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Research Article

**FACTORS CONTRIBUTING TO POOR COMPLIANCE WITH
ANTI-TB TREATMENT AMONG TUBERCULOSIS PATIENTS**¹Dr. Rafia Jamil, ¹Dr. Mehreen Fatima Khan, ²Dr. Saba Ali¹Mayo Hospital Lahore²Medical Officer, Kahna Nau Hospital (Managed by the Indus Hospital)**Abstract:**

Tuberculosis (TB) has made a comeback. It has become a resurgent public health problem in developing countries in the tropics and is the leading cause of death from any single infectious agent. Non-compliance to anti-tuberculosis treatment is the most serious problem in TB control. A cross-sectional study was conducted to investigate the determinants of poor compliance with anti-tuberculosis treatment among tuberculosis patients in Gujranwala Pakistan in 2017. A total of 309 patients were included in the study of which 130 were tuberculosis patients who defaulted treatment and 260 were those compliant to treatment. Data collection was done by interviewing the patients and collecting clinical and laboratory data from their medical records. Using multiple logistic regression analysis, patients who were not on direct observed therapy (DOT) lived distant to the health facility. Anti-TB treatment should be accessible to patients at the nearest health center from their residence. Interventions with health education programs emphasizing the benefits of treatment compliance should be implemented by further large-scale multi-centered studies.

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INTRODUCTION:

The World Health Organization (WHO) has declared tuberculosis a global public health emergence (TB) (Kochi, 2007; WHO, 2008). The disease causes significant mortality and morbidity globally and with the advent of the human immune deficiency virus (HIV) epidemic, TB is regarded as a world-wide public health challenge (Kochi, 2007; WHO, 2008). The rising incidence of TB due to the effect of HIV in both developed and developing countries is well recognized (Narain *et al*, 2008). Besides well-known risk factors, the most important unresolved challenge in TB control is the treatment completion. Treatment will only be effective if the patient completes the regimen which includes a combination of drugs recommended by the physicians. Poor compliance contributes to the worsening of the TB situation by increasing incidence and initiating drug resistance. Resistance to anti-TB drugs has also emerged as an important obstacle in the control of the disease. World-wide patient compliance with anti-TB therapy, with an estimate of as low as 40% in developing countries, remains the principle cause of treatment failure (Fox, 1983). The World Health Organization recommends at least 85% cure rate of all diagnosed TB cases (WHO, 2002). In order to achieve this cure rate, compliance needs to be in the order of 85-90 %.

It is therefore beneficial to study factors related to poor compliance, default and abandonment of treatment, which are responsible for drug resistance and increased incidence of TB. Factors that have been reported as being associated with increased compliance by many studies were directly observed therapy.

In this regard, a study was conducted to assess non-compliance and determine treatment-related factors, disease related factors, knowledge and attitude related factors and socio-demographic factors, which may have influenced the poor compliance of TB patients towards anti-TB treatment in Gujranwala Pakistan. Even though similar studies have been done in other parts of the world, there was still a need to conduct this study in this region as there are differences compared to other countries in many aspects such as culture, demography, socio-economic status, knowledge level, drugs used, tolerance to the side effects of drugs. The results of other studies may not be relevant to apply to the context of this region. The expected benefits from conducting this study included determining possible solutions to the existing treatment default problem, to help reduce the transmission and incidence of TB and to contribute towards the improvement of TB control programs especially in planning intervention

measures.

MATERIALS AND METHODS:

A cross-sectional study was conducted between June and December 2017 at TB Clinic DHQ Hospital Gujranwala Pakistan. The study population was TB patients registered at the TB clinic, DHQ Hospital. All subjects were confirmed as TB patients by clinical examination and laboratory investigations (sputum for acid fast bacilli positive status, chest X-ray, Tuberculin test). Patients were referred by other health facilities if they were suspected of suffering from TB and diagnosed and treated at the TB clinic. Patients were ineligible for the study if they were too ill to be interviewed, were suffering from psychiatric illness and gave an incorrect address or could not be traced or died. There was no age exclusion.

The frequency and duration of usual treatment for each patient at the chest clinic is determined by the physician. There were different treatment regimens which consisted of a combination of two or three or four standard anti-TB drugs namely streptomycin, isoniazid, rifampicin and pyrazinamide.

The definitions of compliance and non-compliance were determined by the Ministry of Health based on World Health Organization guidelines. Compliance was defined as completion of prescribed treatment or as missing less than 25% of treatment within the specified duration. Patients who complied with treatment but had not completed the treatment course, were also excluded from the study since their final compliance status was yet to be determined. The compliant patients were recruited to the study only when they came for follow-up one month after completion of the course of treatment. They were eligible to be included into study at the very first visit for follow-up for clinical check-up and other laboratory tests after treatment completion.

Disease related factors were obtained by physician during history taking and physical examination sessions when patients were diagnosed as TB. The research team collected this information from medical records of patients. Two trained research assistants conducted the interviews and completed the questionnaires for both compliance and non-compliance groups (for non-compliance group, either at chest clinic or at their residence). The responses from the patients who were younger than 15 years old were counterchecked by asking their accompanying parents or guardians. The results of laboratory investigations and other information were also collected from the medical records of individual patients.

The questionnaire which had been pre-tested on 50 patients prior to data collection included the following variables: (1) socio-demographic and other related factors such as age, gender, ethnicity, marital status, educational level, occupation, family income, nationality, residential locality (urban/rural), (2) knowledge about TB and attitude towards anti-TB treatment, (3) treatment related factors such as treatment regimen, knowledge about complete dosage of treatment, mode of therapy, side effects of oral and parenteral drugs, problem with distance between residence and treatment center, waiting time, direct observed therapy (DOT) status, (4) disease related factors such as site of tuberculosis (pulmonary/extra-pulmonary), sputum smear result, severity of the disease, type of tuberculosis (first time diagnosis/relapse/multi-drug resistant tuberculosis) and human immunodeficiency virus (HIV) carrier status, and (5) other risk factors such as BCG vaccination status, presence of BCG scar, smoking habit, alcohol intake, intravenous drug user (IVDU) status, movement of residence during the course of treatment and satisfaction with services and staff receptiveness towards patients. The questionnaire was constructed based on factors demonstrated previously to be related to non-compliance or considered to be clinically important.

RESULTS:

There were 709 TB patients who attended chest clinic during study period. A total of 309 patients completed anti-TB treatment. Among the other 400 patients, 237 were not compliant. A total of 58 patients could not be recruited as they had died and 105 were still undergoing treatment and were therefore ineligible for the study. Thus, the compliance rate was reported as 56.6% (309/546).

Among the compliant group, 299 patients were eligible for the study and when approached, 260 agreed to participate in the study. For 237 patients in non-compliance group, a total of 70 patients could be retrieved and among them, 51 were eligible for the study and when approached, 46 volunteered to be included in the study. Ineligibility of most of the patients in both groups was mainly because the patients were ill to be interviewed. Among 167 non-compliance patients who could not be retrieved, 26 patients gave wrong address and 50 patients could not be traced at home/ unwilling to accept home visit

when contacted by phone. When home visits were made, seven patients were not at home or did not consent and 84

patients were willing to participate in the study. Therefore finally, there were 130 non-compliant and 260 compliant patients who were recruited to the study giving the ratio of non-compliance to compliance as 1:2. The response rates for compliance and non-compliance group were 87% and 60% respectively and it was statistically significantly different ($\chi^2=50.8$, $p<0.001$). It showed that non-compliant patients were more reluctant to participate in the study.

Among 390 patients recruited to the study, mean age was 43 ± 17 years with a range of 6 to 84 years. A total of 66% of non-compliance group were males. The Malay ethnic group was predominant comprising 94% of all patients. Site of the disease was predominantly pulmonary (89%) cases. Majority of patients fell into the category of mild and moderate severity of disease by X-ray findings. Among 63 intravenous drug users, 11% were HIV positive (7 out of 63).

On univariate analysis, there were no significant differences in socio-demographic characteristics between non-compliance and compliance groups (Table 1). Among attitude variables, health seeking attitude towards treatment (over the counter treatment) was found of borderline significance which was marginally better in compliance group (Table 2). Among treatment related factors, there were significant differences between compliance and non-compliance groups regarding convenience with clinic day schedule (those who were inconvenient with schedule had about 2.5 times higher odds of being non-compliant), DOT (those who were not on DOT had seven times higher odds of being non-compliant), problem with distance to health facility (those who had problem with distance had two times higher odds of being non-compliant) and patients who lived more than ten kilometers away from health facility had seven and half times significantly higher odds of being non-compliant (Table 3). Disease related factors did not show any significant difference between two groups (Table 4). Among other contributing factors, intravenous drug Knowledge and attitude factors contributing to poor compliance with anti-TB treatment.

				Table 1					
Socio - demographic factors		contributing to		poor compliance with anti-TB treatment		(Univariate analysis).			
Variable		Non-compliance		Compliance		Odds ratio		^a LR	
		(n)(%)		(n)(%)		(95% CI)		(p-value)	
Sex	Male	248	86 (66)	162	(62)	1		0.56	(0.456)
	Female	142	44 (34)	98	(38)	1.18	(0.76-1.84)		
Age group	≤20	36	9 (7)	27	(10)	1		2.30	(0.890)
	21-40	160	57 (44)	103	(40)	1.34	(0.54-3.29)		
	41-60	118	38 (29)	80	(31)	0.56	(0.21-1.51)		
	>60	76	26 (20)	50	(19)	0.86	(0.31-2.37)		
Residence	Urban	151	51 (39)	100	(38)	1		0.02	(0.883)
	Rural	239	79 (61)	160	(62)	0.97	(0.63-1.49)		
Marital status	Married	268	93 (72)	175	(67)	1		0.82	(0.664)
	Never married	88	26 (20)	62	(24)	0.79	(0.47-1.33)		
	Widow / Divorce	34	11 (8)	23	(9)	0.90	(0.42-1.93)		
Ethnic group	Malay	367	122 (94)	245	(94)	1		0.02	(0.880)
	Chinese and Siamese	23	8 (6)	15	(6)	1.07	(0.44-2.60)		
Level of Education	Tertiary and Secondary	213	70 (54)	143	(55)	1		0.16	(0.923)
	Primary	118	41 (31)	77	(30)	1.08	(0.68-1.75)		
	Uneducated/not yet schooling	59	19 (15)	40	(15)	0.97	(0.53-1.80)		
Occupation	Government Servant	41	12 (9)	29	(11)	1		12.28	(0.139)
	Own business	25	9 (7)	16	(6)	1.46	(0.39-5.39)		
	Labourer+farmer	27	6 (5)	21	(8)	1.33	(0.36-4.87)		
	Housewife	83	30 (23)	53	(20)	1.62	(0.59-4.44)		
	Unemployed	68	28 (21)	40	(15)	2.43	(0.88-6.68)		
	Student	32	4 (3)	28	(11)	1.08	(0.30-3.92)		
	Retired	25	10 (8)	15	(6)	0.51	(0.09-2.73)		
	Others	89	31 (24)	58	(23)	0.91	(0.32-2.62)		
Monthly average income	Low (< RM 1,000)	354	119 (92)	235	(90)	1		0.14	(0.709)
	Middle and high (≥RM 1,000)	36	11 (8)	25	(10)	0.87	(0.41-1.83)		

		(Univariate analysis).							
Variable	Non-compliance (n)(%)		Compliance (n)(%)		Odds ratio (95% CI)		^a LR (p-value)		
Causes of TB									
Correct	215	74 (57)	141	(55)	1		0.95	(0.621)	
Incorrect	43	16 (12)	27	(10)	1.13	(0.57-2.23)			
Do not know	132	40 (31)	92	(35)	0.83	(0.52-1.32)			
Spread of TB									
Correct	296	102 (79)	194	(75)	1		1.05	(0.592)	
Incorrect	13	3 (2)	10	(4)	0.57	(0.15-2.12)			
Do not know	81	25 (19)	56	(21)	0.85	(0.50-1.44)			
Prevention of TB									
Correct	210	76 (68)	134	(57)	1		4.78	(0.092)	
Incorrect	45	13 (12)	32	(13)	0.72	(0.35-1.45)			
Do not know	92	22 (20)	70	(30)	0.55	(0.32-0.97)			
Seriousness of TB									
Yes	328	115 (89)	213	(82)	1		3.95	(0.139)	
No	36	7 (5)	29	(11)	1.22	(0.51-2.88)			
Do not know	26	8 (6)	18	(7)	0.54	(0.17-1.75)			
Preventable									
Yes	367	121 (93)	246	(95)	-		1.42	(0.493)	
No	5	1 (1)	4	(1)	0.51	(0.06-4.06)			
Do not know	18	8 (6)	10	(4)	1.63	(0.63-4.23)			
Curable									
Yes	358	121 (93)	237	(91)	1		1.38	(0.503)	
No	7	1 (1)	6	(2)	0.33	(0.04-2.74)			
Do not know	25	8 (6)	17	(7)	0.92	(0.39-2.20)			
Seeking treatment									
Hospital	318	109 (84)	209	(80)	1		7.63	(0.054)	
General practitioner	38	16 (12)	22	(8)	1.39	(0.70-2.77)			
Traditional 5	1	(1)	4	(2)	0.48	(0.05-4.34)			
Over counter	29	4 (3)	25	(10)	0.31	(0.10-0.90)			

Disease related factors contributing to poor compliance with anti-TB treatment

		(Univariate analysis).							
Variable	Non-compliance (n)(%)		Compliance (n)(%)		Odds ratio (95% CI)		^a LR (p-value)		
Sputum smear									
Positive	379	128 (98)	251	(97)	1		1.30	(0.255)	
Negative	11	2 (2)	9	(3)	0.44	(0.09-2.05)			
Site									
Pulmonary	348	118 (91)	230	(88)	1		0.49	(0.483)	
Extra-pulmonary	42	12 (9)	30	(12)	0.78	(0.39-1.58)			
Severity (by x-ray)									
Mild	221	71 (54)	150	(58)	1		3.37	(0.186)	
Moderate	128	40 (31)	88	(34)	0.96	(0.60-1.53)			
Severe	41	19 (15)	22	(8)	1.83	(0.93-3.59)			
Diagnosis									
First time diagnosed	353	118 (91)	235	(90)	1		0.02	(0.903)	
Relapse	37	12 (9)	25	(10)	0.96	(0.47-1.97)			
HIV status									
Negative	272	122 (94)	250	(96)	1		1.01	(0.316)	
Positive	18	8 (6)	10	(4)	1.64	(0.63-4.26)			

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