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PREVALENCE OF DEPRESSION AND ITS CORRELATION AMONG REGISTERED TUBERCULOSIS PATIENTS

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ABSTRACT

INTRODUCTION

In India, psychiatric disease is frequently overlooked among tuberculosis (TB) patients. Depression is a prevalent comorbidity among them that is often undiagnosed, mistreated and further contributes to non-adherence. Prevalence of depression and its severity among TB patients has recently garnered interest with a few studies exploring this association. However, since data in this niche is fairly limited, our study sheds further light on this public health hazard.

OBJECTIVES

The present study was conducted to find out prevalence of depression using PHQ-9 and its correlation amongst tuberculosis patients registered at health centre's in Surat City, India.

METHODOLOGY

In this cross-sectional observational study, 425 adults with pulmonary and extrapulmonary TB without any pre-existing depression or psychiatric illness were enrolled at the DOTS clinics of 11 UHCs in Surat from July to November 2022. The sample size was calculated using 2 proportions- 40.83% and 23.6% (extremes of range of prevalence found in the Indian population) with equal allocation and absolute error of 10%. Patients were screened for depression using the Patient Health Questionnaire (PHQ-9) and were correlated with other clinical and epidemiological variables. Groups were analysed using the chi-square test and a p-value < 0.05 was considered statistically significant.

RESULTS

Overall prevalence of Depression among TB patients was 23.29%, with a majority of patients classified as mildly depressed.

Multivariable logistic regression indicated that patients were more likely to develop depressive symptoms belonging to groups having Marital life affected (OR=5.799 p<0.001), Interpersonal relation with family Ok (OR=3.815 p=0.002), Unemployed (OR=2.265 p=0.003), Occupation affected (OR=2.875 p<0.001), TB (Relapse) (OR=2.741 p=0.028) as compared to their counterparts.

CONCLUSION
The impact of TB and other chronic diseases goes beyond physical impairment. Recognising clues early and providing holistic care to patients should be the way forward.

KEYWORDS: Tuberculosis, Depression, TB, PHQ-9

INTRODUCTION

Tuberculosis (TB) is a chronic infectious disease caused by Mycobacterium tuberculosis. It is a major public health problem worldwide. India registered the highest number of Tuberculosis (TB) cases in the world in 2022. The country accounted for 27 per cent of the total TB cases in the world.[1] Although India has made progress in reducing the number of cases. From 258 patients per 1,00,000 people in 2015, it has dropped to 199 per 1,00,000 people in 2022. But the rate is still far higher than the global average of 133 per 100,000.[2] The Indian government started the RNTCP in 1993 in which The World Health Organisation (WHO) advised that the Directly Observed Therapy Short Course (DOTS) technique be used. [Park K. *Park's Textbook of Preventive and Social Medicine.* 24th ed. Jabalpur (India): Banarsidas Bhanot; 2016. pp. 445–51.].[3]

Depression is a common psychiatric disorder characterised by persistent sadness, loss of interest in activities, and changes in sleep and appetite.[4] It can have a significant impact on quality of life and as many as a third of people with serious medical conditions are thought to exhibit depressive symptoms.[5] According to the Global Burden of Disease survey, depression ranks as the fourth most common cause of disability-adjusted life years worldwide.[6] Medical outpatients with depressive manifestations or disorders saw declines in quality of life and nearly twice as many days of limited activity or absence from work due to sickness compared to those without depression.[7]

The way depressed patients behave when receiving medical care has a negative impact on the effectiveness of tuberculosis therapy, This has led to requests for in-depth studies of longer-term approaches that might deal with other factors like depression that have been shown to affect medication adherence.[8] Additionally, it was noted that TB patients going through depressive episodes avoided social obligations, avoided making social contacts, and as a result of social isolation, lost their sense of self.[9]

However, there is still a need for further research to identify the most effective interventions for the prevention and treatment of depression in TB patients. Prevalence of depression and its severity among TB patients has recently gathered interest and our research aims to establish the groundwork for subsequent investigations to formulate solutions meant to mitigate or forestall these situations that heighten such hazards.

METHODOLOGY

In this cross sectional analytical study, out of the total of 55 UHCs in Surat, we selected 11 (or 20%) for our cross-sectional analytical study utilising an Excel random number table. Patients were chosen based on their compliance with the inclusion criteria, and their informed consent was obtained following a description of the study's goal and a guarantee of anonymity. A questionnaire in the patient's preferred language was given out by the interviewer.

From July to November 2022, 425 persons with pulmonary and extra-pulmonary tuberculosis (TB) who did not have a history of depression or psychiatric disease were recruited at the DOTS clinics of 11 UHCs in Surat. The software "nmaster v2.0 by CMC Vellore" was used to compute the sample size using two proportions: 40.83% and 23.6%, which represent the extremes of the prevalence range seen in the Indian population. The allocation was equal, and the absolute error was set at 10%.

The Patient Health Questionnaire (PHQ-9)[10] was used for evaluating patients for depression, and results corresponded to other clinical and epidemiological characteristics. The PHQ-9 is a self-reported questionnaire consisting of nine items that ask individuals to rate the frequency with which any of the listed problems have afflicted them during the past two weeks. These nine items reflect the DSM-IV criteria for major depressive disorder:

The score of each question varies from 0 to 3 (0 = not at all, 1 = several days, 2 = more than half the days, and 3 = nearly every day) with a result range of 0–27. A score of 0–4 indicates none/ minimal depression; 5–9 mild depression; 10–14 moderate depression; 15–19 moderately severe depression; and 20–27 severe depression.

Qualitative data represented by percentage and frequency. Fisher's exact test and chi-square test were used to determine the relationship between depression in TB patients and its associated risk factors. The chi-square test was used to analyze the groups, and a p-value of less than 0.05 was deemed statistically significant. The relationship between depression and the variables (risk factors) that showed a significant relationship in the bivariate analysis was ascertained through the use of binary logistic regression.

The logistic model was statistically significant, 86.92, P<0.0001. The model explained 27.9% (Negelkerke R^2) of the variance in the disease (depression) correctly classified 80.9% cases. Level of significance was considered 95%. SPSS was used for statistical Analysis. Forest plot was used to show the crude odds ratio and adjusted odds ratio.

RESULTS

This study included a total 425 TB patients who were under the treatment of TB. Median age of study participants was 30 years with a range of (18-78) years and with Inter quartile range was (23-40) years. Majority of TB patients were in age group 26-40 years (40.47%), married (68.70%), male in sex (59.29%). Primary Tb cases (72.47%) was maximum as compared to others. In the patients drug sensitivity status of DS-TB (88.70%) was high. Pulmonary TB (67.76%) were more as compared to extra pulmonary.

99 patients (23.3%) were observed with depression among them 70(71%) were having mild, 20(20%) were having moderate & 9(9%) were having moderately severe/severe depression.

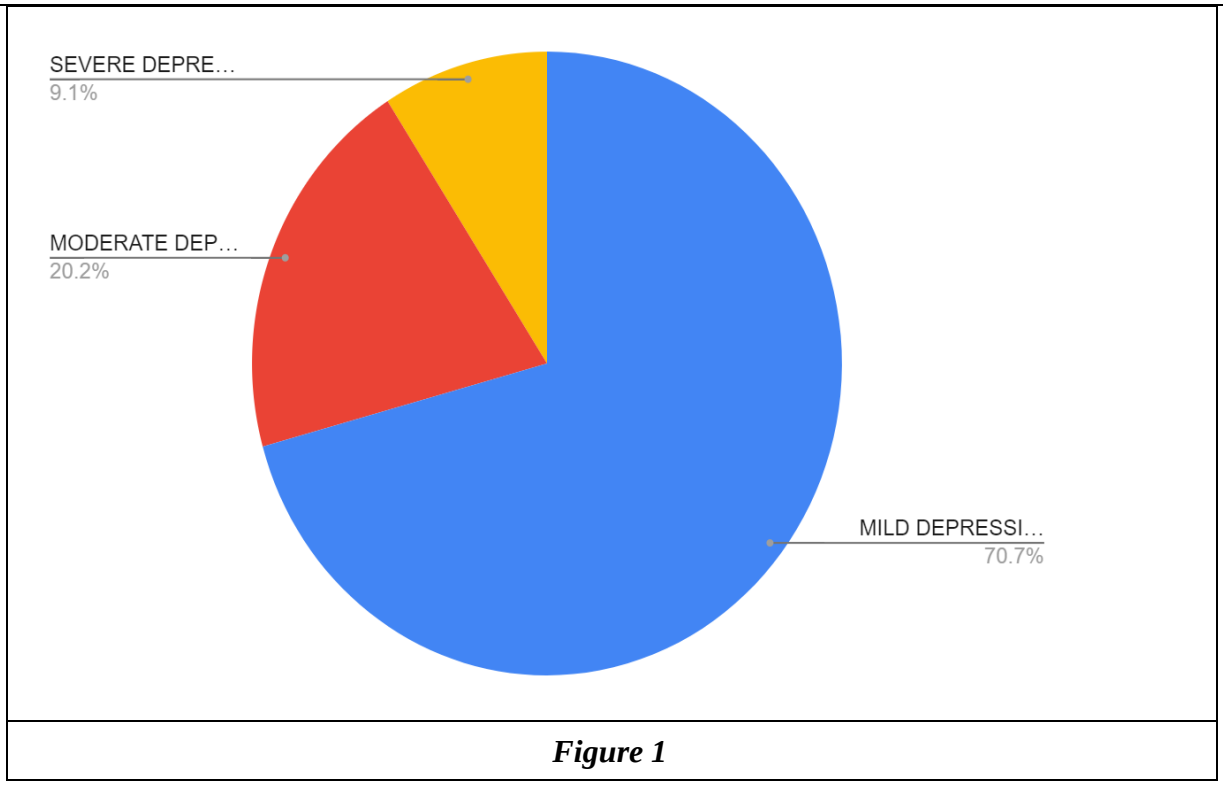

Figure 1

In Bi-variate analysis, depression was mainly associated with Marital Life affected (23.23%), Interpersonal relation NOT SO GOOD with family (33.33%), Interpersonal relation Affected (19.19%), unemployment (52.52%) , Occupation Affected (48.48%) , Based on TB cases in recurrence (16.16%) and relapse (13.13%), DR TB (18.18%) ,extra pulmonary TB(25.25.%) and patient symptomatic currently(56.56%) which was statistically significance (P<0.01). (Table. 1)

In the multivariate regression analysis , Marital Life affected, Interpersonal relation with family, employment Status, Occupation Affected, drug sensitivity status and Patient Symptomatic currently were found to be significantly associated with depression among TB patients

The odds of having depression for those patients with marital life affected was 5.562 fold higher than those patients whose marital life was not affected. (AOR = 5.562, 95% CI 2.495,12,939).

Patient with NOT SO GOOD Interpersonal relation with family were 3.495 times more affected with depression than who had very good (AOR = 3.495, 95% CI (1.54, 7.931) This study also obtained that the odds of developing depression among unemployed patients were 2.302 times higher as compared to those who were employed (AOR= 2.302,95% CI =(1.343,3.944).Patients whose occupation were affected had 2.800 times more depression. (AOR=2.800, 95% CI (1.618,4.844). Tuberculosis patients whose drug sensitivity status was DR-TB, among them depression was found 2.456-fold higher than those who had DS-TB (AOR =2.456, 95% CI (1.198,5.034).

TB patients who were Symptomatic currently had 2.079 time more chance of developing depression as compared to asymptomatic patients. (AOR =2.079, 95% CI (1.243, 3.478). (Figure 1). Mean of Duration of TB in patient who had depression was 114 days with SD=102 days and those who did not had depression, their mean of duration of TB was 110 days with SD=79 days.

	Study Variables	Depression N(%)	No Depression N(%)	P- Value
Age Group	18-25	33(33)	114(35)	0.741
	26-40	42(43)	130(40)	
	41-65	23(23)	73(22)	
	65+	1(1)	9(3)	
Gender	Female	46(46)	127(39)	0.7353
	Male	53(54)	199(61)	
Marital Status	Married	70(71)	222(68)	0.3803
	Unmarried	23(23)	94(29)	
	Widow	3(3)	8(2)	
	Divorce	3(3)	2(1)	
Marital Life affected	Yes	23(23)	14(4)	P<0.001*
	No	76(77)	312(96)	
Interpersonal relation with family	Very Good	66(67)	288(88)	P<0.001*
	Not So Good	33(33)	38(12)	
Interpersonal Affected	Yes	19(19)	18(6)	P<0.001*
	No	80(81)	308(94)	
Education Group	Illiterate	20(20)	51(16)	0.521
	Upto High school	66(67)	235(72)	

	Graduate	13(13)	40(12)	
Employment Status	Employed	47(47)	206(63)	0.005*
	Unemployed	52(53)	120(37)	
Occupation Affected	Yes	48(48)	87(27)	P<0.001*
	No	51(52)	239(73)	

Table 1: Association between depression and socio-demographic variables in TB patients

Based on TB Cases	Primary	62(63)	246(75)	0.007*
	Recurrence	24(24)	64(20)	
	Relapse	13(13)	16(5)	
Drug Sensitivity Status	DS-TB	81(82)	296(91)	0.013*
	DR-TB	18(18)	30(9)	
Based on Organ	Pulmonary TB	74(75)	214(66)	0.09
	Extra-pulmon	25(25)	112(34)	
Symptomatic currently	Yes	56(57)	108(33)	P<0.001*
	No	43(43)	218(67)	
Alcohol	Yes	12(12)	44(13)	0.723
	No	87(88)	282(87)	
Smoking	Yes	40(40)	126(39)	0.745
	No	59(60)	200(61)	
HIV	Positive	3(3)	7(2)	0.8461
	Negative	96(97)	319(98)	
Diabetes mellitus	Present	12(12)	25(8)	0.2416
	Absent	87(88)	301(92)	
Hypertension	Present	4(4)	13(4)	P>0.999
	Absent	95(96)	313(96)	

Table 2: Association between depression and clinical variables in TB patients

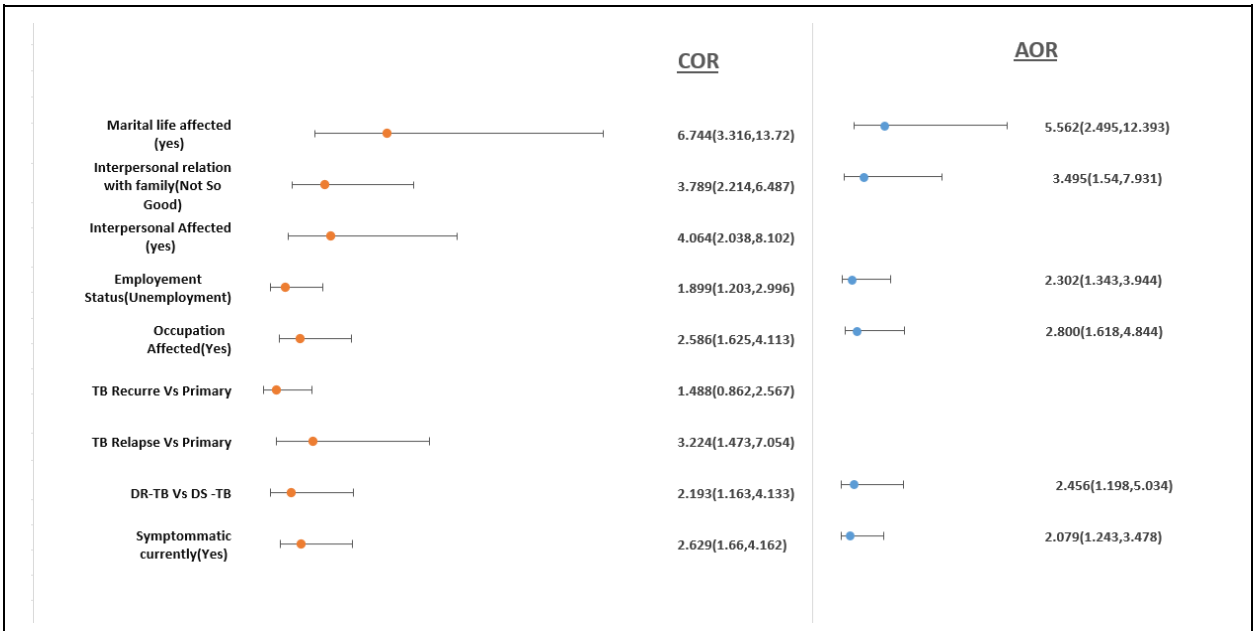

Figure 2: Forest plot of Crude Odds Ratio and Adjusted Odds Ratio

In Figure 1, Depicts the Unadjusted and Adjusted Odds Ratio of outcome of cases (depression) associated with its risk factors.

DISCUSSION

The relationship between tuberculosis and depression has a convoluted, multifaceted etiology. It has been proposed that there are biological and psychological reasons for this connection to exist. Multiple researchers suggested that the psychological toll of a persistent infection and psycho-socio-economic pressures could cause depression in tuberculosis patients.[11-14] In this cross sectional analytical study we included a total 425 TB patients who were under the treatment of TB. Overall prevalence of Depression among TB patients was 23.29%, with a majority of patients classified as mildly depressed.

In a study conducted in 2019 researchers had 23.6% prevalence amongst 106 TB patients set in rural areas of Delhi. The prevalence of depression in both the studies was seen to be very similar and the study participants with depression were more likely to be from the middle or lower income brackets and to be unemployed at the time of evaluation ($P < 0.05$).[11]

There are substantial geographic differences in the occurrence of depression as determined by different authors; these differences arise from the investigation's setting, which includes a mix of urban and rural areas, as well as from the screening tool employed. As seen in a study conducted in Bangalore from June 2016 to October 2016 at a tertiary care hospital. The researchers found that 107 of the 262 TB patients overall suffered from depression. 40.83% was identified to be the prevalence. 72% of those surveyed had mild to moderate depression, a noticeable difference from the study conducted in Delhi.[12]

Another study conducted in tertiary health care facility located in the district of Vidisha in Madhya Pradesh, India from September 2020 to January 2021 using the Patient Health Questionnaire-9 (PHQ-9) reported a prevalence of 55.7% amongst 106 participants with majority of them underlying the mild spectrum of depression.[13] In the study there was a higher percentage of women suffering from depression even with equal percentage of male and females patients included. In our study the percentage of affected patients were more males than females unlike the study conducted in Madhya Pradesh. Although the difference was considered to be non-significant in both the studies.[13]

In our study the percentage of patients married was 68% and amongst that only 23% of the married patients were showing depressive symptoms. Most of the patients in our study did not have any married relations, interpersonal relations or occupational areas of their life affected. The correlation

was found to be statistically significant ($p<0.001$) in all the three sectors. Similarly the study conducted in Madhya Pradesh in 2019 showed that more married patients were suffering from depression but the correlation was not found to be statistically significant.[13]

The patients showed no correlation between the depressive symptoms and their HIV status. Possibly due to a low proportion of HIV-positive individuals within our sample, our results were not statistically significant. Another research conducted in Ethiopia in 2015 showed significant correlation between HIV and TB coinfection indicating that an individual suffering from both the chronic illness may face more stigma from society in turn making that individual more susceptible to mental disorders.[14]

We noticed that amongst the 99 patients suffering from depression even though the unemployed individuals were slightly more in number than employed individuals there was significanty correlation between an individual having TB infection and their employment status. Unlike the study conducted in Delhi in 2019 that depression was found to be statistically significant among those who were unemployed.[11]

One of the study's strengths is the use of a verified and standardised tool (PHQ-9 in Hindi/Gujarati/English) to measure depression in tuberculosis patients from different UHC's in Surat. Considering there is no temporal correlation, the cross-sectional design of this research makes it difficult to remark on the causation of depression. Although the sample size was determined scientifically, the results of this study cannot be applied to all TB patients from Surat districts because it was limited to 11 out of 55 DOTS centre. We did not find any statistically significant differences in the prevalence of depression in our study regarding education level (up to high school vs. more than high school), presence of other comorbidities like HTN Or diabetes mellitus, smoking or consumption of alcohol.

CONCLUSION

As the result indicates about one in four TB patients experience depression, making it a widespread occurrence. The essential component to treating tuberculosis is realizing that it is not just a long-term infection but also a biopsychosocial ailment in nature with concurrent depressive disorders and societal factors like poverty, unemployment, and stigma. The health care providers should be educated and made aware of the early signs so that the individual can be referred to a counselor or a psychiatrist to help them cope with such issues. Health care providers must also help in reducing the stigma surrounding TB and mental health disorders not only amongst the infected population but also amongst their family members and other individuals to reduce the taboo and fear associated. Subsequently it is advised that individuals with TB should undergo psychological assessments a minimum of once while receiving treatment, along with individuals who require it be given access to appropriate counselling and management. All this would not only increase the patient's adherence to drug but might as well have a positive effect in the course of the disease. To fully comprehend the long-term connection between tuberculosis and depressive disorder, more extensive researches are required to improve the understanding and the management of depression in patients suffering with chronic illness like TB

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