Treatment Related Factors Associated with Non-adherence to Anti-Tuberculosis Treatment

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Abstract

Background: Non-adherence to anti-tuberculosis treatment may result in persistent infectiousness on the part of the patient and a higher rate of treatment failure, relapse and drug resistance and therefore, is a significant barrier to the success in tuberculosis control. Objective: To determine the treatment related factors associated with non-adherence to anti-tuberculosis treatment among tuberculosis patients. Materials and method: This case control study was carried out among purposively selected 47 tuberculosis patients non-adherent to treatment (cases) and 94 tuberculosis patients adherent to treatment (controls) and were interviewed with a semi-structured questionnaire and checklist in selected DOTS centres of Dhaka city. Results: Statistical analysis shows that, factors like delay in seeking tuberculosis treatment for >6 weeks (OR=4.57; 95% CI, 1.48-14.1) and getting medicine weekly once (OR=2.8; 95% CI, 1.13-6.77) were more likely to be associated with non-adherence to treatment. Less frequent visit by health providers (p=0.02), no support for side effect (p=0.042) and non-observation of medication (p=0.009) were also found significant. The reasons behind missing anti-TB doses among non-adherent cases were due to feeling better (53.2%), personal reason (25.5%), feeling worse (19.1%) and forgot to take medicine (2.2%). Conclusion: Mass awareness among the tuberculosis patients is required to improve attitude towards anti-tuberculosis treatment and activities of tuberculosis control programme require further strengthening especially in targeting the patients of low economic status.

Keywords: Tuberculosis; Adherence; Anti-TB treatment.

Introduction

Tuberculosis (TB) has affected mankind for more than 4,000 years.[1] Tuberculosis remains a leading cause of morbidity and mortality in developing countries including Bangladesh. It is the first infectious disease declared by the WHO as a global health emergency.[2] In Bangladesh,

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tuberculosis is a major public health problem. It is estimated that 300,000 new cases crop up each year and about half of them are infectious TB. It is further estimated that about 70,000 people die every year with an incidence of 223/100,000 people per year.[3]

Tuberculosis occurs more frequently among low-income people living in overcrowded areas and persons with little schooling.[4] Various surveys have been conducted to understand the knowledge, attitudes, and practices regarding tuberculosis.[5] Drug resistance, in combination with other factors, results in increased morbidity and mortality due to tuberculosis. In Bangladesh, the rate of multi-drug resistant (MDR) TB case is 3.5% among new cases and 20% among previously-treated cases.[3] The death rate in MDR cases is high (50-60%).[6] Several factors have been identified for the development of MDR cases. These include non-adherence to therapy, lack of direct observed treatment, limited or interrupted drug supplies, poor quality of drugs, widespread availability of anti-TB drugs without prescription, poor medical management, and poorly-managed national control programme.[7]

In terms of TB control, adherence to treatment may be defined as the extent to which the patient's history of therapeutic drug-taking with the prescribed treatment.[8] Non-adherence to anti-tuberculosis treatment is a major barrier to the control of TB. It may result in higher rates of treatment failure, relapse, and drug resistance. Several studies reported that non-adherence is associated with poor socioeconomic position; patient-related factors like patients' beliefs, knowledge, perception and attitudes; experiences with disease and treatment; treatment-related factors like medication side effects; disease-related factors like severity of disease, co-morbidity such as psychiatric illness; and factors related to the health care system like quality of relations and communication between health workers and patients.

Materials and method
A case control study was designed for a period of six months to identify the association of treatment related factors influencing the non-adherence to anti tubercular therapy. Forty seven available cases were selected from DOTS centres at Middle Badda, Mirpur-1, Hazaribag areas of Dhaka city under 2nd Urban Primary Health Care Project (UPHCP) who were non-adherent TB patients with defaulted or interrupted treatment for two consecutive weeks or more. Because of shortage of control in the DOTS centres, 94 un-matched controls that were all new TB patients, received four months or more anti TB therapy and didn't miss more than two consecutive weeks of doses were taken. Minimum sample size of 58 cases and 116 controls were estimated by Epi info software. Pre-testing was done. Data were collected through face-to-face interviews using a questionnaire and a checklist. Statistical Package for Social Science (SPSS) version 11.5 was used to analyze the data.

Results
Treatment related factors represent the symptoms, duration of sickness, side effects and others diseases of the patients. Health care delivery includes location of health centre, health education, home visit and support for any complications. Participants were asked to identify any factors that affect adherence to anti-TB treatment.

Table I: Level of symptoms of TB among respondents

	Case (n=47)		Control (n=94)		OR	Statistics
	Number	%	Number	%	95% CI	
Symptoms of TB						
Less	34	72.3	71	75.5		$\c^2$=0.168
More	13	27.7	23	24.5		p>0.05
Duration (weeks) of sickness before seeking for TB treatment						
< 4	15	31.9	48	51.1	1	
5 to 6	22	46.8	39	41.5	1.81(0.83-3.94)	$\c^2$=7.747
>6	10	21.3	7	7.4	4.57(1.48-14.10)	p=0.01
Mean ±SD	5.36±1.358		4.69±1.262			t=2.898
						p=0.004

*t-test, OR= Odds Ratio, CI= Confidence Interval

Symptoms of TB on the day of diagnosis among cases (27.7%) were in higher proportion than the controls (24.5%) in developing more symptoms. Statistically this was not significant (p >0.05). The period delayed >6 weeks in seeking TB treatment was almost three times higher proportions of cases (21.3%) than the controls (7.4%). The controls

more commonly started treatment within four weeks duration of symptoms. The χ^2 test was highly significant (p=0.001). The t-test was also significant (p=0.004). Odds ratio found that, delayed for longer duration more than six weeks were 4.6 times (OR=4.57; 95% CI, 1.48-14.10) more likely to be nonadherent than ≤4 weeks.

Table II: Problem with attending health centre and distance of the health centre from the house and informed by doctor about consequence of discontinuing

Characteristics	Case (n=47)		Control (n=94)		Statistics
	Number	%	Number	%	
Problem with attending health centre					
No	19	40.4	47	50.0	Ç²=1.154
Yes	28	59.6	47	50.0	p>0.05
Type of the problem					
Transport cost	2	7.1	1	2.1	Ç²=1.154
Time consuming	3	10.7	2	4.3	
Busy at work place	23	82.2	44	93.6	p>0.05
Distance of the health centre from the house of the respondents					
Mean ±SD	1.33±1.41		0.88±0.57		t=2.118 p=0.039

*t-test

Distance of the health centre from the house and problems faced by the respondents

The mean (±SD) distances of the health centre from the house of cases and controls were 1.33 (±1.41) Km and 0.88(±0.57) Km, respectively. The t-test was significant (p=0.039). Cases (59.6%) faced problem in attending health centre more than the controls (50.0%). The type of problem was was that the cases (82.2%) were busy with their work and 7.1% faced with transport cost and 10.7% with time consuming. The χ^2 test was found non-significant.

Table III: Frequency of getting medicine and from whom taken, observation and visit by health care provider

Characteristics	Case (n=47)		Control (n=94)		OR	Statistics
	Number	%	Number	%	95% CI	
Frequency of getting medicine						
Daily	10	21.3	31	33.0	1	Ç²=7.329
Several times a week	25	53.2	28	29.8	1.06(0.40-2.80)	p=0.026
Weekly once	12	25.5	35	37.2	2.77(1.13-6.77)	
Observation of taking drug						
Nobody	35	74.5	51	54.2	1	Ç²=9.319
Family members	2	4.3	23	2.5	0.13(0.03-0.57)	p=0.009
DOTS provider	10	21.2	20	21.3	0.69(0.30-1.74)	
Frequency of visit						
Never visited	35	74.5	51	54.3	1	Ç²=5.381
Visited	12	25.5	43	45.7	0.407(0.19-0.88)	p=0.020

OR= Odds Ratio, CI= Confidence Interval

Higher proportion of TB patients adherent to treatment (controls) received drugs daily than the cases. On the other hand non-adherent cases (53.2%) received drugs several times a week than the controls (29.8%). The difference was found significant (p=0.026). Tuberculosis patients who got the drugs weekly once were 2.8 times (OR=2.77; 95% CI, 1.13-6.77) more likely to become non-adherent than those who got the drugs daily. Higher proportion of cases (74.5%) took medicine by themselves without any observation by others than the controls (54.2%). The difference was significant (p=0.009). The patients who took anti-TB drugs under observation of family members were about eight times less likely to develop nonadherence than those not observed. Controls (45.7%) were more commonly visited by health care provider during anti-TB therapy than the cases (25.5%) and were 2.5 times (OR=0.407; 95% CI, 0.19-0.88) less likely to become non-adherent.

Table IV: Doctor informed about side effects of anti TB drug, side effects, support and sputum test

Characteristics	Case (n=47)		Control (n=94)		OR	Statistics
	Number	%	Number	%	95% CI	
Doctor informed about side effects						
No	26	55.3	22	23.4		Ç²=14.214
Yes	21	44.7	72	76.6		p <0.001
Developed side effect						
No	22	46.8	46	48.9		Ç²=0.57
Yes	25	53.2	48	51.1		p>0.05
Got support for side effect						
No	5	20.0	2	4.2	1	Ç²=0.30
Yes	20	80.0	46	95.8	0.17(0.03-0.97)	p=0.042
Sputum test						
Not done	12	25.5	0	0.0		Ç²=26.233
Done	35	74.5	94	100.0		p <0.001

*t-test, OR= Odds Ratio, CI= Confidence Interval

It was found that the double proportions of cases (55.3%) were not informed by doctors about anti TB drugs side effects than the controls (23.4%). The differences were found highly significant (p< 0.001). Proportions as well as severity of side effects for anti-TB drugs were more in cases (53.2%) than the controls (51.1%). The differences between the groups were not significant. Proportions of not getting support for

the side effects were five times more in cases (20.0%) than the controls (4.2%). Significant difference (p=0.042) was noticed but on a few sample. The odds ratio showed that those who got support for side effect were six times (OR=0.17; 95% CI, 0.03-0.97) less likely to become non-adherent than those who didn't. All of the controls (100.0%) did sputum test after 2 months of intensive phase treatment and remained adherent to treatment whereas among cases 25.5% failed to do the test.

Reasons behind missing anti TB doses by respondents

The non-adherent TB cases were asked reasons behind missing anti-TB doses. They opined due to feeling better (53.2%), due to personal reason (25.5%), feeling worse (19.1%) and forgot to take medicine (2.2%).
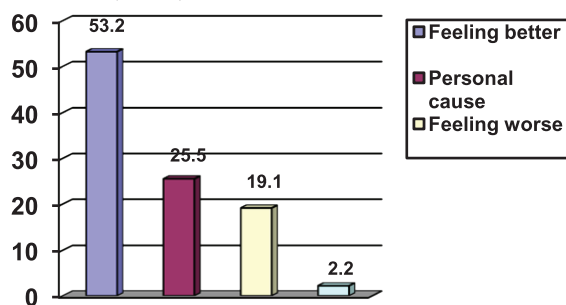

Fig. 1: Distribution of reasons behind missing anti-TB doses

Discussion

This study found that symptoms of TB were higher among non-adherent group and the period delayed >6 weeks before seeking treatment was almost three times higher in proportion among non-adherent group. The difference found was of high significance and those suffered for >6 weeks were 4.57 times more likely to be non-adherent than ≤4 weeks sufferer. These findings were consistent with a study in India found that defaulters exhibited inadequate knowledge of TB (OR=1.88) compared to the completed group.[8]

The distances of the health centre from the house of respondents were within 1.5 km. Among the cases, 59.6% faced problems in attending health centre due to busy with work 82.2%, transport cost 7.1% and time consuming 10.7%. More than half of the non-adherent cases (53.2%) received drugs several times a week more commonly than the controls (29.8%). On daily basis adherent groups were more than non-adherent. Tuberculosis patients who got the drugs weekly once were 2.77 times more likely to become non-adherent than those who got the drugs daily. Higher proportion of non-adherence groups took medicine by themselves without any observation by others. This study showed that the patients who took anti-TB drugs under observation of family members were 7.7 times less likely to develop non-adherence than those not observed. Tuberculosis patients who were visited by health care provider during anti-TB therapy were 2.5 times (OR=0.407) less likely to become non-adherent than those that of not visited. These findings consistent with a study in India, patients who defaulted were more likely to be public health facility based DOT (OR=1.33; 95% CI, 1.11-1.60).[9]

Proportions of not getting support for the side effects were five times more in cases (20.0%) than the controls (4.2%). It was also found that 5.9 times (OR=0.17) less likely to become nonadherent among those who got support for side effect. Double proportions of non-adherent were not informed by doctors. A study in Nepal has the similarity with this study finding, lack of information about side effects, was found to be significantly related to non-adherence.[10]

A study in India, DOT services were reported highly satisfying among TB patients in completed group than defaulted. Nonetheless, 91% of the patients in the study group expressed satisfaction with the DOT services, there was significant difference in this regard between the defaulted and completed group (81% v/s 98%, p <0.01).[11]

Patients having good attitude to anti-TB treatment were 11 times (OR=0.09; 95% CI, 0.01-0.80) less likely to become non-adherent than poor attitude. This might be due to low economic and education status. The difference in these two groups were found highly significant (p=0.016). This health seeking attitude towards treatment was found in studies at Thailand.[12]

The reasons behind missed anti-TB doses during the therapy period were found in this study that due to feeling better (53.2%), due to personal reason (25.5%), feeling worse (19.1%) and forgot to take medicine (2.1%). Similarity is found in a study in Indonesia that, feeling better was the most frequently mentioned reason (47%), almost 20% of the non-adherent patients actually thought they were healthy at the moment of interviewing. On the other hand some non-adherent patients stopped because they were feeling worse (13%) or experienced side effects (28%).[13]

Conclusion
This study found that there were significant differences between adherent and non-adherent groups in terms of treatment related factors as delay in seeking care from health centre for TB treatment, distance of health centre, frequency of getting medicine, observed taking medicine, frequency of visit, support for side effect and adherence to sputum test. The findings of this study will have implications for a range of stakeholders including non-government organizations, national policy makers and international bodies working towards reducing the global health burden of tuberculosis.

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