PSYCHIATRIC MORBIDITY IN PEOPLE WITH TUBERCULOSIS: A CROSS SECTIONAL STUDY

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ABSTRACT

BACKGROUND

Tuberculosis ranks alongside Human Immunodeficiency Virus as a leading cause of death worldwide.[1,2] Psychiatric disorders in chronic medical illnesses have been found to be associated with poor compliance in previous studies. Poor compliance in tuberculosis can have drastic consequences including emergence of drug resistance.[1,2,3,4,5] In this study, we have attempted to study the prevalence of psychiatric disorders in tuberculosis at a tertiary care centre in Chennai.

The objectives of the study were-

1. To assess the prevalence of psychiatric illnesses in people undergoing treatment for tuberculosis.
2. To assess the association between psychiatric comorbidity and different socio-demographic factors (age, gender, education) and tuberculosis disease related factors.
3. To assess the relationship between psychiatric comorbidity and negative behavioural factors like history of defaulting.

MATERIALS AND METHODS

Ours is a cross sectional study conducted at the Department of Thoracic Medicine in Government Kilpauk Medical College, Chennai. A total of 106 patients were interviewed and examined.

RESULTS

We observed that 63.12% of the patients had at least one psychiatric illness. About 62.6% had depressive disorder. Anxiety disorders were found in 23.5%. We also found significant relationships between the following: male gender and presence of psychiatric illnesses, joint family and presence of psychiatric illnesses, dyspnoea grade 3 or more and presence of psychiatric illnesses, dyspnoea grade 3 or more and severity of depression.

CONCLUSION

The high prevalence of psychiatric disorders in people with tuberculosis warrants specific screening and management.

KEYWORDS

Tuberculosis, Psychiatric Morbidity, Depression.

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BACKGROUND

Tuberculosis is an infectious disease caused by the bacteria belonging to the Mycobacterium tuberculosis complex.[6,7,8] According to the World Health Organisation, tuberculosis (TB) is a major global health problem. TB ranks alongside human immunodeficiency virus as a leading cause of death worldwide. India has the highest incidence of TB in the world. It is estimated that, in 2014, there were 2 to 2.3 million incident cases in India.[8,9,10] India has the highest prevalence of TB in the world – 2.5 million cases, which is more than that of China, which has a prevalence of 1.2 million[1] (WHO, Global tuberculosis report 2015). Psychiatric and physical diseases or disorders can influence each other through many mechanisms including neuroendocrine and immune systems.[11,12,13] Tuberculosis and psychiatric disorders have many common risk factors including homelessness, HIV positive serology and alcohol or substance abuse[2] (Doherty, A. M., 2013). Tuberculosis has been associated with significant burden of psychiatric illnesses.[3] Panchal SL, 2011,[4] Chandra P, 2011,[5] Kumar K, 2016,[6] Duko B, 2015). Also, TB is associated with financial burden[7] (Rajeswari R, 1999), poor quality of life[8] (Atif et al, 2014), stigma and discrimination,[9] (Thomas BE, 2016) which again increase the risk of psychiatric illnesses.[14,15,16,17] Prevalence of psychiatric illnesses in tuberculosis is high not only during treatment, but a significant proportion of patients have been found to be at risk for depression even at the end of tuberculosis treatment[8] (Atif et al, 2014).[18,19,20] Presence of psychiatric illnesses like depression can affect TB outcome through poor compliance[10] (DiMatteo, M. R., 2000). Non-adherence leads to drug resistance[11] (Paramasivan CN. 1998), which then necessitates the use of

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second line drugs which are associated with relatively more adverse effects. Multi drug resistance has also been found to be significantly associated with higher anxiety and depression levels[12] (Xavier, 2015). Moreover, improvements have been observed in psychiatric disorders in people with tuberculosis after psychiatric intervention[21] (Das M, 2014). In this study, we have attempted to study the prevalence of psychiatric disorders in people with tuberculosis, so as to improve the understanding of the interplay between and psychiatric illnesses and tuberculosis and improve the outcome of tuberculosis.

MATERIALS AND METHODS

Our study is a cross sectional study conducted at Government Thiruvateeswarar Hospital for Thoracic Medicine, Otteri, Chennai, which is attached to the Government Kilpauk Medical College, Kilpauk, Chennai. It is an urban tertiary care institution that is government run. A total of 106 consecutive patients fulfilling the inclusion and exclusion criteria were interviewed. Informed consent was obtained from those willing to participate. All patients were diagnosis with tuberculosis by consultant chest physicians. A semi structured socio demographic proforma (Name, age, hospital no., gender, education, occupation, family income per month, marital status, type of family) and modified Kuppuswamy socioeconomic status scale[13] Kuppuswamy B. 1981,[14] Kumar BR 2012 were applied to participants. Information regarding disease related factors like sputum positivity, presence of extrapulmonary TB, duration of illness, dyspnea grade (MRC breathlessness scale)[15] (Stenton C., 2008), presence of MDR TB and XDR TB, H/O default, relapse or failure, presence of HIV coinfection, and ATT drugs the patient is on were collected. Symptom Check List 90 (SCL-90) was used to screen patients. ICD 10 guidelines[16] (WHO, The ICD-10 classification, 1992) were used for diagnosis of psychiatric disorders, Hamilton Depression rating scale (HAM-D 17)[17] (Hamilton MA 1960) and Hamilton Anxiety rating scale (HAM-A)[18] (Hamilton MA 1959) were used for assessing the severity of depressive and anxiety disorders respectively.

Inclusion Criteria

- Pulmonary or extrapulmonary TB or both, as diagnosed by a chest physician.
- Currently on treatment
- At least 1 month since initiation of treatment
- Age ≥ 18 yrs.
- Willing to participate in the study
- Able to co-operate for the interview

Exclusion Criteria

- Patients who did not consent

Ethical Approval

Ethical approval for the study was obtained from the Ethics committee, Government Kilpauk Medical College, Chennai.

Analysis

Statistical analysis was done using computer software, to assess the association between psychiatric comorbidity and different sociodemographic factors and disease related factors (duration of illness, grade of dyspnea in pulmonary TB, MDR-TB, HIV-TB coinfection), and to assess the relationship between psychiatric comorbidity and negative behavioural factors like history of defaulting. Chi-squared test and Fisher's exact probability test were used for the analysis. P value was taken to be significant if it was <0.05.

RESULTS

A total of 111 patients were approached for the study. Of these, 2 patients did not consent to participate in the study and another 3 patients were acutely dyspnoeic, so were not included in the study. The remaining 106 patients consented to participate in the study. Informed consent was obtained from all these participants. Of these 106 patients, 79.24% (n = 84) were males and 20.76% (n = 22) were females. About 44.3% belonged to the age group 18-44 years, 50.94% to the 45-64 years group, and 4.71% to the 65 or more years group. Majority (88.67%) were from upper lower socio-economic status, 8.4% from lower middle, and 2.8% from lower socio-economic status. No one was from upper middle or upper socio-economic status. The complete socio-demographic data are listed in Table 1.

Sl. No.	Psychiatric Illness		n	Percentage (%)
1.	Depressive disorder	Mild	34	51.5% of depression
		Moderate	21	31.8% of depression
		Severe	11	16.6% of depression
		Total	66	62.26% of total patients
2.	Anxiety disorder	Mild	18	72% of anxiety
		Moderate	7	28% of anxiety
		Severe	0	0% of anxiety
		Total	25	23.5% of total patients
3.	Both depressive and anxiety disorders		24	22.64% of total patients

Table 1. Prevalence of Psychiatric Illnesses in the Study Population

About 81.1% had sputum positive tuberculosis, while the remaining (18.86%) had sputum negative tuberculosis. Extra-pulmonary tuberculosis was present in about 2.8% of the study population, the rest had pulmonary tuberculosis. Mean duration of tuberculosis was 5.7 months. About 83.9% had a duration of less than 1 year, while 16.03% had a duration of 1 year or more. Clinically significant dyspnoea was present in about 83.01% of the study population. A history of default from ATT regimen was present in about 40.5% of the study population. A history of relapse of tuberculosis after successful course of ATT was present in about 15.09%. No one in the study population had a history of failure of anti-tubercular treatment. HIV co-infection was present in about 4.7% (n=5). About half of the patients (n=53) were on Category I anti-tubercular regimen. The other half (n=53) were on Category II anti-tubercular regimen. The data is presented in Table 2.

Sl. No.	Medical Comorbidity in the Study Population	n
1	Type II Diabetes Mellitus	28
2.	Chronic Obstructive Pulmonary disease	4
3.	Seizure Disorder	3
4.	Anaemia	2
5.	Pleural Effusion	2
6.	Medical Renal Disease	1
7.	Coronary Artery Disease	1
8.	Gastritis	1
9.	Cerebrovascular Accident	1
10.	Chronic Pancreatitis	1

Table 2. Other Medical Comorbidities in the Study Population

About 38.67% (n=40) had at least one medical co-morbidity. The most common medical co-morbidity was Type II Diabetes Mellitus. It was present in 28 people. Of the 106 people who participated in the study, 67 people (63.12%) had at least one psychiatric illness. Depressive disorder was present in 66 (62.26%) people. Among these, majority (51.5%, n=34) had mild depressive disorder. Twenty-one (31.8%) had moderate depressive disorder, and 11 (16.6%) had severe depressive disorder.

Anxiety disorders were present in 25 (23.5%) patients. Among these, about 72% had mild anxiety and 28% had moderate anxiety as measured by Hamilton anxiety rating scale. Both depressive and anxiety disorders were present in 24 (22.64%) people.

In the analyses, type of family (joint family) was found to have a statistically significant association with presence of psychiatric illnesses (Chi squared = 7.186, p = 0.028). All other socio-demographic variables - age group, sex, religion, education, occupation, family income, socio-economic status and marital status did not have statistically significant association with presence of psychiatric illnesses. (Table 3)

Sl. No.	Tuberculosis Disease Related Factors		Presence of Psychiatric Illnesses			P value
			Present	Absent		
1.	Sputum Positivity	Positive (81.1%)	55	31	Fischer exact probability=1.332	0.248
		Negative (18.9%)	10	10		
2.	Extra-Pulmonary Tuberculosis	Present (2.8%)	3	0	Fischer exact probability=1.947	0.226
		Absent (97.2%)	62	41		
3.	Duration of Illness	<1 year (83.96%)	10	7	Chi square = 0.05	0.817
		≥ 1 year (16.04%)	55	34		
4.	Dyspnoea Grade	1 (13.6%)	7	5	Chi square = 15.929	0.003
		2 (31.8%)	11	17		
		3 (26.1%)	13	10		
		4 (14.7%)	12	1		
		5 (13.6%)	11	1		
5.	History of Default	Present (40.5%)	25	18	Chi square = 0.309	0.578
		Absent (59.5%)	40	23		
6.	History of Relapse	Present (15.09%)	9	7	Chi square = 0.204	0.651
		Absent (84.90%)	56	34		

7.	Presence of HIV Co-Infection	Present (4.7%)	4	1	Fischer exact probability=0.800	0.349
		Absent (95.2%)	60	40		
8.	ATT Regimen	Category I (50%)	33	20	Chi square =0.040	0.842
		Category II (50%)	32	21		

Table 3. Tuberculosis Disease Related Factors and Presence of Psychiatric Illness

Tuberculosis disease related factors – sputum positivity, extrapulmonary tuberculosis, duration of illness, dyspnea grade, presence of HIV coinfection, duration of illness and drug regimen – were analysed for association with presence of psychiatric illnesses. Of these, only dyspnoea Grade 3 or more was statistically significantly associated with presence of psychiatric illnesses (chi squared = 15.929, p = 0.003). All other factors - sputum positivity, extrapulmonary tuberculosis, duration of illness, presence of HIV co-infection, duration of illness and drug regimen – were not statistically associated with presence of psychiatric illnesses. Analysis was done to observe the association between various factors – default, relapse of tuberculosis, presence of HIV co-infection, type of anti-tubercular regimen, and presence of other medical comorbidities - and current presence of psychiatric illness. We did not find statistical significance in any of the analyses.

Depression severity was analysed against various tuberculosis disease related factors – sputum positivity, presence of extra-pulmonary tuberculosis, dyspnoea grade, past history of relapse, past history of default, past history of failure of treatment, presence of HIV co-infection, and presence of co-morbid medical conditions. We were able to observe statistical significance with only dyspnoea grade – moderate and severe depression were significantly associated with dyspnoea grade 3 or more (Chi square = 6.00, p = 0.049). All other comparisons - sputum positivity, presence of extra-pulmonary tuberculosis, past history of relapse, past history of default, past history of failure of treatment, presence of HIV co-infection, presence of co-morbid medical conditions – were not statistically significant.

DISCUSSION

Tuberculosis and psychiatric disorders may share many common risk factors like homelessness, HIV positive status, alcohol or substance abuse and migrant status. TB is also associated with negative outcomes when there is a major depressive episode present at baseline[19] (Ugarte-Gil, C., 2013). Non-adherence to treatment is considered as the principal hurdle in eliminating TB[20] (Prince, 2007). India faces many challenges against controlling tuberculosis including poor sub optimal functioning of general health services, a large and mostly unregulated private sector with inconsistent quality, poor socioeconomic development, difficulty in ensuring the quality of drugs and difficulty in establishing patient friendly services[22] (Khatri GR, 2002).

Global estimates by the WHO state that there were 9.6 million new cases in the year 2014. Incidence of TB in India in 2014 was 2.2 million. Prevalence was 2.5 million. About 2.2% of new TB cases and 15% of retreatment TB cases had MDR-TB. About 4% of TB patients were HIV positive, that is a total of 44,171 cases. TB is the leading cause of infectious death in India[22] (Khatri GR, 2002). The socioeconomic impact of TB on families in India is also significant. Mean total cost was estimated in a study to be Rs.5986, with direct and indirect cost estimated to be Rs. 2052 and Rs. 3934 respectively. Mean work days lost due to TB was estimated to be 83. Mean debts due to TB was estimated to be Rs. 2079. Both rural and urban female patients had faced rejection by family. 11% of school children were estimated to have discontinued their studies and an additional had taken up employment to support their families[7] (Rajeswari R, 1999).

The total participants in our study were 106. Of these 84 (79.24%) were males, and 22 (20.76%) were females. Duration of illness varied widely - from 1 month to 48 months. Mean duration of tuberculosis was about 5.7 months. About 83.9% had a duration of less than 12 months, while 16.03% had a duration of 12 months or more. Mean duration in our study is much less than observations by previous studies – 10.6 years[23] (Mathai, 1981), 8.78 years[24] (Moussas, G., 2008). About 38.67% (n=40) had other medical co-morbidities, of which Type 2 Diabetes Mellitus was the commonest, being present in 28 people (26.41%). This is comparable to the finding by[25] Shen, T. C. (2014), who observed that the prevalence of Diabetes in tuberculosis patients was 17.1%.

About 61.32% (n=65) of the study population had at least one psychiatric illness. This is comparable to the findings of previous studies from India[3] Panchal SL, 2011 – 82%,[4] Chandra P, 2011 - 76%. In another study, also published in 2011, out of 50 patients, 38 (76%) were found to meet the criteria for common mental disorders. Depressive disorder was the most common psychiatric morbidity in our study, present in about 62.26% (n=66) of the patients. Among these, 51.5% had mild, 31.8% had moderate, and 16.6% had severe depressive disorders. A study from India published in 2016 reports 35% prevalence of depression in patients with tuberculosis[5] (Kumar K, 2016). Another study from India published in 2015 reports 44% of patients with tuberculosis had depressive symptoms.[26] (Singh L, 2015).

Anxiety disorders were the next common morbidity – present in about 23.5% (n=25) patients. The prevalence of anxiety disorders in our study conforms with the finding by[27] van den Heuvel, 2013, who observed a prevalence of 30.8% for any anxiety disorder. An Indian study published in 2016 reports a prevalence of 39% for anxiety disorders in patients with tuberculosis[5] (Kumar K, 2016). Another study published in 2015 reports that 38% of patients with tuberculosis had anxiety symptoms, with 12% receiving a diagnosis of mixed anxiety and depressive disorder and 5% receiving a

diagnosis of generalised anxiety disorder as per ICD-10.[26] (Singh L, 2015).

Joint family - as opposed to nuclear, extended, and broken families – was significantly associated with presence of psychiatric illnesses excluding substance use disorders (Chi squared = 7.186, p = 0.028). This is in variance with the findings of[28] Olusoji Mayowa Ige (2011), who observed that nuclear family was more associated with psychiatric illness. We did not find significance in analyses for other socio-demographic factors. Generally past studies have only mixed results for almost all socio-demographic factors – age, gender, religion, education, occupation, income, marital status, though a recent Indian study had found a significant relationship with older age, and male gender for psychiatric illnesses in patients with tuberculosis[5] (Kumar K, 2016).

Among the tuberculosis disease related factors, dyspnoea grade of 3 or more was significantly associated with presence of psychiatric illnesses (chi squared = 15.929, p = 0.003). This is in keeping with the findings of[29] Masumoto, S (2014). An Indian study had also found a statistical significance between severity of tuberculosis based on X-Ray findings and increased incidence of depression and anxiety.[26] (Singh L, 2015). Longer duration of illness has been found to be associated with presence of psychiatric illnesses in past studies[26] (Singh L, 2015)[28] (Olusoji Mayowa Ige 2011,[24] Moussas, G. 2008). But, we did not find such relationship in our study.

Multi drug resistance has been found to be significantly associated with higher anxiety and depression levels[12] (Xavier, 2015). But, we did not come across any MDR-TB patients in our study, so we couldn't do an analysis.

We also did not find significant association between HIV co-infection and presence of psychiatric illness. This is consistent with the findings of[29] Deribew A (2010) and[27] van den Heuvel (2013).

We did not find significance in the association between type of anti-tubercular regimen and presence of psychiatric illness. This is in variance with[28] Olusoji Mayowa Ige (2011), who found an association between Category 2 tuberculosis and severity of depression.

We did not find statistical significance in the analysis of association between presence of other medical co-morbidities in general and presence of psychiatric illnesses. This is variance with the findings by[25] Shen, T. C., (2014), who found that medical co morbidities in general increase the risk of psychiatric illness. But, in their study, hypertension was more common than diabetes in the tuberculosis group, and they had not found a statistical significance when diabetes alone was compared with the presence of depression (aOR = 0.98, 95% CI = 0.85 – 1.12). In our study, diabetes was the most common medical comorbidity, accounting for about 70% of the total medial co-morbidities. Moreover, their study had included HIV and schizophrenia as co-morbidities, while we had considered HIV separately and also had no patient with schizophrenia in the study population.

We also found a statistically significant association between severity of depression and dyspnoea of grade 3 or more (Chi square = 6.00, p = 0.049). This is in agreement with the finding by[30] Masumoto (2014) - dyspnoea grade 3 or more was significantly associated with the presence of depression in tuberculosis.

CONCLUSION

A high prevalence of psychiatric illnesses in patients with tuberculosis (65%) has been observed in our study and also in previous studies. Given the burden of tuberculosis in a developing country like ours, and given the observations in past studies that the presence of psychiatric illnesses in tuberculosis is associated with poor outcomes, it becomes obvious that the psychiatric illnesses in this group of patients need to be effectively identified and managed. Effective liaison services between the physicians treating tuberculosis and psychiatric services can improve the outcome of tuberculosis and thereby improve the quality of life of people with tuberculosis.

Limitations of the Study

Our study included people who were mostly from lower socio-economic status. People from higher socio-economic status have not been represented adequately in our study. Participant factors like recall bias may have interfered with certain information. Ours is a cross sectional study. A longitudinal follow up study may provide more information regarding relationship between presence of psychiatric illness and outcome of tuberculosis.

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