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Stress, Depression and Coping in Tuberculosis Patients- A Hospital Based Study

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ABSTRACT

Context/Background: Tuberculosis (TB) often leaves its impact physically, socially and mentally on patients. Coping strategies refer to the specific efforts, both behavioural and psychological, that people employ to master, tolerate, reduce or minimize stressful events. The study was started to find out the prevalence of Depression in Tuberculosis patients, to find out the effect of Stress and Depression on Coping strategies in patients diagnosed with Tuberculosis.

Methodology: The study was a Cross sectional study carried out for period of two years at District tuberculosis centre, SNR Hospital, Kolar. Sample size calculated was 288. All data entered in Microsoft office excel sheet, analyzed using SPSS v 22. Descriptive statistics applied where ever needed and to compare between groups t-test, ANOVA was used. To check for association between factors, Chi-square was applied.

Results: Out of 302 Tuberculosis patients, 29.1% belonged to 41-50 years, 72.2%were male, 77.5% resided in rural area, 24.5% were unemployed, 4% had HIV comorbidity, 46.4% had Diabetes Mellitus. 138(45.7%) patients had Severe Depression. Age, Gender, HIV status, Diabetes status, Tb Patients who Perceived TB stigma, BMI, Perceived Family Support, type of family and occupation were few Clinico-social factors which were statistically significant for Perceived stress scores.

Conclusions: Better management of psychiatric morbidities should be educated by the treating primary health care doctors and DOTS providers in chronic infectious diseases like Tuberculosis can have direct or indirect impact on improving treatment adherence, illness perception and patient coping skills.

Keywords: Tuberculosis, Depression, Problem Coping, Emotion Coping, Avoidant Coping, Stress

INTRODUCTION

Tuberculosis (TB) is a leading cause of mortality and morbidity throughout the world and more so in developing countries. Burden of tuberculosis and depression is increasing.[1] It is of extreme importance for primary health care physicians and also Directly Observed Treatment Short course (DOTS) provider who treat TB patients, to be sceptical about clinical manifestations of depression in TB patients.[2] Tuberculosis (TB) often leaves its impact physically, socially and mentally on patients. Depression is a common mental disorder that presents with depressed mood, loss of interest or pleasure, decreased energy, feelings of guilt or low self-worth, disturbed sleep or appetite and poor concentration. Many times, symptoms of depression and tuberculosis can co-exist which might be missed. This makes it extremely important for primary care physicians to understand the importance of mental illness in TB patients so that proper treatment provisions can be implemented.[3]

The high prevalence of Mood disorder in people with TB may be attributed to a combination of biological and behavioural factors, social vulnerability, inade-

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quate living conditions and socio-economic inequities. Psychological stress has been rarely investigated among tuberculosis patients despite the fact that mental ill health has far-reaching consequences for the health outcome of TB patients.[4] There is augmenting corroboration that emotional distress expressed in terms of anxiety and depression is very high among TB patients.[5] Coping strategies refer to the specific efforts, both behavioural and psychological, that people employ to master, tolerate, reduce or minimize stressful events.[6] Globally, to end tuberculosis, the approach stressed more on patient centric with social support. However, specific recommendations for people with comorbid depression or any other mental health is lacking.[7] Most of the times maladaptive coping strategies to chronic disease with comorbid mental health issues can lead to grave outcomes. Few established social events linking TB and mental health issues are Perception of illness severity of illness, Social Stigma, Poverty, Social isolation, Alcoholism, smoking and drug addiction. Smoking and drug addiction portrays Negative coping strategy towards the illness. The Causal pathways between TB and depression are both complex and multidirectional, manifesting in biological, pharmaceutical and psychosocial mechanisms. There are very scanty studies showing some association of tuberculosis with depression and stress and very few studies showing the coping abilities of tubercular patients with depression and stress. With this background, the study was started to find out the prevalence of Depression in Tuberculosis patients, to find out the effect of Stress and Depression on coping strategies in patients diagnosed with Tuberculosis

METHODOLOGY

The study was a Cross sectional study carried out for period of two years from January 2020 till December 2021. Study was done at District tuberculosis center, SNR Hospital, Kolar. The district TB center which is also the District Hospital in Kolar covers a population of 12 lakh with daily outpatient clinic fetching treatment to at least 30-40 sputum positive tuberculosis patients per day including those on regular treatment and freshly detected cases.

With the reported prevalence of depression in Tuberculosis patients as 23.6 % from the previous study, with 5% absolute precision and 95% confidence level, the required number of subjects was calculated to be 288.[8] The sample size was calculated by using Open epi software version 3.01(Open-Source Epidemiologic Statistics for Public Health) with a level of confidence of 1.96, prevalence (P) of depression as 23.6% and Precision (d) as 5%. Consecutive enrolment of all the patients attending Tuberculosis unit for 2 years of study duration fitting our inclusion criteria was done.

Tuberculosis patients diagnosed using Sputum microscopy with at least 1 month of anti-tuberculosis treatment, Study participants aged 18 years or older, have no plans to migrate out of the study area, had not been an inpatient for more than 5 days in a month after diagnosed with tuberculosis were included in the study. Patients with already diagnosed mental illness, Patients diagnosed with multi-drug resistant TB, new cases with severe forms of TB like miliary TB, tuberculous meningitis, tuberculous pericarditis, tuberculous peritonitis, intestinal TB, genitourinary TB, bilateral or extensive TB pleurisy, spinal disease with neurological complications and patients who are bedridden were excluded.

Patients who were screened for depression were also screened for perceived stress and coping strategies adapted to TB at the same time. Regarding sociodemographic profile, pretested semi-structured questionnaire was used. To assess depression Zung Self-Rating Depression Scale was used which is a short survey to quantify the depressed status of a patient consisting of 20 items on the scale that rate the four common characteristics of depression like the pervasive effect, the physiological equivalents, mood disturbances, and psychomotor activities.[9]

To assess coping abilities of Tuberculosis patients with tuberculosis, Brief COPE inventory was used. The Brief-COPE is a 28-item questionnaire designed to measure effective and ineffective ways to cope with a stressful life event. The scale is often used in health-care settings to ascertain how patients are responding to a serious diagnosis. The scale can determine primary coping styles as either Approach Coping, or Avoidant Coping. Problem-focused coping targets the causes of stress in practical ways which sets one hand to tackle the problem or stressful situation that is causing stress, consequently undeviatingly reducing the stress. Problem focused strategies aim to remove or reduce the cause of the stressor. Emotion-focused coping is a type of stress management that attempts to reduce negative emotional responses associated with stress. Negative emotions such as embarrassment, fear, anxiety, depression, excitement and frustration are reduced or removed by the individual by various methods of coping. Avoidance coping (avoidant coping) which is escape coping. This is a maladaptive form of coping in which a person changes their behaviour to avoid thinking about, feeling, or doing difficult things. Avoidance coping involves trying to avoid stressors rather than dealing with them.[10]

To assess stress, Cohen's perceived stress scale (PSS) was used which is a 10-item stress scale. It is one of the most widely used psychological instrument for measuring the perception of stress which measures degree to which situations in one's life are appraised as stressful. PSS is an easy-to-use questionnaire with established acceptable psychometric properties.[11]

All three questionnaires used were in English which were translated into Kannada which were later verified by Language experts, Community Physician and Psychiatrist. A pilot testing was done before the start of study and Cronbach's alpha was calculated. Data

Table 1: Distribution of Tuberculosis patients according to Clinico-socio-demographic factors

Clinico-socio-demographic factors	Participants (%)
Age in years	
18-20	22 (7.3)
21-30	48 (15.9)
31-40	54 (17.9)
41-50	88 (29.1)
51-60	88 (29.1)
More than 60	2 (0.7)
Gender	
Male	218 (72.2)
Female	84 (27.8)
Place of living	
Urban	68 (22.5)
Rural	234 (77.5)
Marital status	
Married	254 (84.1)
Unmarried	42 (13.9)
Separated	6 (2)
Education	
Illiterate	38 (12.6)
Primary and Middle	22 (7.3)
High	82 (27.2)
Pre university/Graduates	160 (53)
Occupation	
Unemployed	74 (24.5)
Unskilled Workers	30 (9.9)
Semiskilled Workers	42 (13.9)
Skilled Workers	42 (13.9)
Clerical/Shop/Farm	74 (24.5)
Semi professional	16 (5.3)
Professional	2 (0.7)
Students	22 (7.3)
Family type	
Nuclear	208 (68.9)
Joint	30 (9.9)
Three Generation	64 (21.2)
Duration of illness	
Less than 2 months	102 (33.8)
More than 2 months	200 (66.2)
Drug	
Rifampicin Sensitive	272 (90.1)
Rifampicin Resistance	30 (9.9)
Site of Tuberculosis	
Pulmonary	274 (90.7)
Extra-pulmonary	28 (9.3)
BMI	
Underweight	6 (2)
Normal	106 (35.1)
Overweight	100 (33.1)
Obese	90 (29.8)
HIV comorbidity	
Yes	12 (4)
No	290 (96)
DM comorbidity	
Yes	140 (46.4)
No	162 (53.6)
Perceived TB stigma?	
Yes	188 (62.3)
No	114 (37.7)
Perceived Social support	
Low	14 (4.6)
Medium	274 (90.7)
High	14 (4.6)

collected by Interview technique. Each interview lasted not more than 15 minutes. All data entered in Microsoft office excel sheet, analyzed using SPSS v 22(IBM Corp, USA). Descriptive statistics applied wherever needed and to compare between groups t-test, ANOVA were used and to check for association between factors, Chi-square applied with level of significance defined as p value less than 0.05. Binary logistic Regression analysis was done to assess the association.

Ethical clearance was obtained from the Institutional Ethical Committee (IEC) before the start of study (SDUMC/KLR/IEC/182/2020-21). Informed written consent was taken from the study participants by informing them about the benefits and risks involved in the study. It was informed to them that Participation by the study participants will be voluntary, and Confidentiality will be maintained.

RESULTS

Out of 302 Tuberculosis patients, 88(29.1%) belonged to 41-50 years and 88 (29.1%) belonged to 51-60 years, 218(72.2%) belonged to Male gender, 234 (77.5%) resided in rural area, 254 (84.1%) were married, 160 (53%) Pre-university degree holders, 74 (24.5%) were unemployed, 208 (68.9%) belonged to Nuclear family, 200 (66.2%) had completed two months duration of treatment, 272 (90.1%) were Rifampicin sensitive Tuberculosis, 274 (90.7%) had Pulmonary Tuberculosis, 100 (33.1%) were Overweight, 12 (4%) Had HIV comorbidity, 140 (46.4%) had Diabetes Mellitus, 188 (62.3%) were victims of stigma because of Tuberculosis, 274 (90.7%) received medium social support. Out of 302 Tuberculosis patients, 164 (54.3%) had Moderate Depression and 138 (45.7%) had Severe Depression. (Table 1)

Tb patients aged more than 60 years, Female Tb patients, Tb Patients who were positive for HIV, those who had no Diabetes, Tb Patients who Perceived TB stigma, Tb Patients with Normal BMI, Tb Patients who had Low family support and Tb Patients who were Semi-professional, Tb Patients who belonged to nuclear family and Tb Patients who had illness less than 2 months had higher Perceived Stress scores compared which were statistically significant. (Table 2)

32(66.7%) of those TB patients with Severe depression belonged to 21-30 years age group, 34(45.9%) who were Unemployed had Severe depression, 72.7% of those who were students had severe Depression, 34.3% of those with Severe depression had Diabetes. This association with various Clinico-social factors and depression were statistically significant. Occupation, Drug treatment whether Rifampicin Sensitive/Resistant, HIV Co-morbidity and Social support were few factors which had higher Odds with statistically significant p value. (Table 3)

Table 2: Comparison of various clinic-socio-demographic factors of Tuberculosis patients with Perceived stress scores

Variables	Mean ± SD	p value
Age in years		
18-20	15.3 ± 5.6	**0.001** #
21-30	16.7 ± 5.9	
31-40	17.9 ± 5.9	
41-50	14.0 ± 5.4	
51-60	13.8 ± 4.8	
More than 60	29.0 ± 1.1	
Gender		
Male	14.4 ± 4.9	**0.001***
Female	17.6 ± 6.9	
Level of treatment		
Rifampicin Sensitive	15.4 ± 5.8	0.3
Rifampicin Resistance	14.2 ± 4.3	
Site		
Pulmonary	15.2 ± 5.7	0.28
Extra pulmonary	16.2 ± 5.5	
HIV comorbidity		
Yes	22.8 ± 4.4	**0.001***
No	15.0 ± 5.6	
DM comorbidity		
Yes	14.4 ± 5.4	**0.01***
No	16.0 ± 5.9	
Perceived TB stigma?		
Yes	16.5 ± 6.1	**0.001***
No	13.3 ± 4.5	
Marital status		
Married	15.2 ± 5.7	0.862
Unmarried/Separated /Divorced	15.8 ± 6.0	
Educational status		
Illiterate	15.3 ± 4.8	0.9
Primary and Middle	15.0 ± 7.8	
High	14.9 ± 5.2	
Pre university/Graduates	15.5 ± 5.9	
Asian Body Mass Index		
Underweight	17.0 ± 2.3	**0.001** #
Normal	17.3 ± 6.2	
Overweight	15.5 ± 5.6	
Obese	12.5 ± 4.1	
Perceived Family support		
Low	19.0 ± 6.6	**0.04** #
Medium	15.0 ± 5.6	
High	15.8 ± 6.8	
Place of living		
Urban	16.2 ± 6.8	0.1
Rural	15.0 ± 5.4	
Occupation		
Unemployed	15.7 ± 5.7	**0.04** #
Unskilled Workers	15.4 ± 6.8	
Semiskilled Workers	15.5 ± 5.7	
Skilled Workers	13.8 ± 4.4	
Clerical/Shop/Farm	14.1 ± 4.6	
Semi professional	17.7 ± 7.7	
Professional	20.0 ± 2.1	
Students	17.6 ± 7.3	
Type of family		
Nuclear	15.9 ± 5.9	**0.02** #
Joint	14.3 ± 4.9	
Three generation	13.7 ± 5.1	
Duration of illness		
Less than 2 months	17.1 ± 5.6	**0.001***
More than 2 months	14.3 ± 5.6	
Category of Depression		
Moderate Depression	13.1 ± 4.4	**0.001***
Severe Depression	17.9 ± 6.0	

*Independent T test, #ANOVA

Tb patients aged 18-20 years, those who were graduates, students, those without HIV co-morbidity, those who had not perceived Tb stigma, those who had higher perceived social support had higher scores for Problem Focused Coping which was statistically significant. Tb patients aged 18-20 years, female Tb patients, Unemployed Tb patients, those with HIV comorbidity, those with Diabetes Mellitus, those who had perceived TB stigma, those Rifampicin sensitive, those with Normal BMI, those who had perceived high social support had higher scores with Emotion Focused Coping which was statistically significant.

Male Tb patients, Tb patients those who had completed Primary and Middle schooling, those who were professionals by occupation, those who belonged to nuclear family, those with HIV and Diabetes Comorbidity, those who had Perceived Tb stigma, those with Normal BMI and Low Social support had higher scores with Avoidant Focused Coping with statistically significant p value. (Table 4)

DISCUSSION

The present study was a cross sectional study being carried out for a period of 2 years at Tertiary care center (SNR Hospital) Kolar on tuberculosis patients to find the depression status, perceived stress scores and coping strategy adapted by Tuberculosis patients. Out of 302 Tuberculosis patients, majority belonged to 41-50 years, Male gender, rural area, had completed two months duration of treatment, belonged to nuclear family. Majority of Tuberculosis patients were married and were diagnosed with Rifampicin sensitive Tuberculosis. Out of 302 Tuberculosis patients, 12 (4%) Had HIV comorbidity, 140 (46.4%) had Diabetes Mellitus, 188 (62.3%) were victims of stigma because of Tuberculosis. Out of 302 Tuberculosis patients, 138 (45.7%) patients diagnosed with Tuberculosis had Severe Depression. Age, Gender, HIV status, Diabetes status, Tb Patients who Perceived TB stigma, BMI, Perceived Family Support, type of family and occupation were few Clinico-social factors which were statistically significant for Perceived stress scores. Age group, occupation, Education and Diabetes status were few Clinico-social factors where association with Depression was statistically significant. Tb patients aged 18-20 years, graduates, HIV co-morbidity, those who had not perceived Tb stigma, those who had higher perceived social support had statistically significant higher scores for Problem Focused Coping. Tb patients aged 18-20 years, female patients, Unemployed patients, HIV comorbidity, Diabetes Mellitus comorbidity, who had perceived TB stigma, Rifampicin sensitive Tuberculosis patients, those with Normal BMI, those who had perceived high social support had higher scores with Emotion Focused Coping which was statistically significant. Male Tb patients, Tb patients those who had completed Primary and Middle schooling, those who were professionals by occupation, those who belonged to nuclear family, those

Table 3: Association between various clinic-socio-demographic factors of Tuberculosis patients with Depression status

Variables	Moderate Depression (%)	Severe Depression (%)	p value^	Adjusted Odds ratio	Confidence interval	p value#
Age in years						
18-20	10 (45.5)	12 (54.5)	0.02	0.51	0.34-.79	0.002
21-30	16 (33.3)	32 (66.7)				
31-40	22 (40.7)	32 (59.3)				
41-50	50 (56.8)	38 (43.2)				
51-60	66 (75.0)	22 (25.0)				
More than 60	0 (0.0	2 (100.0				
Gender						
Male	122 (56.0)	96 (44.0)	0.36	1.07	0.52-2.1	0.8
Female	42 (50.0)	42 (50.0)				
Place of living						
Urban	32 (47.1)	36 (52.9)	0.21	1.05	0.46-2.4	0.8
Rural	132 (56.4)	102 (43.6)				
Education						
Illiterate	28 (73.7)	10 (26.3)	0.07	1.33	0.06-2.1	0.12
Primary and Middle	12 (54.5)	10 (45.5)				
High	42 (51.2)	40 (48.8)				
Pre university/ Graduates	82 (51.2)	78 (48.8)				
Occupation						
Unemployed	40 (54.1)	34 (45.9)	0.03	1.20	1.04-1.39	0.01
Unskilled Workers	18 (60.0	12 (40.0)				
Semiskilled Workers	24 (57.1)	18 (42.9)				
Skilled Workers	26 (61.9)	16 (38.1)				
Clerical/Shop/Farm	40 (54.1)	34 (45.9)				
Semi professional	10 (62.5)	6 (37.5)				
Professional	0(0.0)	2 (100.0)				
Students	6 (27.3)	16 (72.7)				
Drug treatment						
Rifampicin Sensitive	140 (51.5)	132 (48.5)	0.03	1.60	1.14-2.39	0.01
Rifampicin Resistance	24 (80.0)	6 (20.0)				
Site of Tuberculosis						
Pulmonary	146 (53.3)	128 (46.7)	0.2	0.33	0.11-0.97	0.045
Extra-pulmonary	18 (64.3)	10 (35.7)				
HIV comorbidity						
Yes	6 (50.0)	6 (50.0)	0.5	1.8	1.15-5.8	0.845
No	158 (54.5)	132 (45.5)				
DM comorbidity						
Yes	92 (65.7)	48 (34.3)	0.001	0.46	0.58-2.27	0.04
No	72 (44.4)	90 (55.6)				
Social support						
Low	8 (57.1)	6 (42.9)	0.4	4.25	1.41-12.5	0.04
Medium	152 (55.5)	122 (44.5)				
High	4 (28.6	10 (71.4)				
Perceived TB stigma?						
Yes	96 (51.1)	92 (48.9)	0.1	0.46	0.2-09	0.04
No	68 (59.6)	46 (40.4)				
BMI						
Underweight	4 (66.7)	2 (33.3)	0.001	0.46	0.3-0.7	0.001
Normal	40 (37.7)	66 (62.3)				
Overweight	48 (48.0)	52 (52.0)				
Obese	72 (80.0)	18 (20.0)				
Family type						
Nuclear	100 (48.1)	108 (51.9)	0.003	0.92	0.6-1.42	0.8
Joint	18 (60.0)	12 (40.0)				
Three Generation	46 (71.9)	18 (28.1)				
Marital status						
Married	140 (55.1)	114 (44.9)	0.56	0.20	0.06-0.6	0.008
Others	24 (50.0)	24 (50.0)				

^Chi-square Test, # Binary Logistic regression analysis

Table 4: Comparison of various clinic-socio-demographic factors of Tuberculosis patients with various Coping Strategies

Variables	Problem Focused Coping	Emotion Focused Coping	Avoidant Focused Coping
Gender			
Male	21.3 ± 2.1	24.8 ± 2.7	24.8 ± 3.4
Female	21.0 ± 3.3	25. 7 ± 3.9	24.5 ± 2.4
p value*	0.43	0.02	0.02
Age in years			
18-20	22.6 ± 3.0	26.1 ± 2.6	14.6 ± 3.0
21-30	21.2 ± 3.3	25.6 ± 4.8	14.0 ± 2.1
31-40	21.1 ± 2.6	25.5 ± 2.9	14.2 ± 2.2
41-50	21.5 ± 2.3	25.0 ± 2.6	14.1 ± 2.6
51-60	20.9 ± 1.7	24.2 ± 2.3	13.6 ± 2.5
More than 60	17.0 ± 1.3	30.1 ± 2.3	18.0 ± 2.6
p value#	0.01	0.04	0.1
Place of living			
Urban	21.1 ± 3.1	24.7 ± 4.6	24.7 ± 4.6
Rural	21.3 ± 2.3	25.1 ± 2.5	25.1 ± 2.5
p value*	0.6	0.3	0.36
Marital status			
Married	21.2 ± 2.2	24.9 ± 2.6	24.9 ± 2.6
Others	21.5 ± 3.6	25.8 ± 4.9	25.8 ± 4.9
p value*	0.36	0.07	0.07
Education			
Illiterate	21.3 ± 1.8	24.6 ± 2.1	12.7 ± 2.3
Primary and Middle	19.8 ± 2.0	25.2 ± 2.5	14.6 ± 3.2
High	21.2 ± 2.8	25.1 ± 2.8	13.9± 2.4
Pre university/Graduates	21.4 ± 2.5	25.1 ± 3.5	14.3 ± 2.4
p value#	0.03	0.8	0.004
Occupation			
Unemployed	21.6 ± 3.2	25.7 ± 3.8	13.6 ± 2.4
Unskilled Workers	19.9 ± 2.0	24.6 ± 3.0	14.0 ± 3.0
Semiskilled Workers	20.8 ± 2.0	24.3 ± 2.2	14.9 ± 2.9
Skilled Workers	21.7 ± 1.9	25.0 ± 2.6	14.3 ± 1.7
Clerical/Shop/Farm	21.4 ± 1.7	25.1 ± 3.1	13.3 ± 2.0
Semi professional	19.8 ± 4.0	24.3 ± 1.9	14.8 ± 2.5
Professional	20.0 ± 2.4	19.0 ± 1.0	19.0 ± 1.0
Students	22.3 ± 2.4	26.2 ± 2.9	14.8 ± 2.9
p value#	0.002	0.01	0.001
Type of family			
Nuclear	21.2 ± 2.7	25.2 ± 3.4	14.3 ± 2.5
Joint	21.8 ± 1.7	24.9 ± 1.6	13.1 ± 1.6
Three Generation	21.1 ± 2.0	24.5 ± 2.7	13.6 ± 2.7
p value#	0.4	0.01	0.02
Site			
Pulmonary	21.3 ± 2.6	25.1 ± 3.1	25.0 ± 3.1
Extra pulmonary	20.4 ± 1.4	25.2 ± 3.1	25.1 ± 3.1
p value*	0.12	0.9	0.9
Duration of illness			
Less than 2 months	20.9 ± 2.4	25.4 ± 3.7	25.4 ± 3.7
More than 2 months	21.4 ± 2.5	24.9 ± 2.7	24.9 ± 2.7
p value*	0.2	0.1	0.14
HIV comorbidity			
Yes	19.5 ± 1.9	27.5 ± 3.5	27.5 ± 3.5
No	21.3 ± 2.5	25.1 ± 3.1	25.1 ± 3.1
p value*	0.01	0.007	0.007
DM comorbidity			
Yes	21.3 ± 2.3	24.6 ± 2.7	24.6 ± 2.7
No	21.1 ± 2.6	25.5 ± 3.4	25.5 ± 3.4
p value*	0.6	0.001	0.01
Perceived TB stigma?			
Yes	20.9 ± 2.6	25.4 ± 3.4	25.4 ± 3.4
No	21.8 ± 2.2	24.5 ± 2.4	24.5 ± 2.4
p value*	0.004	0.03	0.03
TB treatment			
Rifampicin Sensitive	21.3 ± 2.5	25.1 ± 3.2	25.1± 3.2
Rifampicin Resistant	21.6 ± 2.1	24.5 ± 1.9	24.5 ± 1.9
p value*	0.5	0.01	0.5

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Variables	Problem Focused Coping	Emotion Focused Coping	Avoidant Focused Coping
Body Mass Index			
Underweight	21.6 ± 1.5	24.0 ± 1.8	14.0 ± 1.5
Normal	21.4 ± 3.2	25.9 ± 4.0	14.7 ± 2.6
Overweight	21.2 ± 2.3	24.9 ± 2.7	13.9 ± 2.6
Obese	21.0 ± 1.8	24.4 ± 2.0	13.4 ± 2.2
p value#	0.65	0.01	0.007
Perceived Social support			
Low	18.7 ± 2.1	25.1 ± 4.2	16.5 ± 2.4
Medium	21.3 ± 2.4	25.0 ± 3.1	13.8 ± 2.4
High	22.4 ± 2.3	25.5 ± 2.9	16.0 ± 3.0
p value#	0.001	0.02	0.001
Category of Depression			
Moderate Depression	21.1 ± 2.0	24.4 ± 2.3	13.6 ± 2.1
Severe Depression	21.4 ± 3.0	25.8 ± 3.8	14.3 ± 2.8
p value*	0.48	0.001	0.001

*Independent T test, #ANOVA

with HIV and Diabetes comorbidity, those who had Perceived Tb stigma, those with Normal BMI and Low Social support had higher scores with Avoidant Focused Coping with statistically significant p value.

Association between Tuberculosis and Depression are being studied in recent years. The present study showed that 45.7% had Moderate Depression according to Zung Depression scale. The study done by Kunal Kumar and Chandra in India on Tuberculosis patients to see for Depression using BDI-II showed that 35% were suffering from Depression.[13] Cross-sectional study done by Umang , Surabhi and Anita in Tuberculosis patients in DOTS center found to be 23.6% which used PHQ-9 questionnaire.[14] Study done in India by Basu et al among Tuberculosis patients showed that two third of the Tuberculosis patients were suffering from mild to moderate depression whereas 5.5% patients suffered severe depression with Elders being commonly affected.[15] Study done in China using shows that 34.8% and 13.2% had mild and moderate depressive symptoms. Study done in Pakistan by Sulehri et al a using Becks Depression scale also showed higher prevalence of Depression.[16]Study done by de Castro-Silvaet al in Brazil also showed higher prevalence of Tuberculosis as assessed by PHQ-9.[17] Systematic analysis done by Bereket, Asres and Getinet on prevalence of Depression among Tuberculosis patients also showed similar prevalence.[18] Study done by Wang et al in China using Hospital Anxiety and Depression Scale among Tuberculosis patients showed Depression being very common.[19] Cross sectional study done in Pakistan by Amreen and Nadeem Rizvi shows that depression assessed by PHQ-9 among tuberculosis patients shows that significant association.[20] Studies have shown that TB patients had higher risk for Depression because of the disease per se, prolonged treatment course, stigma associated with the disease, associated complications of Tuberculosis.[21] The study done by Alemayehu, Birhanie and Habtamu revealed that perceived TB stigma was also associated with depression showing that patients with perceived TB stigma were 2 times more likely to have depression.[22] This might be due to a lack of social support, and somatic illness (TB) may lead to increased psychological distress (mental disorders), on the other hand, good social support is vital for good disease prevention.[23] Study done by Peltzer et al showed that tuberculosis (TB) and psychological distress has association and symptoms of depression and anxiety are common among Tuberculosis patients.[24] Once diagnosed with Tuberculosis, patients face in numerous social, psychological and economic issues, with a higher quantum issues seen in drug-resistant TB. Both tuberculosis and depression share common risk factor, which explains the high prevalence of their comorbidity. Different psychosocial problems and mild and moderate psychiatric features are very common among patients with TB.

Study done by Yesuf Y shows that anxiety, depression and shame were the main psychosocial burdens experienced by TB patients and TB patients employed a host of cognitive and behavioural coping strategies to overcome burden of this disease.[25] Coping is a psychological adaptation to stress and serious life events. Psychological disorders of stress, depression, and anxiety experienced by tuberculosis patients are a manifestation of the maladaptive coping mechanisms, impacting on their physical health. The present study showed higher scores in emotion focused coping strategy. Study done by Makhfudli in Saudi to assess coping strategy among Tuberculosis patients showed adaptive mechanism which is use of better emotional support, better social support and family support.[26]Study done by Rashmi and Harneetpal Kaur among tuberculosis patients showed that the common coping strategy adopted by pulmonary tuberculosis patients was problem solving domain.[27] Study done in Indonesia regarding Coping in Tuberculosis patients by Anita, Soedarsono and Laily shows that low coping mechanisms .The study also revealed that Coping in Tuberculosis patients is one of the effort in the success of treatment from the psychological aspects. [28] Emerging literature shows that very effective Anti-tuberculosis medications like Isoniazid and ethambutol are known to

alter serotonin reuptake playing a huge role in psychiatric disease like depression causing negative impacts on the progress of chronic physical illness such as decreased function, an increase in medical expenses, long-term adherence to treatment, and self-care as well as the increase of mortality rate. Initial emotional shock and increased mental health toll, along with lack of health education and emotional support during diagnosis and treatment initiation, elevate this period as critical for emotional and educational intervention. Depression and substance abuse affect self-care and increases non-adherence and overall outcome of the disease. On the other hand, a TB diagnosis can lead to shock, anxiety, and elevated psychological stress. People suffering from TB are almost at a fourfold increased risk of experiencing depressive episodes. Mental health in primary health care has been neglected in spite of various efforts at time. National TB programs of various countries does not address mental health issues confounding with tuberculosis. Better understanding and tackling of mental disorders in TB could strengthen the control of TB. Because of the chronicity of TB life is affected physically, psychologically, and economically which can result in physiological problems like weakness, psychogenic somatic pains, breathlessness, decreased libido, and weight loss, perception of being infected or source of infection additionally burdened with social stigma, and decreased social interaction, prolonged hospitalization resulting in job loss, worthlessness and hopelessness. Most of these symptoms are similar to mental health disorders symptoms which goes unnoticed. Strengths of the present study were many. The present study shows that Depression is common among Tuberculosis patients which should be addressed by the treating Physician. Routine mental health screening in chronic infectious disease like Tuberculosis will have indirect effect on treatment out. So, the present study stresses the importance of mental health screening. Limitation of the present study was it was a single center study making it poor to generalize the results. Second inherited issue with cross sectional study is temporal association cannot establish. Better study designs will help in establishing the causality of the disease. In the present study, Likert scale was used to diagnose depression. Severe Depression being very common in the present study, no any other Diagnostic tests were used to confirm this Severe Depression which in turn may need clinical attention. It's preferred to use two step diagnosis while using a Likert scale as over diagnoses of mental health conditions is common. Various published literature shows varying prevalence of Depression among Tuberculosis patients which could be attributed to dissimilar questionnaires used in several studies stressing the importance of need of one uniform mental health survey questionnaire.[29] The present study was planned during ongoing COVID-19 pandemic where mental health was impacted immensely due to the novel strain and no availability of vaccines. This could also be a reason for higher prevalence of Depression among Tb patients in the present study as Tuberculosis was one of the risk factors for morbidity and mortality which could have deranged the mental equilibrium.[30]

CONCLUSION

Tuberculosis being a chronic disease with chronic treatment course can disturb the mental health equilibrium at any stage either during the diagnosis or treatment or post cure phase. Screening for mental health for these chronic infectious diseases can identify patients who require further psychosocial assessment, support and treatment which can indirectly better clinical response to anti-TB treatment. Better management of these psychiatric morbidities should be educated by the treating primary health care doctors and DOTS providers which will have direct or indirect impact on improving treatment adherence, illness perception and patient coping skills. Doctors and DOTS providers should have a high index of suspicion of mental health problems when treating patients. Awareness needs to be given to all patients regarding mental health issues which could be probably faced during the course of the disease and possible non-pharmacological ways for managing these common mental health issues which are often neglected.

REFERENCES

1. Ambaw F, Mayston R, Hanlon C, Alem A. Depression among patients with tuberculosis: determinants, course and impact on pathways to care and treatment outcomes in a primary care setting in southern Ethiopia—a study protocol. BMJ open. 2015 Jul 1; 5(7):e007653.
2. Sulehri MA, Dogar IA, Sohail H, Mehdi Z, Azam M, Niaz O, Javed MS, Sajjad IA, Iqbal Z. Prevalence of depression among tuberculosis patients. Annals of Punjab Medical College (APMC). 2010 Dec 14;4(2):133-7.
3. Pachi A, Bratis D, Moussas G, Tselebis A. Psychiatric morbidity and other factors affecting treatment adherence in pulmonary tuberculosis patients. Tuberculosis research and treatment. 2013;2013.
4. Peltzer K, Naidoo P, Matseke G, Louw J, Mchunu G, Tutshana B. Prevalence of psychological distress and associated factors in tuberculosis patients in public primary care clinics in South Africa. BMC psychiatry. 2012 Dec;12(1):89.
5. Xavier PB, Peixoto B. Emotional distress in Angolan patients with several types of tuberculosis. African health sciences. 2015;15(2):378-84.
6. Jacobson JM. The Brief COPE: Emerging subscales within a popular standardized measure of coping. In Society for Social Work Research (SSWR), Annual Conference, Miami, FL 2005 Jan 14.
7. Ambaw F, Mayston R, Hanlon C, Medhin G, Alem A. Untreated depression and tuberculosis treatment outcomes, quality of life and disability, Ethiopia. Bulletin of the World Health Organization. 2018 Apr 1;96(4):243.
8. Salodia UP, Sethi S, Khokhar A. Depression among tuberculosis patients attending a DOTS centre in a rural area of Delhi: A cross-sectional study. Indian J Public Health 2019;63:39-43.

9. Biggs JT, Wylie LT, Ziegler VE. Validity of the Zung self-rating depression scale. The British Journal of Psychiatry. 1978 Apr;132(4):381-5.
10. Carver CS. You want to measure coping but your protocol too long: Consider the brief cope. International journal of behavioral medicine. 1997 Mar 1;4(1):92.
11. Lee EH. Review of the psychometric evidence of the perceived stress scale. Asian nursing research. 2012 Dec 1;6 (4):121-7.
12. Kumar K, Kumar A, Chandra P, Kansal HM. A study of prevalence of depression and anxiety in patients suffering from tuberculosis. Journal of family medicine and primary care. 2016 Jan;5(1):150..
13. Salodia UP, Sethi S, Khokhar A. Depression among tuberculosis patients attending a DOTS centre in a rural area of Delhi: A cross-sectional study. Indian journal of public health. 2019 Jan 1;63(1):39...
14. Basu G, Chatterjee C, Singh R, Biswas S. Prevalence of depression in tuberculosis patients: an experience from a DOTS clinic. IJRRMS. 2012 Oct;2(4):14-7.
15. Gong Y, Yan S, Qiu L, Zhang S, Lu Z, Tong Y, Fang P, Yin X. Prevalence of depressive symptoms and related risk factors among patients with tuberculosis in China: a multistage cross-sectional study. The American journal of tropical medicine and hygiene. 2018 Jun;98(6):1624.
16. Sulehri MA, Dogar IA, Sohail H, Mehdi Z, Azam M, Niaz O, Javed MS, Sajjad IA, Iqbal Z. Prevalence of depression among tuberculosis patients. Annals of Punjab Medical College (APMC). 2010 Dec 14;4(2):133-7.
17. de Castro-Silva KM, Carvalho AC, Cavalcanti MT, Martins PD, França JR, Oquendo M, Kritski AL, Sweetland A. Prevalence of depression among patients with presumptive pulmonary tuberculosis in Rio de Janeiro, Brazil. Brazilian Journal of Psychiatry. 2018 Oct 22;41:316-23.
18. Duko B, Bedaso A, Ayano G. The prevalence of depression among patients with tuberculosis: a systematic review and meta-analysis. Annals of General Psychiatry. 2020 Dec;19:1-1. …..
19. Wang XB, Li XL, Zhang Q, Zhang J, Chen HY, Xu WY, Fu YH, Wang QY, Kang J, Hou G. A survey of anxiety and depressive symptoms in pulmonary tuberculosis patients with and without tracheobronchial tuberculosis. Frontiers in psychiatry. 2018 Jul 19;9:308.
20. Rizvi N. Frequency of depression and anxiety among tuberculosis patients. Journal of Tuberculosis Research. 2016;4(04):183.
21. Shrestha P, Subba UK, Brouwer M, Sweetland AC. Depression among TB patients and associated factors in Kathmandu Valley, Nepal. Global Mental Health. 2020;7.
22. Molla A, Mekuriaw B, Kerebih H. Depression and associated factors among patients with tuberculosis in Ethiopia: a cross-sectional study. Neuropsychiatric disease and treatment. 2019;15:1887.
23. Bøen H, Dalgard OS, Johansen R, Nord E. Socio-demographic, psychosocial and health characteristics of Norwegian senior centre users: a cross-sectional study. Scandinavian Journal of Public Health. 2010 Jul;38(5):508-17.
24. Peltzer K, Naidoo P, Matseke G, Louw J, Mchunu G, Tutshana B. Prevalence of psychological distress and associated factors in tuberculosis patients in public primary care clinics in South Africa. BMC psychiatry. 2012 Dec;12(1):1-9.
25. Yesuf Y, Wondimu H, Demeke A. A new look to the coping strategy preferences of TB patients: Qualitative Explorations among TB patients in Northwestern Ethiopia. International Journal of Infectious Diseases. 2018 Aug 1;73:343.
26. Makhfudli AF, Sukartini T, Asmoro CP. Family Support and Coping Mechanisms in Patients with Pulmonary Tuberculosis.
27. Rashmi and Harneetpal Kaur. A Descriptive Study To Assess The Quality Of Life And Coping Strategies Adopted By Pulmonary Tuberculosis Patients At Selected Dots Centers With A View To Develop A Pamphlet. *Int. J. of Adv. Res.* **7** (Jun). 938-945] (ISSN 2320-5407). www.journalijar.com
28. Anita F, Soedarsono S, Laily H. Description of Coping on Tuberculosis Patient in Community Health Center (Puskesmas) In Jember.
29. Fried EI, Nesse RM. Depression sum-scores don't add up: why analyzing specific depression symptoms is essential. BMC medicine. 2015 Dec;13(1):1-1.
30. World Health Organization. Addressing mental health through primary care and community engagement in the WHO South-East Asia Region. 2022.