Prevalence of Anxiety and Depression among Drug-Resistant Tuberculosis Patients in Lumbini Province of Nepal

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ABSTRACT

Background

Drug-resistant tuberculosis is raising public health concerns and posing a health security threat, affecting thousands of people worldwide as well in Nepal. Drug resistance tuberculosis treatment regimens was long-term and complicated treatments, depression and anxiety are two of the most common psychological problems among drug-resistant tuberculosis patients.

Objective

To assess the prevalence and factors associated with anxiety and depression among drug-resistant tuberculosis patients.

Method

A health facility based cross-sectional study was conducted among 140 drug resistance tuberculosis participants. Anxiety and depression were screened using GAD-7 and PHQ-9 respectively. Data were entered in Epi-data and analysis was performed with the help of the Statistical Package for Social Science (SPSS).

Result

The prevalence rate of anxiety and depression is 29.3% and 47.9% respectively. Occupational status (p 0.031), transportation to reach drug-resistant tuberculosis treatment center (p 0.042) and social engagement (p 0.002) was statistically significant with anxiety whereas occupation (p 0.031), family income (p 0.016), drug-resistant tuberculosis treatment phase (p 0.042) and social engagement (p <0.001) was found statistically significant with depression.

Conclusion

Patients with drug-resistant tuberculosis faces enormous psychological burdens. Transportation facility should be provided to reach drug-resistant tuberculosis patients to make easy access to health services and reduce anxiety.

KEY WORDS

Anxiety, Depression, Drug resistance, Prevalence, Tuberculosis

INTRODUCTION

Drug-resistant TB (DR-TB) threatens global TB control and remains a major public health concern in several countries as well as in Nepal.1–3 The prevalence of comorbidities among DR-TB patients was found high.4 Nepal reported an estimated 2800 cases of MDR/RR-TB in 2022.3,5 Different study done in Indonesia, Nepal, Pakistan and India found notably high prevalence of anxiety, depression among the DR TB patients.6–11 These mental health disorders are not merely secondary concerns but critical determinants of treatment adherence and success. The long duration of therapy, severe side effects, stigma, and lack of family or community support contribute to psychological distress, which in turn undermines TB control efforts.12 Despite this, mental health outcomes among DR-TB patients remain underexplored in Nepal, particularly at the provincial level. Lumbini Province, a border region with high population mobility, rising drug resistance, and limited mental health service, represents a critical setting where the intersection of DR-TB and mental health warrants crucial exploration. This study aims to assess the prevalence and factors associated with anxiety and depression among DR-TB patients in Lumbini Province, addressing a neglected dimension of TB control and informing integrated, patient-centered interventions.

METHODS

This study was a health facility-based cross-sectional study conducted among DR-TB patients. The study population included all drug-resistant patients who were receiving medication from three drug resistance centers: Lumbini Provincial Hospital, Butwal; TB Nepal, Banke; and Rapti Academy of Health Sciences, Dang, in Lumbini Province of Nepal, from 18th September to 5th November, 2023. Drug-resistant TB patients aged 18 years and above were considered as study participants. A convenience sampling method was used to reach the sample from selected DR centers. Ethical approval was obtained from the Institutional Review Committee of Pokhara University (Reference number: 011-080/81). Confidentiality was strictly maintained by assigning unique identification codes to each participant, ensuring that no personal identifiers were recorded in the dataset. Data were stored in password-protected files accessible only to the research team. Participants were fully informed about the study objectives, and written consent was obtained before data collection. Data was collected from DR-TB patients using an interview schedule in Nepali at one point in time for each patient. The sample size was calculated using the following formula.

Sample size (n) = $(z^2 \times p \times q)/d^2$

Where,

n= required sample size

Z= z statistical at 5% level of significance (1.96)

d= allowance error (5%)

p=Proportion of depression or anxiety (q=1-P)

Considering the allowance error is 0.05, the sample size will be

Now,

Proportion of depression (p) = 62.7% Prevalence of depression in patients with drug-resistant tuberculosis in Nepal: A cross-sectional study.13

p= 0.627 ≈ 0.63

q= 1-P, = 1- 0.63

= 0.37

no = $(1.96^2 \text{ X } 0.63 \text{ X } 0.37)/0.05^2$

= 358.19 ≈ 358

Total DR Cases in Lumbini Province is (N)=229[6]

For finite population

n=no/(1+no/N) ,

n=358/(1+358/229)

=139.84 ≈ 140

Total sample = 140

The calculated final sample size taken was 140.

Generalized Anxiety Disorder-7 (GAD-7), is a administered questionnaire developed by Spitzer et al. with a sensitivity of 89% and specificity of 82% to assess level of anxiety and validated in local context.[14]

It consists of 7 items on a four-point Likert scale ranging from 0 to 3, in which 0 implies 'not at all' and 3 implies "nearly every day". Patient health questionnaire-9 (PHQ-9) developed by primary care evaluation of mental disorders (PRIME MD) was used to assess depression level among participants. It consists of 9 items on a four-point Likert scale ranging from 0 to 3, where 0 implies 'not at all' and 3 implies "nearly every day".[15,16] A schedule was divided into five sections. The first section included the socio-demographic characteristics, the second section included disease-related information, the third section was focused on lifestyle-related behavior, the fourth section included the healthcare system and the fifth section was focused on the anxiety and depression measurement tools.

The study participants were 140. Data was entered into Epi Data v3.1 software and analyzed using the Statistical Package for Social Sciences (SPSS). Descriptive analysis was conducted to describe the socio-demographic profile of participants, the pattern of DR-TB medication, and the levels of anxiety and depression during treatment. Mean and standard deviation were calculated for continuous variables. Bivariate chi-square and Fisher exact tests were performed to test the existing significant associations

among DR-TB patients. Four domains of anxiety and depression, along with selected independent variables, were analyzed, and 95% CI was reported to show the association between the prevalence of anxiety and depression and the independent variables. These results were considered significant at a 5% level (i.e., p-value < 0.05).

RESULTS

Among 140 interview schedules, more than two-third (68.60%) of the participants were from DR-TB Treatment Center of Lumbini Province Hospital, Butwal Rupandehi. The mean age of the participants was 37 years old with minimum age of 18 years and maximum 83 years old. More than two third (67.10%) of participants were male. Nearly two-fifth (59.30%) of the participants were unemployment (Table 1).

Among total DR TB patients, nearly half (49.30%) of the participants drink alcohol in past days. More than half (40.70%) of the participants had experience side effects of DR TB medication. One-fifth (21.40%) of the participants were living with co-morbidities other than tuberculosis and among them 20% were suffering from diabetes (Table 2).

More than one-fourth (29.30%) of participants had anxiety who had score more than equal to ten (≥ 10 Score); in which 2.90% had severe anxiety, 26.40% had moderate, 34.30% had mild and 36.40% had minimal anxiety. The PHQ-9 depression scale was used to assess depression of the patient. Depression was found among the 67 (47.90%) participants who had score more than equal to ten (≥ 10 Score). The severity of depression was 2.90%, moderately severe 9.30%, moderately 37.50%, mild 29.30% and 22.90% had minimal depression (Table 3).

Table 4 shows the association between occupation and anxiety in DR-TB patients (p-value = 0.031), as well as between treatment center and anxiety (p-value = 0.042). Additionally, there is an association between not participating in social work and anxiety in DR-TB patients (p-value = 0.002).

Table 5 shows the association between various independent variables and depression in DR-TB patients. There is a significant association between occupation and depression (p-value = 0.031), family income and depression (p-value = 0.016), phase of DR-TB treatment and depression (p-value = 0.042), and not participating in social work and depression (p-value = 0.01).

Table 1. Socio-demographic characteristics of the participants (n=140)

Characteristics	n (%)
Treatment Facilities	
Lumbini Province Hospital, Butwal	96 (68.60)
TB Nepal, Nepalgunj Banke	30 (21.40)
Rapti Academy of Health Science, Dang	14 (10.00)
Age (Years)	
≤ 37 Years	70 (50.00)
> 37Years	70 (50.00)
Mean=37.08, SD= 17.392	
Sex	
Male	94 (67.10)
Female	46 (32.90)
Religion	
Hindu	121 (86.50)
Islam	15 (10.70)
Christian	2 (1.40)
Buddhist	2 (1.40)
Ethnicity	
Janjati	43 (30.70)
Brahmin/Chhetri	35 (25.00)
Dalit	26 (18.60)
Madheshi	21 (15.00)
Muslim	15 (10.70)
Type of Family	
Nuclear	79 (56.40)
Joint	61 (43.60)
Education Level	
Illiterate	17 (12.10)
Informal Education	36 (25.70)
Basic Education	49 (35.00)
Secondary Education	29 (20.70)
Bachelor or above Education	9 (6.40)
Occupation	
Unemployment	83 (59.30)
Housewife	18 (12.90)
Agriculture	15 (10.70)
Bossiness	9 (6.40)
Labor	8 (5.70)
Government job	5 (3.60)
Private job	2 (1.40)
Enrollment in Health Insurance	
Yes	115 (82.10)
No	25 (17.90)

DISCUSSIONS

The prevalence of anxiety in our study was found 29.3% and depression was 47.9% indicating alarming level of psychosocial distress. Similar findings was found in the study conducted in Mumbai, India which shows 48% had depressive disorders, and 23.5% had mixed anxiety and depression, though prevalence of anxiety (4.9%) was comparatively lower than our study.[17] This differences may partly reflect due to the variation in measurement tools.

Table 2. Life style, Diseases and Health care system related Factors (n=140)

Characteristics	n (%)
Alcoholic history before DR TB	
Yes	69 (49.30)
No	71 (50.70)
Smoking history before DR TB	
Yes	59 (42.10)
No	81 (57.90)
Infected with TB in Past	
Yes	44 (31.40)
No	96 (68.60)
Family member infected with TB in past	
Yes	37 (26.40)
No	103(73.60)
Types of DR TB of Patient	
SSTR-MDRTB	23 (16.40)
LTR-MDRTB	90 (64.30)
Pre XDRTB	24 (17.10)
XDRTB	3 (2.10)
DR TB treatment phase	
Intensive Phase	71 (50.70)
Continuous Phase	69 (49.30)
Any side effects experience DR TB Medicine	
Yes	57 (40.70)
No	83 (59.30)
Knowledge about symptoms of DR TB	
Yes	84 (60.00)
No	56 (40.00)
Co morbidity with DR TB	
Yes	30 (21.40)
No	110(78.60)
Contact with diagnosis of DR TB previous day	
Yes	20 (14.30)
No	120(85.70)
Money spend for the diagnoses of DR TB	
Yes	94 (67.10)
No	46 (32.90)
Discrimination by community due DR TB infection	
Yes	17 (12.10)
No	123(87.90)

Another study of China shows the depression prevalence of 47.9% which corresponds to our findings, but a higher anxiety prevalence of 42.6%.[18] In Eastern Ethiopia depression prevalence was 51.9% which is higher than our study.[19] A study of Nepal found 62.7% had depression of these, 25.9% had moderately severe depression, 8.6% had severe depression which is higher than our study whereas another study contradicts with our findings which shows prevalence of depression (22.2%) and anxiety (15.6%).[8]

Table 3. Generalized Anxiety Disorder (GAD-7) and Patient Health Questionnaire (PHQ-9) Scale: (n=140)

Characteristics	n (%)
GAD-7 Scoring for Anxiety Level	
Minimal (0-4)	51 (36.40)
Mild (5-9)	48 (34.30)
Moderate (10-14)	37 (26.40)
Severe (15-21)	4 (2.90)
GAD-7 Score	
No Anxiety <10 Score)	99 (70.70)
Anxiety (≥10 Score)	41 (29.30)
PHQ-9 Scoring for Depression Level	
None-minimal (0-4)	32 (22.80)
Mild (5-9)	41 (29.30)
Moderate (10-14)	50 (35.70)
Moderately Severe (18-19)	13 (9.30)
Severe (20-27)	4 (2.90)
PHQ-9 Score	
No Depression (< 10 Score)	73 (52.10)
Depression (≥ 10 Score)	67 (47.10)

Table 4. Association between Independent Variables with Anxiety (n=140)

Characteristics/ Variables	Anxiety		Chi square value	p-value
	No	Yes		
Occupation				
Unemployed	53 (63.90)	30 (36.10)	4.631	**0.031***
Employed	46 (80.70)	11 (19.30)		
Transportation to reach DR TB Treatment center				
Yes	77 (75.50)	25 (24.50)	4.139	**0.042***
No	22 (57.90)	16 (42.10)		
Not participate in social work due to DR TB				
Yes	49 (60.50)	32 (39.50)	9.695	**0.002***
No	50 (84.70)	9 (15.30)		

Evidence from Pakistan, Vietnam and North India also demonstrate wide variation, with depression rates of 42.8%, 42.5% and 68% in MDR and 78% in XDR.[11,20,21] Similarly contradicts finding was found in a study done in Ahmedabad City, India which shows 16.2% of DR TB patients had depression.[9] These discrepancies highlight the influence of study design, study setting, sample variation and sample size factor which may be responsible for the differentiation of output.

Beyond descriptive comparison, it is important to consider underlying mechanisms. The chronicity of DR-TB treatment, stigma, socioeconomic hardship, and limited access to psychosocial support likely contribute to the observed burden of mental health disorders. Our findings shows that occupation (p 0.031), transportation barriers (p 0.042) and

Table 5. Association between Independent Variables with Depression (n=140)

Characteristics/ Variables	Depression		Chi square value	p value
	No 73 (2.1%)	Yes 67 (47.1%)		
Occupation				
Unemployed	37 (44.60)	46 (55.40)	4.675	**0.031***
Employed	36 (63.20)	21 (36.80)		
Family Income of Patient (NRs)				
≤ 18200	39 (44.30)	49 (55.70)	5.813	**0.016***
> 18200	34 (65.40)	18 (34.60)		
DR TB Treatment Phase				
Intensive phase	31 (43.70)	40 (56.30)	4.152	**0.042***
Continuous Phase	42 (60.90)	27 (39.10)		
Not participate in social work due to DR TB				
Yes	32 (39.50)	49 (60.50)	1.299	**<0.001***
No	41 (69.50)	18 (30.50)		

*significant at p<0.05

social participation (p 0.002) were significantly associated with anxiety and occupation (p 0.031), family income (p 0.016), DR TB Treatment phase (p 0.042) and social participation (p < 0.001) were significantly associated with depression suggest that structural and social determinants play a critical role.

The study has several limitations; although bivariate analyses identified significant associations, confounding factors may have influenced these results so, multivariable regression is necessary to disentangle independent predictors and provide adjusted effect estimates, potential biases such as self-reporting bias, social desirability bias, and selection bias may have affected prevalence estimates. Despite of several limitations, the study emphasizes the need for integrated TB and mental health services, particularly in resource-constrained settings such as Lumbini Province, where structural barriers and limited psychosocial support may exacerbate patient vulnerability. Future longitudinal and mixed-methods research could provide deeper insights into causal pathways and intervention strategies.

CONCLUSION

This study found a high prevalence of anxiety and depression among patients with drug-resistant tuberculosis, highlighting the substantial psychosocial burden associated with the disease underscoring the urgent need to integrate psychosocial support into DR-TB care alongside biomedical treatment. Involvement of DR TB patients in social works and engaged them in any occupation is utmost importance to reduce the anxiety and depression. It also supports in their family livelihood too. Transportation facility should be provided to reach DR TB patients to make easy access to health services and reduce anxiety. During intensive phase of DR-TB treatment, patients should be provided with counselling.

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