if child got TB	35.6	14.3	28.8	0.004
SSs perceived that her family would be deprived of social benefits if child got T	25.7	7.1	19.1	0.005
N	101	56	157	

Table 3. Presence of stigma associated with tuberculosis among SSs (%)

	Presence of stigma	
	Present	Absent
TB was perceived as dangerous	60.5	39.5
Afraid of child TB	10.8	89.2
SSs would be shameful if her child got TB	5.1	94.9
SS did not want to express her child' TB information	32.5	67.5
SSs perceived that community would neglect her if her child had TB	28.7	71.3
SSs perceived that community would avoid her if child got TB	28.8	71.2
SSs perceived that her family would be deprived of social benefits if child got TB	19.1	80.9
Stigma scores (Mean \pm SD) (range 0-7)	1.84 (\pm 1.60)	
High stigma (mean >1.84)	50.3	
Low stigma	49.7	

Interpersonal communication (92%) was perceived as an effective media for disseminating childhood TB information (Table 4). Only half of SSs (53%) would advice on taking medicine regularly when they got child TB patients.

Table 4. Perceived effective media for disseminating Childhood TB information (%)

	Study area		All	P value
	Urban	Rural		
Perceived effective media				
Interpersonal communication	97.0	82.1	91.7	0.004
Mass media (Electronic and print media)	25.7	23.2	24.8	0.135
Miking	11.9	16.1	13.4	0.265
What to do if child got TB in your catchment areas				
Would advice on taking medicine regularly	61.4	37.5	52.9	0.0001
Would advice on taking test further	22.8	44.6	30.6	0.0001
Would advice on starting treatment immediately	13.9	16.1	14.6	0.239
Hygiene care of children	10.9	7.1	9.6	0.325
N	101	56	157	

Sociodemographic profile of children reported

Majority of child TB patients were aged between 11-14 years (46-65%) followed by 6-10 years (23-28%) (Table 5). Most children (65%) were reported as the patients of Extra-Pulmonary TB. More than one-third of children (38%) had exposure history to TB patients at home and 16% reported outside home (neighbor). Only 1.6% was given isoniazide preventive therapy (verbal report). Around 85% were given BCG vaccines. One-fourth (25%) of child TB patients came from poor families and one-third of parents did not have school education (34-35%).

Table 5. Sociodemographic profile of child TB patients and mothers (%)

	Child sex		All	p-value
	Male	Female		
Age group				
1-5 years	26.1	12.3	18.3	0.003
6-10 years	27.9	22.6	24.9	
11-14 years	45.9	65.1	56.8	
Mean	8.94 (4.26)	10.43 (3.7)	9.79 (4.03)	0.004
Types of TB				
PTB	30.6	39.0	35.4	0.163
ETB	69.4	61.0	64.6	
Religion				
Muslim	93.7	93.2	93.4	0.862
Non-muslim	6.3	6.8	6.6	
Median family income (Tk.)	12,000	10,000	10,000	
School education of children				
No school	27.1	13.0	18.5	0.071
Primary incomplete	37.6	43.5	1.2	
Primary complete	12.9	13.7	13.4	
Secondary incomplete	22.4	29.8	26.9	

(Table 5 continued----)

(-----continued Table 5)

Perceived economy in last year				
Surplus	35.1	21.2	27.2	
Equal	38.7	39.7	39.3	
Bad	26.1	39.0	33.5	0.048
Child had exposure history to TB patients at home	40.5	36.3	38.1	0.488
Presence of TB patients neighbour	13.5	19.2	16.2	0.23
Presence of BCG scar mark on left arm	91.0	82.2	86.0	0.44
Child was given preventive therapy against TB	1.8	1.4	1.6	0.403
Maternal education				
No school education	32.4	37.0	35.0	
Primary incomplete	12.6	17.8	15.6	0.062
Primary	14.4	15.1	14.8	
Secondary incomplete	25.2	25.3	25.3	
Secondary and above	15.3	4.8	9.3	
Father education				
No school education	28.8	37.0	33.5	
Primary incomplete	6.3	10.3	8.6	
Primary	13.5	11.0	12.1	0.186
Secondary incomplete	17.1	20.5	19.1	
Secondary and above	27.9	18.5	22.6	
Could not remember	6.3	2.7	4.3	
N	111	146	257	

Knowledge of mothers about child TB

A great majority of mothers (84%) had knowledge about child TB (6). However, they seriously lacked information about the main risk source (TB patient) for child TB (35%) and germ cause of TB (13%). Further, they did not have comprehensive knowledge about the weight loss symptom considered as one of important clinical features of child TB. The knowledge about the age when child TB was common was not comprehensive. The knowledge on BCG and isoniazid preventive therapy as the strategy of prevention of child TB was very inadequate (7-40%). Knowledge about sputum test (67%), and X-ray (63%) was adequate, except tuberculin test (27%). Knowledge about the six months duration of TB treatment, free policy of sputum test, and free policy of TB treatment was universal. However, the knowledge about MDRTB (Multi Drug Resistance TB) was poor (26%). The main sources of child TB information was BRAC SS (63%) followed by mass media (28%) and neighbor (26%) (Table 7). Near about 80% perceived that interpersonal communication was the best effective method for disseminating child TB information (Table 8).

Table 6. Knowledge of mothers towards childhood TB (%)

Knowledge variable	Mother of child			p-value
	Male	Female	All	
Had knowledge about child TB	83.8	83.6	83.7	0.962
Knowledge about the main risk source for child TB	42.3	29.5	35.0	0.032
Knowledge about gem cause of TB	16.2	10.3	12.8	0.158
Main symptom of TB				
Low grade fever	79.3	80.1	79.8	0.865
Persistent cough	73.0	73.3	73.2	0.955
Loss of weight	24.3	17.1	20.2	0.155
Failure to thrive	3.6	3.4	3.5	0.938
Knowledge about the main transmitting route of TB (sneezing and coughing)	62.2	61.6	61.9	0.932
Knowledge about the age at which child is getting TB				
1-5 years	36.9	26.0	30.7	
6-10 years	35.1	39.0	37.4	0.022
11-15 years	26.1	24.7	25.3	
Do not know	1.8	10.3	6.6	
Knowledge about BCG as prevention strategy	9.0	4.8	6.6	0.178
Knowledge about isoniazid preventive therapy	39.6	40.4	40.1	0.901
Overall Knowledge about preventive measure of child TB	48.6	44.5	46.3	0.511
Knowledge about sputum test for detecting TB	62.2	71.2	67.3	0.125
Knowledge about X-ray for detecting TB	56.8	65.8	61.9	0.141
Knowledge about tuberculin test for detecting TB	36.6	24.0	26.8	0.233
Child do not need to stay with TB patient for long time to get TB	67.6	59.6	63.0	0.189
Knowledge about free policy of TB treatment	98.2	67.7	43.2	0.409
Knowledge about free sputum test	93.7	97.3	95.7	0.162
Knowledge about six months TB treatment duration	92.8	92.5	92.6	0.706
Knowledge about MDR TB	20.7	30.1	26.1	0.089
N	111	146	257	

Table 7. Sources of Child TB information of mothers (%)

Sources of child TB information	Child sex		All	P value
	Male	Female		
BRAC	57.7	67.1	63.0	0.07
Mass media	27.9	28.1	28.0	0.851
Neighbour	30.6	21.9	25.7	0.113
Family members	11.7	16.4	14.4	0.285
N	111	146	257	

Table 8. Perceived best media for disseminating TB information in community reported by mothers (%)

	Child sex		All	P value
	Male	Female		
Interpersonal communication	79.3	78.1	78.6	0.817
Miking	8.1	10.3	9.3	0.554
Mass media	23.4	30.1	27.2	0.231
N	111	146	257	

Attitudes of mothers towards child TB

Near about one-third of mothers were afraid of their child's TB (Table 9). One fifth (22%) became shameful about disclosing it. Near about half of mothers (47%) perceived that TB was dangerous. One-fourth of mothers (27%) did not want to disclose their child's TB due to fear. About 35% became frustrated and stopped thinking about her future. Some of mothers (14-18%) also perceived that people would avoid her, would neglect her family would be deprived of getting social benefit due to her child's TB.

Table 9. Attitudes of mothers towards childhood TB (%) ((n=257)

	Stigma		p-value
	Presents	Absents	
Afraid of TB	33.1 (85)	66.9 (172)	0.126
You became shameful when your child got TB	21.8 (56)	78.2 (201)	0.955
TB was perceived as dangerous	47.1 (121)	56.9 (136)	0.709
You did not want to disclose your child TB information due to fear	26.8 (69)	73.2 (188)	0.733
You became frustrated and stopped thinking about you future due to your child got TB	35.4 (91)	64.6 (166)	0.384
You perceived that people would avoid you for your child illness	17.9 (46)	82.1 (211)	0.710
You perceived that people would neglect your family	13.6 (35)	86.4 (222)	0.489
You perceived that your family would be deprived of social benefits	13.6 (35)	86.4 (222)	0.966

Practice regarding childhood tuberculosis

Only 38% of mothers answered that they would go for quick treatment (Table 10). Even less numbers of mothers (21%) would go for pathological test (21%) like sputum, X-rays,

tuberculin tests. One-third of mothers would bring their children under regular TB treatment. On the other hand, a great majority of mothers (67%) would ask other mothers to bring their children under regular TB treatment (Table 11).

Table 10. Practice about what to do if a household child gets TB (%)

	Child sex			P value
	Male	Female	All	
Bringing children quickly under TB treatment	39.6	36.3	37.7	0.259
Bringing children under pathological examination	26.1	17.8	21.4	0.08
Bringing children under regular treatment	29.7	34.2	32.3	0.256
Bringing children under proper care	13.5	16.4	15.2	0.408
N	111	146	257	

Table 11. Practice about what to do if a child gets TB in community (%)

	Child sex			P value
	Male	Female	All	
Mothers would inform others about child TB	41.4	36.3	38.5	0.07
Mother would encourage other mothers of child TB patients for taking relevant tests for detecting TB	22.5	23.3	23.0	0.807
Mothers would ask mothers to bring their children under regular treatment	64.0	68.5	66.5	0.246
N	111	146	257	

Health-seeking behavior of mothers towards childhood TB

The time gap between the onset of symptoms and first consultation with healthcare providers was 29 days (mean). Further, the time between onset of symptoms and diagnosis of TB was 60 days. Female delayed more (34 days) for first medical consultation than that of male (22 days). The main symptoms of patients were fever (76%) followed by neck pain (35%) and cough (26%). A great majority of mothers (62%) of male child patients went to formal doctors compared to the mothers (42%) of female child patients. Village doctors (18%), and drug shop attendants (23%) were also common information sources for seeking care. The most commonly prescribed drugs by providers for relieving symptoms were cough syrup (41%), tablet for fever (40%) and antibiotics (37%). On an average four visits were required for diagnosis of TB. The most common places where they were diagnosed were distric (23%) and private hospitals (30%). Wherever they were diagnosed, they greatly (85%) were referred to BRAC. An average of Tk. 6,000 (median) was spent on treatment purposes before diagnosis (reported). Around 69% of patients took medicines in front of health workers (SS). A significant majority of mothers (98%) did not take initiative for preventive therapy to other children at home.

Table 12. Health seeking behavior of mothers towards child TB

	Child sex			p-value
	Male	Female	All	
Days between onset of symptom and first consultation with healthcare providers(mean days)	22.12	33.5	28.6	0.001
Major clinical symptoms				
Fever	74.8	76.7	75.9	0.248
Neck pain	22.5	22.6	22.6	0.981
Chronic cough	36.0	34.9	35.4	0.850
First healthcare providers				
Formal doctor	62.2	41.8	50.6	0.062
Informal	35.1	55.5	46.7	
BRAC	2.7	2.7	2.7	
Nature of treatment received from provider				
Cough syrup	39.6	42.5	41.2	0.648
Antibiotics	36.0	37.0	36.6	0.876
Vitamin	13.5	8.9	10.9	0.240
Tablet for fever	35.1	43.8	40.1	0.159
Advice	9.9	9.6	9.7	0.931
Average number of visits to healthcare providers before diagnosis (median)	4.0	4.0	4.0	
< 4 number visits	48.6	43.2	45.5	
≥ 4 number visits	51.4	56.8	54.5	
Places of diagnosis				
Upazila Health complex	1.8	3.4	2.7	
District hospital	27.0	19.9	23.0	0.671
Chest disease hospital	10.8	9.6	10.1	
BRAC	11.7	17.1	1.8	
Private clinic/hospital	28.8	31.5	30.4	
Child hospital	7.2	4.8	5.8	
Specialized hospital/tertiary hospital	12.6	13.0	12.8	
Where to refer for treatment				
BRAC	87.4	83.6	85.2	
Government hospital	9.0	8.2	8.6	0.056
Private hospital	3.6	2.1	2.7	
Others	0.0	6.2	3.5	
Median delay between onset of symptom and TB diagnosis in days	45.0	60.0	60.0	
Average treatment cost before diagnosis (TK.)	6,000	6,000	6,000	
Took medicine in front of SS regularly	65.8	71.2	68.9	
Not yet take preventive measure for protecting other children at home from TB	98.8	97.5	98.0	0.534
N	111	146	257	

Discussion

Childhood TB is considered as a public health problem in 22 high TB burdened countries (WHO 2009) and the National TB Control Programme (NTP) of Bangladesh currently focused on controlling the epidemic of childhood TB with great emphasis. The case detection of child TB is low in Bangladesh according to expectations (NTP 2012). This happens when the mothers fail to conceptualize the importance of child TB with ineffective source of information. Though NTP started the child TB programme in 2010, however, information is limited on the extent to which the objectives of child TB programme have been achieved in terms of raising awareness about child TB, and changing health-seeking behavior of community mothers for seeking appropriate treatment. This study explored the knowledge, attitudes and health seeking behavior of mothers of children having TB. We found that both BRAC health workers and community mothers lacked basic knowledge for controlling and preventing childhood TB. Child TB was perceived as dangerous and both health workers and mothers were socially stigmatized. The path of health-seeking for appropriate care was arduous and it was expensive for poor people. The programmatic implications are discussed below.

The knowledge about the primary risk source (closeness of contact with TB patients) for child TB and the isoniazide preventive therapy for children when TB patients stayed at home was poor among the health workers and mothers. Children exposed to adults with smear-positive pulmonary TB have a high risk for infection, and this risk increases with the degree of contact (Grzybowski *et al.* 1975, Loudon 1958). It clearly indicates that health workers were not able to provide mothers with such important information on how to protect children from getting TB from adults. We also found that many mothers of TB patients did not practice to give isoniazide therapy also to their other children despite of indication. So having adequate knowledge about prevention limits the spread of TB infections to the larger community. At least programme should address the issue with great importance to control Child TB effectively. Knowledge about the main clinical symptoms like fever, chronic cough was universal. However, cough and fever were well known clinical features of Acute Respiratory Infection (ARI) in rural Bangladesh (Islam *et al.* 2011). The knowledge on another clinical symptom like weight loss was very important for detecting child TB clinically. It indicates that the mothers would not be able to identify childhood TB as soon as possible on basis of clinical symptoms, and it could delay in accessing childhood TB care services. Further, the knowledge on germ cause of TB was also poor. The mother and health workers also failed to link TB germs to the causation of TB. Causes of TB mainly were based on cultural explanations in developing countries rather than being medically caused (Mesfin *et al.* 2005, Mangesho *et al.* 2007). The germ cause should be incorporated into IEC (Information Education Communication) materials to make the practitioners and mothers understand about the medical importance of childhood TB. This would eventually enable the mothers to seek care quickly with great urgency and vigorously.

Stigma against child TB was found to be quite dominant in the study communities. The main reason was social rejection. Fear of social isolation is observed worldwide (Mustaq *et al.* 2010). A similar finding was observed among adult TB in Nepal (Baral *et al.* 2007). TB is considered highly infectious and incurable disease in Bangladesh (Islam *et al.* 2009). The health workers were part of stigmatized society and the study also found that they were also stigmatized. Stigma appeared to be an important deterrent from seeking timely care (Baral *et al.* 2007). And its consequences are not only damaging to personal well-being of TB patients, but also are likely to undermine the overall effectiveness of the TB control

activities. Social support often can help patients overcome these barriers, with active intervention from the programme. Thus, the TB IEC campaigns need to work more intensively to remove such misperceptions. Hence, health education might be a suitable way to fight the strong stigma attached to TB.

The healthcare-seeking behaviour of mothers towards childhood TB was also found to be poor. The delay for care-seeking is for adult TB cases, quite a common practice in Bangladesh (Rifat *et al.* 2011). We got the same finding in our study. The majority of mothers did not seek help for child's illness from formal place. It was a common phenomenon in Bangladesh (Ahmed *et al.* 2009, Islam *et al.* 2011). The main reason was that people did not take the disease as serious and life threatening (Islam *et al.* 2009). Similar thinking and inaction were also observed in Ethiopia (Yimer *et al.* 2009), Vietnam (Hoa *et al.* 2003), and China (Wang *et al.* 2008) for adult TB. In most places informal providers are quite available, and easily accessible etc (Ahmed *et al.* 2009). Use of antibiotic is a very common practice in Bangladesh (Ahmed and Islam 2012). We got the same results in our study. The antibiotics should be used rationally in child TB patients. If providers does not have adequate knowledge on antibiotics, there is chance to have an antibiotics resistance. This hampers the diagnosis of TB.

The main limitation of this study is that the responses of mothers regarding health seeking behavior were not validated by observations of their practice pattern.

The main area of weakness of programme is the insufficient knowledge of health workers who are involved in controlling and preventing child TB. Another challenge for the child TB programme is that the society was stigmatized and to achieve the success of programme in a stigmatized society, it would be quite difficult but not impossible. The paths of health seeking care were long, often inappropriate, and expensive. Irrational use of antibiotics is another threat to the Child TB Control Programme. Though many challenges are being encountered, however, it is gallant start for NTP in controlling child TB. Mothers' education and awareness is needed to improve knowledge, attitude, and practice about childhood tuberculosis. Collaboration between NTP and local communities are needed to develop social mobilization, and sensitization in disseminating childhood TB information.

Special training should be organized for BRAC health workers focusing various child TB issues and hence would encourage health workers to visit homes frequently. Healthcare providers need to set schedule to provide education, increase awareness of contact case screening, early identifying and treating TB infection and disease in children.

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