



## **Factors Associated with Compliance to Anti-Tuberculosis Treatment Among Iraqi TB-Patients in Al-Najaf**

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**Original Article**

### **Summary**

*Tuberculosis (TB) is an endemic disease in Iraq, compliance with its treatment play a significant role in its prevention and control. This cross-sectional study aimed to assess the compliance to anti-tuberculosis treatment among Iraqi TB-patients in Al-Najaf , the study carried out in six health sectors in Al-Najaf city included 119 TB patients who were registered in 41 Primary Health Care Centers (PHCC). Data collected through interviews with the patients attending PHCC for routinely treatment according to direct observational therapy short course (DOTs).*

*Findings revealed that 43 patients (36.1%) were incompliant to treatment Majority of incompliant patients were males 27 (62,8%). Urban resident patients represented (63.9%). Low-income levels were found to be the most strongly associated factor with the outcome (P-value 0.025).TB patients living in urban areas, male patients, married patients, patients aged 21-60 years, lower educated, found any embarrassment or shame of mentioning the disease were at higher risk to weak compliance. The period of treatment above two months , feeling better during treatment, remote PHCC were associated with interruption of treatment and weak compliance to treatment among patients. In conclusion, Feeling better after initial treatment, low education level of patients, male gender, being married, urban residence, low income, hard occupation, a history of travel, long-distance from treatment sites, poor knowledge of the duration of TB treatment were the main reasons for stopping treatment and incompliance*

**Keywords:** *Tuberculosis, epidemiology, treatment, compliance.*

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## 1. INTRODUCTION

Tuberculosis (TB) is an infectious disease caused by *Mycobacterium tuberculosis* (M.TB). The disease primarily affects the lungs and causes Pulmonary Tuberculosis (PTB). It can also affect the intestine, meninges, bones and joints, lymph glands, skin and other tissues of the body. The disease is usually chronic with cardinal features like persistent cough with or without expectoration, intermittent fever, loss of appetite, loss of weight, chest pain, night sweats and hemoptysis .(1) Transmission of M.TB is usually by inhalation of airborne mucus droplet nuclei, that contain M. TB. Airborne transmission of *M. Bovis* and *M. Africanum* also occurs. *M. Bovis* can penetrate the gastrointestinal mucosa or invade the lymphatic tissue of the oropharynx when large numbers of the organism are ingested (contaminated unpasteurized milk).(2). TB is a major contributor to the global burden of disease. Poor adherence to treatment is common despite various interventions aimed at improving treatment completion.(3) Many factors influencing non-compliance. They range from the individual patient, health care provider, health care delivery patterns and socio-economic related factors influencing non-adherence to TB treatment.1 Defaulter is a patient whose anti TB treatment was interrupted for 2 consecutive months or more.(4). The most commonly used diagnostic tool for TB is a simple skin test, Blood tests may be used to confirm or rule out latent or active tuberculosis, chest X-ray or a CT scan, sputum samples are tested for TB bacteria.(5) Since the 20th century the Bacille Calmette-Guérin (BCG) vaccine there is only one defensive tool against *Mycobacterium TB* (attenuated virulence of *M. Bovis*). (6) All new cases are treated according to direct observational therapy-short (DOTs). Patients receive daily ethambutol, rifampicin, isoniazid, pyrazinamide and streptomycin followed by four months of rifampicin and isoniazid (continuation phase). The treatment is directly observed during the intensive phase for all new bacteriologically confirmed Pulmonary TB cases, those who are clinically diagnosed or have extrapulmonary Tuberculosis (EPTB) are supplied every two weeks with anti-TB drugs daily.(7).

The non-adherence or non-compliance to tuberculosis treatment represents an emerging public health problem, since it is a barrier in the prevention and control of TB, where poor adherence can mean, in addition to the prolongation of the infectious state and resistance to medication, disease relapse, and even death. Non-adherence may be due to several factors. According to various studies.

Therefore the current study aimed to determine the factors associated with weak compliance to treatment among TB patients in both urban and rural areas of Al-Najaf city.

## **2. PATIENTS and METHODS**

The study was carried out in six health sectors in Al-Najaf city and included 41 PHCC. All patients with diagnosed pulmonary tuberculosis and EPTB during a period of study time in Al Najaf city were enrolling in this study.

**Inclusion criteria:** All patients diagnosed with TB and registered in the included PHCCs in Al-Najaf during the study period.

**Exclusion criteria:**

The inability to contact defaults with and refused to take treatment.

**Study design:** Health Facility Based, Cross-sectional study.

**Study Period:** from September 2017 to March 2018.

**Sample:** A purposive sample of all patients with PTB and EPTB:

- a) That attending to (PHCC) for routinely treatment according to (DOTs).
- b) That come to the centre of respiratory and chest diseases for diagnosis and treatment
- c) Contact and interview with patients that were interrupting treatment or defaults and neglects it.
- d) These meeting points were, in many cases, the homes of the patients.

**Tools and methods for data collection:**

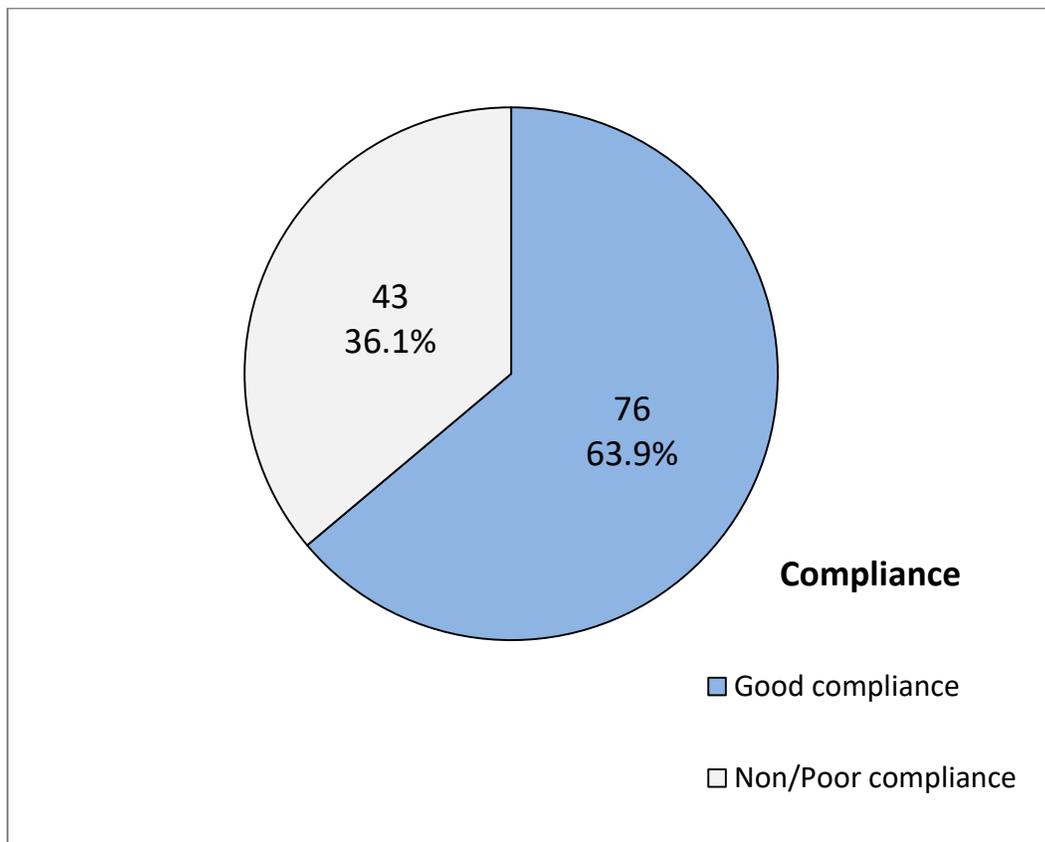
- a) By using a questionnaire: to collect data through direct interviews with PTB and EPTB patients or his family.
- b) Reviewing the records of study sample: Some information about the default TB patients was taken from their patients in PHCC or chest and respiratory diseases centre.

**Data management and analysis:** Data coded, entered and analyzed using SPSS software version 20. Appropriate statistical tests and procedures were applied accordingly, at level of significance of 0.05.

### 3. RESULTS

In total, 119 TB patients were registered in 2017. Out of 119 patients, 69 were male and 50 were female, 43 were incompliant to treatment and 76 are compliant to treatment (figure 1). The majority of incompliant to treatment were males 27(62, 8%). The age of participants ranged from 1 to 80 years, with a mean of 39.91years. The highest percentage that had TB was seen in the age group 21-40 years 42, followed by age group 41-60 years 41, and also higher incompliant to treatment in these two age groups. The study was found most of the TB patients were married 83(69.7%) and most of the defaulters also married (72.2%). The low family income is more affected by the increase percent of incompliant. The majority of defaulters (60.4%) were always in debt or sometimes in debt. And can describe the compliance among educated level, by report the primary education and low educate is more incompliant to treatment, and found more complaint patients in secondary level and above. Most of the TB patients were from urban areas as well as defaulters. if the primary health care centers were remote and increase the period of treatment above two months that lead to elevated incompliance to treatment among patients. According to the type of job, the study reported more chance to have tuberculosis among taxi drivers, military (soldier) and students and reported the student is more compliance to treatment and the taxi driver is more likely to interrupted and weak compliance to treatment.

Income is enough for living were found to be the most strongly associated factor with the incompliance (P-value 0.025).TB patients living in urban areas, male patients,  $\leq$  primary education level and were found any embarrassment or shame of mentioning the disease those higher risk to weak compliance. The period of treatment (34.9%) and feeling better during treatment (30.2%) is the most factors that causes interrupted the treatment (Tables 1,2 & 3).



*Figure 1. Distribution of 119 TB-patients according to their compliance to TB-treatment*

**Table 1. Demographic and social characteristics of the studied group**

Characteristics		Non/poor compliance		Good Compliance		Total	P. value
		No	%	No.	%		
Gender	Male	<b>27</b>	39.1	<b>42</b>	60.9	<b>69</b>	0.082
	Female	<b>16</b>	32.0	<b>34</b>	68.0	<b>50</b>	
Age in years	<20	<b>4</b>	21.1	<b>15</b>	78.9	<b>19</b>	< 0.001
	21-40	<b>18</b>	43.9	<b>23</b>	56.1	<b>41</b>	
	41-60	<b>17</b>	40.5	<b>25</b>	59.5	<b>42</b>	
	>60	<b>4</b>	23.5	<b>13</b>	76.5	<b>17</b>	
Marital status	Married	<b>31</b>	37.3	<b>52</b>	62.7	<b>83</b>	< 0.001
	Unmarried*	<b>12</b>	33.3	<b>24</b>	66.7	<b>36</b>	
Family income	Enough	<b>17</b>	28.3	<b>43</b>	71.7	<b>60</b>	< 0.001
	Not enough	<b>26</b>	44.1	<b>33</b>	55.9	<b>59</b>	
Education level	Primary or less	<b>27</b>	40.9	<b>39</b>	59.1	<b>66</b>	0.036
	Secondary	<b>7</b>	26.9	<b>19</b>	73.1	<b>26</b>	
	College	<b>9</b>	33.3	<b>18</b>	66.7	<b>27</b>	
Residence	Urban	<b>23</b>	30.3	<b>53</b>	69.7	<b>76</b>	0.002
	Rural	<b>20</b>	46.5	<b>23</b>	53.5	<b>43</b>	
Health center remote		<b>27</b>	43.5	<b>35</b>	56.5	<b>62</b>	0.029
Duration on Treatment	1-2 month	<b>11</b>	30.6	<b>25</b>	69.4	<b>36</b>	< 0.001
	3-6 month	<b>27</b>	35.1	<b>50</b>	64.9	<b>77</b>	
	7-9 month	<b>5</b>	83.3	<b>1</b>	16.7	<b>6</b>	
Type of jobs	Employed	<b>7</b>	41.2	<b>10</b>	58.8	<b>17</b>	0.028
	Unemployed	<b>35</b>	36.5	<b>61</b>	63.5	<b>96</b>	
	Students	<b>1</b>	16.7	<b>5</b>	83.3	<b>6</b>	

\*Unmarried= single, widow or divorced

**Table 2. Factors associated with Non/weak compliance to anti-TB treatment**

Characters	OR (95% CI OR)	P. Value.
Gender (male)	1.77 (0.92 – 2.7)	0.033
Resident ( urban areas )	1.86 (1.13 – 4.1)	0.03
≤ Primary Education	1.32 (0.54 – 3.2)	0.034
Income is enough for living	2.00 (1.87 – 4.64)	0.025
Stigma about the disease	0.87 ( 1.21 – 2.06)	0.039

OR: odds ratio, CI: confidence interval

**Table 3. Factors contributed to interruption of treatment**

Factor	Frequency	Per cent
Busywork	5	11.6
Period of treatment	15	34.9
Travel	5	11.6
Feeling better	13	30.2
Side effects of therapy	5	11.6

#### 4. DISCUSSION

We found that most of TB was males this might be because females have fewer opportunities to access TB treatment centres, due to restrictions in movement, stigma might have a role in this; as females may hide their disease from husbands and local communities to avoid divorce. This result is consistent with the result of the studies. (8, 9, 10) There were 43(36.1%) of the TB patients in Al-Najaf city had weak compliance to treatment most of them were males 27(62.8%). This might be because most males were

workers and stop treatment when feeling better and this finding was similar to the result from studies. (8, 9, 11)

The highest percentage that had tuberculosis disease was seen in the age group 21-60 years. The productive population (21-60) years reported poor adherence to treatment because they return to work after feeling better and were more likely to travel and interrupted treatment. These results were consistent with similar studies. (11, 12) In contradictory to our study, a similar study reported that age did not affect compliance.<sup>13</sup> The patients from (0-20) years and >60 years were most compliant to treatment because more likely to support their family and community in our society. Married patients were more likely to have tuberculosis disease because crowded in the family and that more in-compliant to treatment (72.2%). A similar study was also reported that most of the defaults among married patients. (11) There were no divorced patients in the study period in the same area.

The income of the family is mostly affected to compliance and make the patients with low income to weak compliance to treatment and interrupted it, especially if found any embarrassment or shame of mentioning the disease in the place work and community because of low educational level and lack of awareness about treatment. These findings were tallying with many studies (8, 11) Another study reported that there were no significant differences between non-compliance and compliance groups in terms of family income.<sup>(13)</sup>

The low educated level  $\leq$  primary (21.2%) is most likely to have weak compliance with treatment because of low knowledge and maybe the reason probably is the effect of education on lifestyle and this was comparable with findings from research. (1,8,9,11) The other possibility is the effect of economic status on the education level. People from well to do families have more facilities for continuing their education, as well as the secondary level and above(24.35%) is more compliant to treatment because of high educational status. The present study shows that majority of patients (63.9%) who had tuberculosis were from urban areas because of the crowded residence. This is because the rural community had less availability of health services and treatment which leads to a lack of early detection of tuberculosis as well as lack of awareness of food and health education in this community. But the study reported the patients in urban areas (53.5%) were more

non-compliance in contrast with the study (8,9). The remote of the primary health care centre is most affected cause to interrupted and weak compliance to treatment and may be due to low-income status because of difficult access to receive treatment, similarly seen in studies. (1,13)

The period of treatment from 3-6 months in the continuous phase is more likely to incompliance with treatment and also the lowest compliance to treatment in period 7 months and above may be due to feeling better after few weeks of treatment or not know the duration of treatment. A similar finding has been observed in many studies as a cause for non-compliance. (8, 9, 12). The study found most of the defaulters were non-workers. These might be a lack of money to visit the health centre for treatment similar to study (14) and in contrast to other studies.(13) The type of occupation is of most importance to compliance and non-compliance with treatment. The study was reported the taxi driver and soldier were most likely to infect with tuberculosis and in the patients in the same job above is most in compliant to treatment because busy in life and lack of awareness to health education and closer to people in the life as well as the student is the most complaint to treatment. The gender (male), patients >40 years old, those who live in an urban area more affected because hard-working, busy and closed to many people and contact with their in crowded life, that makes more related to infection with TB and weak compliance to treatment. The low educational level  $\leq$  primary education is more likely to weak compliance to treatment because of their low knowledge and health education, Also the income of the family is mostly affected to compliance and make the patients with low income to weak compliance to treatment and interrupted it, especially if found any embarrassment or the shame of mentioning the disease in the place work and community because low educational level. The important thing in the study is detecting the common reasons for weak compliance and interrupted treatment, and in this study reported the feeling better after initial treatment and period of treatment that continue to six months that makes compliant to treatment is most difficult special if busy, working, low knowledge, no health education and no family support

## **5. CONCLUSIONS**

We concluded that feeling better after initial treatment, low education level, male patients, being married, urban residence, low income, hard occupation, a history of travel, long-distance from treatment sites, poor knowledge of the duration of TB treatment were the main reasons for stopping treatment and significantly influence and increased the risk of defaulting or weak compliance to treatment among tuberculosis patients

**Ethical Clearance:** Ethical clearance and approval of the study are ascertained by the authors. All ethical issues and data collection were in accordance with the World Medical Association Declaration of Helsinki 2013 of ethical principles for medical research involving human subjects. Data and privacy of patients were kept confidentially.

**Conflict of interest:** Authors declared none

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