

## ORIGINAL ARTICLE

# NON-COMPLIANCE AMONG THE PATIENTS TAKING ANTI- TUBERCULAR DRUGS IN A TEACHING HOSPITAL

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### Abstract

**Background:** Tuberculosis (TB) remains a major, worldwide, public-health problem in the 21<sup>st</sup> century. Patient non-compliance is a major barrier to the control of TB, treatment of individual patients and in the development of drug resistance. The reasons for poor compliance are complex, ranging from characteristics of individual patients to qualities of social economic environment of the patient and the health service. **Methods:** An observational, cross sectional study was carried out in the Department of Medicine in Bangabandhu Sheikh Mujib Medical University (BSMMU), Shahbag, Dhaka during the six months period. **Results:** The average age group of compliance patients is between 46-55 years and between 26-45 among the defaulter group. The gender, marital and employment status were not significantly associated with compliance. Furthermore the study also show that the majority (35%) of compliance group reside at distances less than 5 km. from the TB centre while the majority from the defaulters (92%) resided over 15 km. Multiple logistic regression analysis showed the barriers to TB treatment include: disbelief in the fact that TB can result in death if not treated, belief in traditional medicine for curing TB, bad healthcare worker attitudes, long distance to the clinic for treatment, belief that TB treatment takes very long and the pill burden. **Conclusion:** Knowledge, patient-provider communications, social support and accessibility might have played significant roles in the low completion rate of TB treatment. Planned interventions targeted at these factors should be implemented with their effects carefully monitored to improve current TB control in Bangladesh.

**Key words:** Non-compliance, Tuberculosis treatment, Anti-tubercular drugs

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### Introduction:

Tuberculosis is a public health problem in developing countries in the tropics and is the leading cause of death from any single infectious agent<sup>1</sup> With an estimated population of 164 million, Bangladesh is listed among the 30-high burden countries for TB and 27 for MDR-TB<sup>2</sup>. The incidence rate for all from of tuberculosis is 221 per 100,000 population per year. The TB mortality is 24 per 100,000 population per year with over 38,000 deaths annually<sup>2</sup>. In 1993 WHO declared TB as a global emergency and recommended a standard strategy for control of the disease known

as “DOTS” or Directly Observed Treatment, Short-course. The Bangladesh National Tuberculosis Control Program (NTP) adopted the DOTS strategy in 1993. Since the introduction of DOTS, remarkable progress has been achieved in TB control in the country. The program has managed to successfully treat >85% of TB patients since 2003. This has further improved to above 90% since 2005. Further, the program achieved the initial target of detecting at least 70% of new smear positive (NSP) cases in 2006 and has been successful in consistently sustaining

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this. In spite of all steps, currently compliance to treatment amongst tuberculosis patients is still not up to a satisfactory level as evidenced by high defaulter rates. Treatment of tuberculosis involves taking multiple drugs daily for 6 months. Although there are treatment regimens that have a greater than 95% efficacy in tuberculosis, patients infected with mycobacterium tuberculosis strains susceptible to first line drugs, there are a number of patients who are unable to comply with treatment. Moreover Multi-drug resistant tuberculosis (MDR-TB) is an emerging threat, 3.3% of new TB cases and 17.7% of previously treated cases<sup>2</sup>, increasing the mortality rate to 40 per 100 000 population<sup>3</sup>. Efforts to control the tuberculosis epidemic depend largely on patients' compliance to tuberculosis treatment. Factors related to non-compliance to tuberculosis treatment are: healthcare system, therapy-related, social, and economic, as well as client-related factors. In a study Kandel, Mfenyana, Chandia & Yogeswaran observe that three factors may contribute to non-compliance to TB treatment, these being poor communication between health care providers and patients, financial constraints limiting access to health care facilities and lack of nutritious food which supports TB treatment<sup>4</sup>. The National Institute of Health is of the view that illiteracy is the main factor in non-compliance to TB treatment, as clients may not understand written instructions about the treatment<sup>5</sup>. Other researchers assert that TB may not be completely cured by scientific treatment and that patients will resort to alternate modes of treatment<sup>6</sup>. The National Institute of Health report states that substance abuse, being home-bound, stigma and lack of trust in Western medication all cause patients to be non-compliant to TB treatment<sup>6</sup>. According to McKinney a basic approach should be used in promoting compliance to TB treatment, such as: access to treatment; education on the benefits of complying with treatment; and rendering user-friendly services, that are culturally acceptable and convenient to patients<sup>7</sup>.

#### **Methods:**

This cross sectional observational study was performed in indoor and outdoor patients of Bangabandhu Sheikh Mujib Medical University (BSMMU), Shahbag, Dhaka Bangladesh of the patients diagnosed having tuberculosis who admitted indoor of medicine department between July 2014 to December 2014 were included in this study by purposive sampling technique. Sample was selected from the population by non-probability sampling technique and who disagreed to participate was excluded. Both male and female was included. A

Questionnaire appropriate to evaluate the contributing factors was developed as a tool for data collection by reviewing different questionnaire. A verbal consent was taken and demographic information was collected through an initial series of questions. Data was collected by a semi structured questionnaire by face to face interview of the patients or patients' attendant (whichever is applicable). Data collector distributed the self-administered questionnaire to the TB patients and recollected after 30 minutes.

#### **Study setting and design**

##### **Patient selection:**

##### **A) Inclusion criteria:**

1. Patients diagnosed as a case of Tuberculosis (pulmonary & extra pulmonary)
2. Patients who had been initiated on anti-TB treatment for more than 2 months.
3. The age of the patients was above 18 years.
4. Both male and female patients.

##### **B) Exclusion Criteria:**

1. The patients who are not interested in participating in the study.
2. Patients who have been initiated on anti-TB treatment for less than 2 months.
3. Age less than 18 years.

**Statistical analysis:** Collected data was checked and coded manually and entered into computer and data file was constructed. Result was presented in tabulated forms. Statistical Analysis was done using computer based programmed Statistical Package for Social Science (SPSS) for windows version 16.0. The Chi-square test was used to compare different proportions and the association between variables. The 5% level of significance was used as the cut off for statistical significance. Descriptive statistics of frequency distributions and measures of dispersion were used to describe study variables.

**Ethics statement:** Informed written consent had been taken from patients. They had the freedom to withdraw from the study at any time, if they desired. It had been assured that all information and records would be kept confidential and the procedures would be helpful for both the physician and the patients in making rational approach to the care management. Privacy of the patients had been strictly maintained

**Results:**

Total 106 Patients who were diagnosed as a case of Tuberculosis( pulmonary and extra pulmonary) both in outpatient and inpatient department of BSMMU were enrolled in our study during a period of 6 months(July2014 to December 2014).

**Determining compliance patterns among TB patients:** To determine compliance patterns among pulmonary TB patients, compliance patterns were

assessed in relation to demographic, health related as well as disease and medicine-related factors. To measure compliance, respondents were asked whether they had ever missed a dose of their TB treatment.

**A) Compliance patterns among TB patients by age group:** Respondents aged 26-55 years were the most non-compliant.The most compliant respondents were aged more than 65 years(5%) (Table-I).

**Table-I**  
*Compliance patterns by respondents' age group (N=106)*

	15-25 years	26-35 years	36-45 years	46-55 years	56-65 years	>65 years	total
Missed TB dose before	13%	24%	24%	24%	10%	5%	100%
Never missed TB dose	16%	21%	20%	26%	13%	4%	100%

**B) Compliance patterns among TB patients by gender** Of the 87 respondents who reported to have never missed a dose of their TB drugs, 49 (56%) were females and only 38 (44%) were males. This is shown in table 2 below. Gender was not statistically associated with non-compliance to TB treatment (P=0.636) (Table-II).

**Table-II**  
*Compliance patterns by respondents' gender (N=106)*

	Male	Female	Total
Missed TB dose before	56%	44%	100%
Never missed TB dose	44%	56%	100%

**C) Compliance patterns among TB patients by educational level**

Of the respondents who have higher secondary, 17% had never missed a dose of their TB drugs before. Of the participants with a Graduation and post graduation, 12% and 9% had never missed a dose respectively. Thirty one (31 %) participants who had secondary education level had never missed a dose of their TB drugs and 12% of participants with no education at all had never missed a dose. These statistics are presented in table 3 below. However, education level was not statistically associated with noncompliance to TB treatment (P=0.168) (Table-III).

**Table-III**  
*ompliance patterns by respondents' educational level (N=106)*

	Noschool	Primary	Secondary	H.Secondary	Graduat	P.Graduate	Total
Missed TB dose before	5%	11%	18%	36%	16%	14%	100%
Never missed TB dose	12%	19%	31%	17%	12%	9%	100%

**D) Compliance patterns among TB patients by whether respondents believed that TB can result to death if not treated**

Of the respondents who believed that TB can result in death if not treated, 98% had never missed a dose of their TB drugs before, whilst only 2% of the participants who did not believe that TB can result to death if not treated had never missed a dose. This is shown in table 4 below. Not believing that TB can result in death if not treated was statistically associated with non-compliance to TB treatment (P=0.04) (Table-IV).

**Table-IV**

*Compliance patterns by whether respondents believed that TB can result in death if not treated (N=106)*

Believed that TB can result in death if not treated	Believed	Did not believed
Missed TB dose before	2%	98%
Never missed TB dose	98%	2%
Total	100%	100%

**E) Compliance patterns among TB patients by whether respondents believed that TB can be cured if treatment is taken daily for the correct duration**

Of the participants who believed that TB can be cured if treatment is taken daily for the correct duration, 97% had never missed a dose of their TB drugs before, whilst only 36% of the respondents who did not believe had never missed a dose. This is shown in table 5 below. Not believing that TB can be cured if treatment is taken daily for the correct duration was not statistically associated with non-compliance to TB treatment (P=0.451) (Table-V).

**Table-V**

*Compliance patterns by whether respondents believed that TB can be cured if treatment is taken daily for the correct duration (N=106)*

Believed that TB can be cured if treatment is taken daily for the correct duration	Believed	Did not believed
Missed TB dose before	3%	64%
Never missed TB dose	97%	36%
Total	100%	100%

**F) Compliance patterns among TB patients by participants' responses on why it is important to take TB treatment for the prescribed duration**

Of the respondents who indicated that it is important to take TB treatment for the prescribed duration in order to prevent drug resistance, 80% had never missed a dose of their TB treatment. Those participants who indicated that it is important to take TB treatment for the prescribed duration to be cured, 98% had never missed a dose of their TB treatment, whilst 81% of those who said to prevent the spread of TB, had never missed a dose of their TB treatment.

Of the participants who said to prevent death, 88% had never missed a dose. This is shown in table 6 below. This factor was not statistically associated with compliance or non-compliance to TB treatment (P=0.289) (Table VI)

**Table-VI**

*Compliance patterns by whether respondents believed that TB can be cured if treatment is taken daily for the correct duration (N=106)*

Importance of taking TB treatment for the prescribed duration	To prevent drug resistance	To be cured	To prevent spread of TB	To prevent death
Missed TB dose before	20%	2%	19%	12%
Never missed TB dose	80%	98%	81%	88%
Total	100%	100%	100%	100%

**G) Compliance patterns among TB patients by participants’ responses on healthcare workers’ attitudes at the clinic/facility of treatment**

Of the respondents who reported healthcare workers in the clinic or facility of treatment to be friendly, 77% had never missed a dose of their TB drugs before, 78% of those who reported healthcare workers to be caring had never missed a dose. Of the participants who indicated that healthcare workers were rude, 21% had never missed a dose whilst 22% of those who reported that healthcare workers were uncaring had never missed a dose. This is shown in table 7 below. Bad healthcare workers’ attitudes were statistically associated with noncompliance to TB treatment (P=0.02) (Table VII).

**Table-VII**

*Compliance patterns by participants’ responses to healthcare workers’ attitudes at the clinic/facility of treatment (N=106)*

Health care workers’ attitudes at facility of treatment	Friendly	Caring	Rude	Uncaring
Missed TB dose before	23%	22%	79%	78%
Never missed TB dose	77%	78%	21%	22%
Total	100%	100%	100%	100%

**H) Compliance patterns among TB patients by participants’ responses on the distance travelled to collect TB medicines**

Of the respondents who travelled <5km to collect their TB medicines, 35% had never missed a dose of their TB drugs before, whilst 33% of the participants who travelled 5-10 km had never missed a dose. Of the respondents who travelled 11-15km, 23% had never missed a dose whilst of those who travelled > 15km, 8% had never missed a dose. This is shown in table 8 below. Longer distance travelled to clinic to collect TB medicines was statistically associated with noncompliance to TB treatment (P=0.015) (Table VIII).

**Table-VIII**

*Compliance patterns by participants’ responses on the distance travelled to collect TB medicines (N=106)*

Distance travelled to collect TB medicines	<5 Km	5-10 Km	11-15 Km	>15 Km
Missed TB dose before	65%	67%	77%	92%
Never missed TB dose	35%	33%	23%	8%
Total	100%	100%	100%	100%

**I) Compliance patterns among TB patients by participants’ responses on whether TB can be cured by using traditional medicines**

Of the respondents who believed that TB can be cured using traditional medicines, 23% had never missed a dose of their TB treatment before, whilst of those who did not believe that TB can be cured using traditional medicines, 77% had never missed a dose, as shown in table 9 below. Believing that TB can be cured using traditional medicines was statistically associated with noncompliance to TB treatment (P=0.025) (Table IX).

**Table-IX**

*Compliance patterns by participants’ responses on whether TB can be cured by using traditional medicines (N=106)*

TB can be cured by using traditional medicines	Yes	No
Missed TB dose before	77%	23%
Never missed TB dose	23%	77%
Total	100%	100%

**J) What was the reason (s) for missing your TB medication**

A total of 62 TB patients indicated that they had missed their dose(s) of TB treatment. Of those who indicated they had, 19 (31 %) reported that they felt better and as a result felt no need to continue taking their treatment. Fourteen (22%) missed their doses as a result of side effects whilst only 2 (3%) patients reported that they had been taking traditional medicines at the time and decided not to continue taking TB treatment A total of 27 (44%) respondents highlighted other reasons and these included; lack of money to go to the clinic for TB treatment, long distance to the clinic and being out of the country for some time during their TBtreatment (Table X).

**K. Disease and medicine-related factors contributing to non-compliance to TB treatment**

Respondents were asked what are the reasons for not completing TB treatment and a higher proportion 174 (82%) indicated side effects of TB drugs as the main reason for not completing treatment. One hundred and twenty four (58%) indicated that TB treatment takes very long whilst 59 (28%) indicated too many pills to take as another reason for not completing treatment. Respondents who indicated the reason as TB can still be cured even if treatment is not completed were only 23 (11 %) (Table XI).

**Table-X**  
*Respondents' reasons for not completing TB treatment (N=106)*

	Treatment takes very long to complete		Side effects of anti TB drugs		Too many pills to take daily		TB can be cured even if treatment is not completed	
	Value	%	Value	%	Value	%	Value	%
Yes	62	58%	87	83%	30	28%	12	11%
No	44	42%	19	17%	76	72%	94	89%
Total	106	100%	106	100%	106	100%	106	100%

**Table-XI**  
*A summary of factors contributing to non-compliance to TB treatment amongst pulmonary TB patients*

Client-related factors	Not believing that TB can result in death if not treated
Socio-cultural factors	Belief in traditional medicines for curing TB
Health service related factors	1. Bad healthcare worker attitudes 2. Long distance to the clinic/facility of treatment
Disease and medicine- related factors	1. TB treatment duration- treatment takes too long 2. Pill burden- too many pills to take daily

**Discussion:**

TB treatment non-compliance is recognized as one of the major challenges in achieving TB control<sup>8</sup>. Factors contributing to non-compliance to TB treatment discussed in this study include client related, health service related, sociocultural as well as disease and medicine related factors.

Although majority of the respondents were in the 36-45 age category, participants in the 46-55 years category were more compliant (26%) to TB treatment compared to the 36-45 age category (20%). There was no statistical significance indicating a relationship

between age and compliance to TB treatment (P=0.471). These findings are consistent with a study conducted by Modise<sup>9</sup> in the Free State in which age was also not associated with non-compliance to TB treatment.

Compliance to TB treatment was higher in females (56%) compared to males (44%). Statistically gender was not associated with non-compliance to TB treatment (P=0.636). A study conducted by Kaona, Tuba, Siziya and Sikaona<sup>41</sup> in Zambia and another study by Erhaboret al.<sup>10</sup> in Nigeria got similar findings that gender is not statistically associated with non-compliance to TB treatment.

Respondents who had secondary level education were most compliant (31%) compared to participants with no schooling (12%). Statistically educational level was not associated with non-compliance to TB treatment ( $P=0.186$ ). This is contradictory to findings from a study by Gad et al.<sup>11</sup> in which low educational levels were associated with non-compliance to TB treatment.

83% indicated that the long distance to the clinic was the reason for poor compliance to TB treatment. This finding is similar to a report from a study by Malik & Ahmad<sup>12</sup> which reported that 93% of the non-compliant TB patients had a long distance to travel before accessing care. In the current study, the most non-compliant participants were residing more than 15km from the TB control clinic (92%).

Health care worker attitudes and accessibility issues (distance and cost of getting to the health facility) have been shown in other studies to be important factors affecting TB treatment compliance<sup>13</sup>. This is because health worker attitudes, such as being unfriendly to patients, tend to deter patients from seeking treatment or coming to collect medicines once they are finished<sup>13</sup>. In this study, negative attitudes of health care workers were associated with non-compliance to TB treatment ( $P=0.021$ ). This is consistent with findings from the study conducted by Malik & Ahmad<sup>12</sup> which found that health care worker attitudes in the clinic where patients receive their TB treatment is associated with non-compliance to TB treatment.

Reasons that were significantly associated with non-compliance to TB treatment in this study were that TB treatment takes very long to complete ( $P=0.000$ ) and the pill burden or too many pills to take ( $P=0.023$ ). This is in line with findings from a study conducted by Motlhanke<sup>14</sup> which found that patients who believed that TB treatment takes very long were more likely to be non-compliant to treatment because they reported that they get tired of the treatment and end up not taking it as prescribed.

Distance travelled by TB patients to the clinic for treatment was also associated with non-compliance to TB treatment ( $P=0.015$ ). This is in line with other studies which also found that the further the clinic was from the patient the greater the probability that the patient would be non-compliant to TB treatment<sup>15</sup>.

11% of the participants indicated that they had missed a dose of their TB treatment because they were using traditional medicines which were perceived to be a complimentary drug to treat TB.

Patient knowledge about the disease and its treatment enhance treatment compliance to treatment<sup>15</sup>. Compliance was higher in participants (89%) who believed they were suffering from TB compared to participants who did not believe (11 %). Not believing that we are suffering from TB was not statistically associated with non-compliance to TB treatment ( $P=0.503$ ). This was similar to findings by Motlhanke<sup>14</sup> in a qualitative study conducted in Limpopo which found that 'denial' or not believing that we are suffering from TB is not associated with non-compliance to TB treatment.

Compliance was higher in patients who believed that the TB diagnostic method used is accurate (81 %) compared to patients who did not believe (19%). Not believing that the TB diagnostic method used was accurate was not associated with non-compliance to TB treatment ( $P=0.684$ ). A study by Tshabalala<sup>16</sup> conducted in Tembisa also found that patient's perceptions about the disease and its diagnosis is not associated with non-compliance to TB treatment.

Compliance was higher among patients who knew that TB can result in death if not treated (98%) compared to patients who were not aware that TB can result to death if not treated (2%). Not believing that TB can result to death if not treated was statistically associated with non-compliance to TB treatment ( $P=0.04$ ). A study by Gad et al.<sup>17</sup> also confirmed that lack of patients knowledge about TB treatment was associated with non-compliance to TB treatment.

Compliance was higher (97%) among patients who knew that TB can be cured if TB treatment is taken daily for the correct treatment duration, compared to patients who did not know (36%). Not believing that TB can be cured if treatment is taken daily for the correct treatment duration was not associated with non-compliance to TB treatment ( $P=0.451$ ). This is in line with findings from a study by Chani<sup>13</sup> in Namibia, which stated that patients who did not believe that TB treatment should be taken for the correct duration were likely to be non-compliant to TB treatment.

Compliance was higher amongst patients who indicated that it is important to take TB treatment for the prescribed duration in order to be cured (98%) compared to those who reported that is important to take TB treatment for the prescribed duration to prevent drug resistance (80%). This factor was not statistically associated with non-compliance to TB treatment ( $P=0.289$ ).

Socio-cultural factors will cover patients' beliefs in traditional medicines and components of the health belief model. Belief in traditional medicine for curing

TB was associated with non-compliance to TB treatment ( $P=0.025$ ). This is consistent with findings from other studies which state that patient's beliefs and use of traditional medicine during TB treatment are associated with non-compliance to treatment<sup>14, 16</sup>.

### Conclusion:

This study revealed non-compliance to TB treatment amongst pulmonary TB patients was associated with not believing that TB can result in death if not treated, beliefs in traditional medicines for curing TB, bad health-care worker attitudes, long distance to the clinic/facility of treatment, feeling that TB treatment takes too long and the pill burden. Non-adherence to prescribed treatment could lead to unfavorable outcomes, continued transmission and even drug resistance.

### Limitations:

This study was not without limitation. One of the limitations of the study was small sample size. Also it was a single centre study. Only patients of Bangabandhu Sheikh Mujib Medical University (BSMMU), Shahbag, Dhaka Bangladesh were taken for the study. So this will not reflect the overall picture of the country. A large scale study needs to be conducted to reach to a definitive conclusion. Study was conducted in a tertiary care hospital which may not represent the real scenario of primary or secondary care centre.

### Conflict of Interest:

The authors stated that there is no conflict of interest in this study.

### Funding:

No specific funding was received for this study.

### Ethical consideration:

The study was conducted after approval from the ethical review committee. The confidentiality and anonymity of the study participants were maintained

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