Original Research Article

Association of common mental disorders with pulmonary tuberculosis: A cross sectional study

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Abstract

Objectives: Tuberculosis (TB) and mental illness share few similar factors e.g., poverty, malnutrition, and stress. Our objective was to determine the association of TB among mentally ill patients. **Methods**: A cross-sectional study was conducted at tertiary care center located in a rural area. All patients having respiratory symptomswere screened for TB, and thepatients diagnosed with TB were taken as subjects and those who did not tested positive for TB were taken as control. Sociodemographic proforma and Self Report Questionnaire (SRQ-20) were used as study tools. **Results:** Presence of pulmonary TB is treated as outcome (dependent variable) while Common Mental Disorders (CMD) as independent variable, both were categorized as present or absent. We found statistically significant (P=0.005) association between overall CMDs and TB (OR:2.16, 95% CI 1.32-3.55). **Conclusions:** TB among mentally ill patients is very high, and we recommend that TB care and prevention services be integrated into mental health centers.

Key Words: Tuberculosis, Pulmonary; mental disorders; association.

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Introduction

In recent years, there has been growing interest in association between mental health and infectious diseases[1]. Although, etiology of most of psychiatric disorders is still not clear and under research. But, during literature search it was found that infections may play a role in causing some of psychiatric disorders to some extent, but we couldn't find much evidence vice-versa i.e., mental disorders causing increased risk of infections.

Here, are a few examples of associations of neuropsychiatric disorders with infections. The report by Hatalski et al on Borna virus shows its association with neuropsychiatric disorders[2]. Children with streptococcal infection are at increased risk for obsessive-compulsive disorders and Tourette syndrome[3]. The human B-cell antigen D8/17has been linked to increased risk for psychiatric disorders in children[4]. In a few Lyme disease patients, the only overt symptoms of disease at initial phase were mental confusion[5]. Leptospirosis has been associated with few psychiatric symptoms, such as depression, dementia, and psychosis[6] and neurocysticercosis is associated with seizures and epilepsy[7].

An association has also been described between TB and CMDs in literature, where approximately 39%–70% of pulmonary TB cases have been found to have anxiety or depression[8,9,10]. In developing countries, the prevalence of Common mental disorders (CMDs) varies between 20%–30%[11]. CMDs have a chronic and disabling nature, cause intense subjective suffering and affect individuals' abilities to care for their own health[12,13]. Individuals with CMDs are frequent users of health services; these individuals often seek physical and psychological support[14].

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Health services are often crowded and have poorly ventilated environments, which increases the risk of exposure to infections[15]. It has been well documented that neuropsychiatric disorders cause hormonal and immune dysfunctions as well, which may further contribute to infectious diseases[16,17].

A link between CMDs and tuberculosis is shallow, and if such a link exists, there are implications for the control and treatment of both diseases. There is limited research regarding this matter. Considering the magnitude of problem, such studies can be of vital importance in providing guidance for CMDs to the TB patients which further can have impact of improving cure rates. Current study is an honest effort in this regard. Our study aimed to investigate whether there is an association between CMDs and pulmonary TB.

Material and Methods

We conducted a hospital-based case-control study in Department of Psychiatry and Department of Pulmonary Medicine of Shaheed Hasan Khan Mewati Government Medical College, Nalhar, Nuh for a period of 6 months. Patients of either sex, having age > 18 years, without any previous history of TB and who gave written informed consent for participation in study included for study purpose. Patients having co-morbid physical and psychotic disorders were excluded.

A total of 280 subjects (140 cases & 140 Controls) paired by age and sex were included for study purpose. Individuals who presented with respiratory symptoms to pulmonary medicine outdoor patient department were considered for study. New patients diagnosed with pulmonary TB through clinical findings supported by chest X-Ray, sputum smear microscopy and cartridge-based nucleic acid amplification test (CBNAAT) done by department of pulmonary medicine were taken as cases. Individual with acceptable age and sex match who were excluded from a diagnosis of tuberculosis through absence of clinical findings and were not supported by Chest X-Ray, sputum smear microscopy and CBNAAT were taken as controls. The patient after having been identified as either case or control was referred to Psychiatry department. Written informed consent was taken from entire subjects prior to enrollment in the study. After enrollment socio-demographic data of the participant was collected. Then they were asked to fill responses on Self Report Questionnaire

(SRQ-20). The instruments were applied before the physician diagnosed presence or absence of pulmonary TB.

A semi-structured proforma was used to record demographic, socioeconomic variables and clinical data. The Self Report Questionnaire (SRQ-20), a standardized instrument comprised of 20 questions, was used to identify Common Mental Disorders. The SRQ-20 is a well-recognized and validated instrument in India show sensitivity of 83 and specificity of about 93 percent instrument that is used to establish the presence or absence of a CMD. It has been used by a number of investigators in developing countries, including in India[18].

For the purpose of this study, we have included depressive disorder, anxiety disorder and somatoform disorder as mentioned in ICD 10 (WHO) in the definition of common mental disorders. All those cases who fulfilled the criteria for any of the common mental disorder were provided with management at Psychiatry outdoor patient services.

After compilation of collected data, analysis was done using Statistical Package for Social Sciences (SPSS), version 24 (IBM, Chicago, USA). TB was treated as dependent variable whereas CMD were taken as independent variable, both categorized as present or absent. The Person's Chi-square test was used to evaluate the association between CMDs and TB. The association was estimated with odds ratios (OR) and their respective 95% confidence intervals using univariate and multivariate logistic regression models.

Results

In our study we included a total of 280 participants, 140 cases (having pulmonary TB) and 140 controls (not having pulmonary TB). Out of which around 65% were males and 35 % were females. Maximum participants were married (85%). 20% of study participants were uneducated, one third (36%) of study participants could only read.26% of people were educated up to 5th class, only 6% of participants were educated up to 10th class. Maximum percentage (42%) were of homemakers, around 26% had salaried job, 15% were doing farming, and 15% were working as laborer. Maximum population i.e., 76% belonged to Muslim community (Table 1).

Table 1: Socio Demographic Details

		Tuberculosis		
		Cases N (%)	**Controls N (%)**	**P value**
Age	14-29 years	16 (11.4%)	15 (10.7%)	0.386
	30-44 years	42 (29.6%)	30 (21.4%)	
	5-59 ears	65 (46.4%)	74 (52.9%)	
	>60 years	17 (12.1%)	21 (15%)	
Gender	Male	93 (66.4%)	91 ((65%)	0.801
	Female	47 (33.6%)	49 (35%)	
Education	Nil	31 (22.1%)	28 (20%)	0.066
	Can read	58(41.4%)	43 (30.7%)	
	Class 5th	41 (29.3%)	62 (44.3%)	
	Class 10th	10 (7.1%)	7 (5%)	
	Class 12th	0	0	
	Diploma	0	0	
	Graduate	0	0	
	Post graduate	0	0	
Occupation	Farmer	25 (17.9%)	18 (12.9%)	0.004
	Student	0	0	
	Housewife	69 (49.3%)	49 (35%)	
	Salaried job	29 (20.7%)	46 (32.9%)	
	Laborer	14 (10%)	27 (19.3%)	
	Business	0	0	
	Unemployed	3 (2.1%)	0	
	Retired	0	0	
Marital status	Unmarried	6 (4.3%)	0	0.020
	Married	112 (80%)	126 (90%)	
	Separated	20 (14.3%)	14 (10%)	
	Widow	2 (1.4%)	0	
Religion	Hindu	36 (25.7%)	30	0.398
	Muslim	104 (74.3%)	110	
	Others	0	0	
Total		140	140	

There was no significant difference found between the cases and controls for age, gender, education and religion (p=>0.05) but significant difference was found for occupation (p=0.004) and marital status (p=0.02) between cases and controls (Table1).

Significant difference was found in total SRQ score of cases and controls. (Table 2).

Table 2: Self Report Questionnaire Score

		Tuberculosis		
		Cases N (%)	**Controls N (%)**	**P value**
SRQ Score	<8	75	100	0.005
	8-13	63	40	
	14-20	2	0	
Total		140	140	

We treated TB as outcome (dependent variable) and CMD as independent variable, both categorized as present or absent. Table 3 shows statistically significant (P=0.005) association between overall CMDs and TB (OR:2.16, 95% CI 1.32-3.55)

Table 3: Association between Common Mental Disorder and tuberculosis

		Tuberculosis		
		Cases N (%)	Controls N (%)	OR (95%CI)
CMD	Yes	65	40	2.16 (1.32-3.55)
	No	75	100	

Discussion

In comparison to its burden, common mental disorders have received little attention in medical practice and tuberculosis has been very rarely given any importance in management of mental health. In our study we found that there is 2.16 higher likelihood of having pulmonary tuberculosis among the individuals with CMD's. but a very limited literature is available in which tells the relationship between the CMD's and TB.

Our study findings were in accordance with previous limited literature available, a Brazilian study that investigated relationship between CMD's and TB[19] and an another study conducted in Ethiopia, in which relationship between CMD's and TB in patients of HIV was studied[20]. There can be various reasons for association between CMD and TB have been suggested, but one of the important factor is that stress leads to decreased immunity and leads to increased infections[21,22] and vice versa TB is also known to cause neuropsychiatric disorders[23]. Also, according to social point of view diagnosis of TB in patients to increased stigma and social isolation which further increases mental illness[24]. As described in the literature, various factors could explain the high TB prevalence among mentally ill people.The complex interplay among poverty, undernutrition, immunosuppression, behavioral factors, and substance abuse might contribute to the TB[25]. Though there is lot of burden, but it has been seen that CMD's receive very little attention in general patient management*vis-à-vis*tuberculosis has been rarely given any importance in mental health management, this leads to complicated situation in patient management.Screening of common mental disorder in pulmonary tuberculosis in the initial stages of treatment regimen will allow for providing guidance to the cases which can have impact on treatment adherence to improve cure rates.

Conclusion

The burden of TB is very high among mentally ill people. Because the two diseases are synergistic and India has high burdens of both TB and mental illness, integration of TB services into mental health facilities is important. Mental health experts need to be trained on TB screening and diagnosis and the interplay of the two diseases.

References

1. Doherty AM, Kelly J, McDonald C, O'Dywer AM, Keane J, et al. A review of the interplay between tuberculosis and mental health. Gen Hosp Psychiatry 2013;35: 398–406.
2. Hatalski CG, Lewis AJ, Lipkin WI. Borna disease. Emerg Infect Dis. 1997;3:129–35.
3. Swedo SE, Leonard HL, Mittleman BB, Allen AJ, Rapoport JL, Dow SP, Identification of children with pediatric autoimmune neuropsychiatric disorders associated with streptococcal infections by a marker associated with rheumatic fever. Am J Psychiatry. 1997;154:110–2.
4. Benke T, Gasse T, Hittmair-Delazer M, Schmutzhard E. Lyme encephalopathy: long-term neuropsychological deficits years after acute neuroborreliosis. ActaNeurol Scand. 1995;91:353–7.
5. Fallon BA, Nields JA. Lyme disease: a neuropsychiatric illness. Am J Psychiatry. 1994;151:1571–83.
6. Mumford C, Dudley N, Terry H. Leptospirosis presenting as a flaccid paraplegia. Postgrad Med J. 1990;66:218–20.
7. Garcia H, Tsang V, Gonzalez A, Gilman R. Cysticercosis in the U.S. and Peru. Presented at the 6th Annual National Institutes of Health International Centers for Tropical Disease Research Meeting; 1997 May 5-7; Bethesda, Maryland.
8. Ahola K, Virtanen M, Honkonen T, Isometsa¨ E, Aromaa A, et al. Common mental disorders and subsequent work disability: a population-based Health 2000 Study. J Affect Disord 2011;134: 365–372.
9. Deribew A, Tesfaye M, Hailmichael Y, Apers L, Abebe G, et al. Common mental disorders in TB/HIV co-infected patients in Ethiopia. BMC Infect Dis 2010;10: 201
10. Balaji AL, Abhishekh HA, Kumar NC, Mehta RM Depression in patients with pulmonary tuberculosis in a tertiary care general hospital. Asian J Psychiatr 2013;6: 251–252.
11. Patel V, Kleinman A. Poverty and common mental disorders in developing countries. Bull World Health Organ 2003;81: 609–615.
12. Fonseca MLG, Guimara˜es MBL, Vasconcelos EM Sofrimentodifuso e transtornosmentaiscomuns: umarevisa˜ obibliogra´fica. Rev. APS 2008;11: 285–294.
13. Veggi AB, Lopes CS, Faerstein E, Sichieri R. Body mass index, body weight perception and common mental disorders among university employees in Rio de Janeiro. Rev Bras Psiquiatr 2004;26: 242–247.
14. Udedi M, Swartz L, Stewart RC, Kauye F. Health service utilization by patients with common mental disorder identified by the Self-reporting Questionnaire in a primary care setting in Zomba, Malawi: a descriptive study. Int J Soc Psychiatry, 2013:1.
15. Costa JC, Silva R, Ferreira J, Nienhaus A. Active tuberculosis among health care workers in Portugal. J Bras Pneumol 2011;37: 636–645.
16. Stein M, Schiavi RC, Camerino M. Influence of brain and behavior of the immune system. Science 1976;191: 435.
17. Schneiderman N, Ironson G, Siegel SD. Stress and health: psychological behavioral, and biological determinants. Annu Rev ClinPsychol 2005;1: 607.
18. Harding T. W. Climent C.E., Giel R., Ibrahim, Murthy R.S., Suleman M.A., Wig N.N. W.H.O. collaborative study on strategies for extending mental health care II. The development of New Research methods. American Journal of Psychiatry.1983; 140: 1474-1480.
19. AraújoGSd, Pereira SM, Santos DNd, Marinho JM, Rodrigues LC, Barreto ML. Common Mental Disorders Associated with Tuberculosis: A Matched Case-Control Study. PLoS ONE 2014;9(6): e99551.
20. Deribew A, Tesfaye M, Hailmichael Y, Apers L, Abebe G, et al. Common mental disorders in TB/HIV co-infected patients in Ethiopia. BMC Infect Dis 2010;10: 201.
21. Stein M, Schiavi RC, Camerino M. Influence of brain and behavior on the immune system. Science 1976;191: 435.
22. Schneiderman N, Ironson G, Siegel SD. Stress and health: psychological, behavioral, and biological determinants. Annu Rev ClinPsychol 2005;1: 607.
23. Schaaf HS, Zumla A. Tuberculosis: a comprehensive clinical reference. Philadelphia(2009): Saunders Elsevier. 1008 p.
24. Bender A, Guruge S, Hyman I, Janjua M. Tuberculosis and common mental disorders: international lessons for Canadian immigrant health. Can J Nurs Res 2012;44: 56–75.
25. Theron, G., Peter, J., Zijenah, L. *et al.* Psychological distress and its relationship with non-adherence to TB treatment: a multicentre study. *BMC Infect Dis* 2015;15, 253.

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