Original Research Article

Co-morbidities and addictions affecting treatment outcome in new smear positive cases in Amritsar city, Punjab, India

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ABSTRACT

Background: Although the current approach to TB control focuses on case detection and treatment, recent studies suggest that this strategy might not be sufficient to achieve this goal and it may also be necessary to reduce risk factors that contribute to the occurrence of tuberculosis infection and/or disease. Such risk factors may act at one of several steps in the natural history of the disease. The life time risk of breaking down to disease among those infected with TB is 10–15%, which gets increased to 10% per year amongst those co-infected with HIV. Other determinants such as diabetes mellitus, smoking tobacco products, alcohol abuse and malnutrition also increase the risk of progression from infection to TB disease.

Methods: The study was conducted on new smear positive patients registered under Directly observed treatment, short course (DOTS) in two Treatment Units (TUs) present in Amritsar city. The patients were enquired about their socio-demographic profile, family history, occupational history and associated co-morbidities and addictions. Data management and analysis was done by using Microsoft excel and SPSS version 17.00.

Results: Out of 250 patients, 149 (59.6%) were males and 101 (40.4%) were females. Male preponderance, with male to female ratio of 1.5:1 was seen. Out of the total 250 cases, 7.2% of the cases had associated diabetes mellitus, 1.2 % had hypertension and only 1 case was of asthma. While enquiring for addictions, it was observed that 28.8% of the cases were alcoholic, 17.2% were smokers, 8% had the habit of tobacco chewing and 6% were drug abusers. Favourable outcome was significantly higher in non-addicted cases while presence of co-morbidities was found to have no effect on the treatment outcome.

Conclusions: In the present study, it was observed that favourable outcome was significantly associated with the absence of addictions. So, it is concluded that prevention of tuberculosis should include effective screening especially among high risk groups in order to ensure early detection and aggressive treatment.

Keywords: Addictions, Co-morbidities, DOTS, Tuberculosis

INTRODUCTION

The World Health Organization has set a goal to bring annual TB incidence to less than 1 case per million by 2050.¹ Although the current approach to TB control focuses on case detection and treatment, recent studies

suggest that this strategy might not be sufficient to achieve this goal and it may also be necessary to reduce risk factors that contribute to the occurrence of tuberculosis infection and/or disease.^{2,3} The risk factors for tuberculosis consist of epidemiological triad of agent, host and environment. The agent being the tubercle bacilli, a susceptible person as a host and an environment

which allows the bacilli to survive and transfer from one host to another. Such risk factors may act at one of several steps in the natural history of the disease. The life time risk of breaking down to disease among those infected with TB is 10–15%, which gets increased to 10% per year amongst those co-infected with HIV.⁴ Other determinants such as diabetes mellitus, smoking tobacco products, alcohol abuse and malnutrition also increase the risk of progression from infection to TB disease.

In terms of treatment outcome, studies in Ethiopia have identified indicators for poor TB treatment outcome as being a male, aged above 40 years old, unemployment, and alcohol addiction.^{5,6} In addition, immunosuppression, mainly due to diabetes, human immunodeficiency virus (HIV) infection, and smoking have been linked to a higher risk of developing TB and having a poorer treatment outcome compared to the normal population.^{7,8} Other causes of immunosuppression associated with TB are hepatitis C infection, COPD (chronic obstructive pulmonary disease) and malignancy.⁹

This study was conducted to establish the relationship between co-morbidities and addictions among TB patients and their treatment outcome. The study investigates the basis for aggressive intervention and health policies among those with high risk of developing TB, and a baseline for further research on this area in the future.

METHODS

The study was conducted on newly identified smear-positive patients registered under directly observed treatment, short course (DOTS) in two treatment units (TUs) present in Amritsar city, Punjab, India: the Chest and TB Hospital and the Civil Hospital. A predesigned and pretested pro forma was administered to the subjects after taking their consent. Approval of college ethical committee was granted at the time of the submission of the plan of the study.

On the basis of the quarterly reports of both the TUs and by the expected incidence of new smear-positive (NSP) cases in the northern zone of India, which is 95/lac population/year, a quota of 250 cases was affixed. (As population covered by the two TUs is approximately 11 lac, the expected NSP cases in a year comes around 1045 and expected cases in a quarterly cohort is around 250.) Thus, the study sample consisted of 250 NSP cases that were enrolled from December 1, 2009, to February 28, 2010. The study period was extended till the projected number was achieved. NSP patients aged more than 15 years were included in the study. Patients with extra PTB and smear-negative TB patients were excluded.

The patients were enquired about their socio-demographic profile, family history, occupational history and associated co-morbidities and addictions.

Associated co-morbidities- included history of diabetes, hypertension or asthma

Addictions- included smoking, alcoholism, tobacco chewing, drug abuse or others.

Smoker: who smokes at least one bidi or cigarette per day.

Alcoholic: A person characterized by some loss of control over drinking, with habituation or addiction to the drug alcohol, or causing interference in any major life function like health, job, family or friends.¹⁰

For statistical analysis, outcomes were divided in two categories:

- Favourable Outcome (F.O.) - included cured and treatment completed
- Unfavourable Outcome (U.O.) – included failure, defaulted, transferred out and died.

Data management and analysis was done by using Microsoft excel and SPSS version 17.00. Mantel Hanzel Odds Ratio (OR) and 95% CI were calculated for dichotomous variables

RESULTS

This study was carried out on 250 newly diagnosed smear-positive PTB cases registered under two TUs present in Amritsar city, Punjab, India. The total sample consisted of 149 (59.6%) male and 101 (40.4%) female patients. It was observed that majority (94.8%) of the cases belonged to economically productive age group of 15–59 years.

Table 1 shows that out of the total 250 cases, 7.2% of the cases had associated diabetes mellitus, 1.2 % had hypertension and only 1 case was of asthma. While enquiring for addictions, it was observed that out of the total cases, 28.8% of the cases were alcoholic, 17.2% were smokers, 8% had the habit of tobacco chewing and 6% were drug abusers.

Table 1: Distribution of cases according to the co-morbidities and addictions present in the cases.

Co- morbidities	No. of cases (n = 19*)	Percentage
Diabetes Mellitus	18	7.2
Hypertension	3	1.2
Asthma	1	0.4
Addictions	No. of cases (n = 94*)	Percentage
Smoking	43	17.2
Alcoholism	72	28.8
Tobacco chewing	20	8.0
Drug abuse	15	6.0

*Total exceeds n due to multiple responses.

Perusal of Table 2 reveals that cure rate was almost same i.e. 84% in cases with the co-morbidities or cases without co-morbidities. Death rate was 5.3% in cases with associated co-morbidities while it was 3.9% in cases without co-morbidities. Presence of co-morbidities was found to have no effect on the treatment outcome.

Table 3 shows that cure rate was less i.e. 76.6% in cases who were addicted while it was 88.5% in cases who were not addicted. Failure rate (7.4%) and default rate (6.4%) was also more in addicted cases as compared to non-addicted having failure and default rates of 3.8%. Death rate was 5.3% in addicted cases while it was 3.2% in non-addicted cases. Favourable outcome was significantly higher in non-addicted cases ($p = 0.023$).

Table 2: Distribution of cases showing the relation of co-morbidities with the outcome.

Outcome	Co-morbidities		Total n = 250 No. Col%	Significance*
	Absent n = 231 No. Col%	Present n = 19 No. Col%		
Cured Row%	194 (84.0) {92.4}	16 (84.1) {7.6}	210 (84.0) {100.0}	OR = 0.98, 95% CI = 0.27- 3.55 p = 0.981
Treatment completed Row%	1 (0.4) {100.0}	0 (0) {0}	1 (0.4) {100.0}	
Failure Row%	12 (5.2) {92.3}	1 (5.3) {7.7}	13 (5.2) {100.0}	
Defaulted Row%	11 (4.8) {91.7}	1 (5.3) {8.3}	12 (4.8) {100.0}	
Transferred out Row%	4 (1.7) {100.0}	0 (0) {0}	4 (1.6) {100.0}	
Died Row%	9 (3.9) {90.0}	1 (5.3) {10.0}	10 (4.0) {100.0}	

* According to F.O. and U.O.

Table 3: Distribution of cases showing the relation of addictions with the outcome.

Outcome	Addictions		Total n = 250 No. Col%	Significance*
	Absent n = 156 No. Col%	Present n = 94 No. Col%		
Cured Row%	138 (88.5) {65.7}	72 (76.6) {34.3}	210 (84.0) {100.0}	OR = 2.21, 95% CI = 1.11 – 4.40 p = 0.023
Treatment completed Row%	0 (0) {0}	1 (1.1) {100.0}	1 (0.4) {100.0}	
Failure Row%	6 (3.8) {46.2}	7 (7.4) {53.8}	13 (5.2) {100.0}	
Defaulted Row%	6 (3.8) {50.0}	6 (6.4) {50.0}	12 (4.8) {100.0}	
Transferred out Row%	1 (0.7) {25.0}	3 (3.2) {75.0}	4 (1.6) {100.0}	
Died Row%	5 (3.2) {50.0}	5 (5.3) {50.0}	10 (4.0) {100.0}	

*According to F.O. and U.O.

DISCUSSION

The present study shows that out of the total 250 cases under study, co-morbidities were present in only 19 (7.6%) cases. This could be attributed to the fact that 80.4% of the cases in our study are 15-45 years old and co-morbidities are usually present in higher age group.

Rawat et al in their study on clinico-radiological profile of new smear positive pulmonary TB cases among young

adult and elderly people in a tertiary hospital in Dehradun reported that elderly patients had a higher number of co-morbidities like diabetes mellitus, hypertension and malignancy.¹¹

Table 2 shows that presence of co-morbidities did not alter the treatment outcome in cases on DOTS. In an evaluation study conducted by Balasubramanian et al at TRC Chennai, it was concluded that Category I regimen recommended for all NSP cases under RNTCP is

effective in the treatment of TB patients with DM despite poor control of diabetes.¹²

Another study by Kim et al in South Korea reported that there was no difference in the treatment outcome response and adverse effect in elderly tuberculosis patients with immune-compromising co-morbidities compared to those without them.¹³

In the present study it was observed that addictions were observed in 94 (37.6%) cases out of which 28.8% were alcoholic, 17.2% smokers, 8% had the habit of tobacco chewing and 6% were drug abusers. A study in Orissa reported that 58.7% of the patients had addiction to any form of tobacco, smoking was present in 26.3% of male patients and alcohol was noted among 22.4% of the study population.¹⁴

Researchers from the Centres for disease control and prevention (CDC) have found that roughly one in five people with TB in the US reported abusing alcohol or other drugs, making addiction the leading risk factor for the disease. The study also reported that those with addiction problems were more contagious than those not using drugs.¹⁵

A study by Lin et al on association between tobacco smoking and active TB in Taiwan reported that smoking was associated with two fold increased risk of tuberculosis.¹⁶

A study Vasantha et al in Tiruvallur district, South India showed that among total patients registered under DOTS 31% cases were alcoholic.¹⁷

Table 3 shows that favourable outcome was significantly higher ($p = 0.02$) in those cases who were not addicted (88.5%) as compared to those with addictions (77.7%). Also failure rate (7.4%), defaulter rate (6.4%) and death rate (5.3%) were higher in addicted patients as compared to non-addicted.

In a study on new smear positive patients registered for treatment in two consecutive quarters at National Tuberculosis Institute, Bangalore concluded that alcoholism was significantly associated with default.¹⁸

Another survey conducted by Diel and Niemann on outcome of tuberculosis treatment in Hamburg, Germany showed that the risk of treatment interruption was six times higher among alcoholics and five times higher among drug abusers.¹⁹

CONCLUSION

In the present study it was observed that co-morbidities were present in 7.6% and addictions in 37.6% of the total cases. The favourable outcome was significantly associated with the absence of addictions ($OR = 2.21$, $p = 0.023$). So, it is concluded that prevention of tuberculosis

should include effective screening especially among high risk groups in order to ensure early detection and aggressive treatment.

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