

## DEPRESSION AMONG PATIENTS WITH TUBERCULOSIS

Aarati Acharya<sup>\*1</sup>, Dr. Manoj Koirala<sup>2</sup> and Satya Lamichhane<sup>3</sup>

<sup>1</sup>Lecturer, Charak Academy Pvt Ltd, Pokhara, Nepal.

<sup>2</sup>Department of Internal Medicine, Pokhara Academy of Health Sciences.

<sup>3</sup>Lecturer, Charak Academy Pvt Ltd, Pokhara, Nepal.

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\*Corresponding Author

Aarati Acharya

Lecturer, Charak Academy

Pvt Ltd, Pokhara, Nepal.

### ABSTRACT

Tuberculosis is the sixth leading cause of death in Nepal. Comorbidity of TB and depression is common. Depressed patients are less likely to seek treatment or consistently take their medications and are more likely to result in default. This in turn affects the patient's compliance to TB treatment that can increase mortality from the disease. Thus this study was conducted to identify the depression among patients with tuberculosis and its association with the selected variables. A descriptive cross sectional research study was carried out on a sample of 122 patients who were taking anti-tuberculosis treatment from all DOTS centers in Pokhara. Non probability, consecutive sampling was used to select the sample. Data was collected after informed consent through face-to-face structured interview schedule. Obtained data were analysed by using descriptive statistics like frequency, percentage, mean and standard deviation. Inferential statistics chi-square test was used to find out the association between depression and selected variables. The prevalence of depression among patients with TB was found to be 38.5 percent. Among total depressed 68.0 percent of them had mild depression and remaining (32.0%) had moderate depression. None of them were having severe depression. Significant association of depression was found with educational status ( $p=.049$ ), category of treatment ( $p=.003$ ), types of tuberculosis ( $p=.001$ ), drugs side effects ( $p=.001$ ), comorbid physical illness ( $p<.001$ ), smoking ( $p<.001$ ) and alcohol consumption habit ( $p=.001$ ) and effects on earning ( $p=.003$ ). Based on findings, it is concluded that about one third of the patients with TB have depression of varying severity. Health care personnels in DOTS center should draw attention and take correct measures to screen and treat depression among patients with TB.

### BACKGROUND OF THE STUDY

Tuberculosis (TB) is a chronic, contagious and airborne disease caused by Mycobacterium tuberculosis. TB is a treatable and curable disease, but remains a major global health problem. TB occurs in every part of the world. In 2014, there were 9.6 million new TB cases (133 per 100 000 population) and 1.5 million TB deaths (WHO, 2015). The largest numbers of new TB cases occurred in the WHO South-East Asia Region and WHO Western Pacific Region, accounting for 58% of new cases globally. In 2014, the TB incidence rate in low-income countries was over 10 times greater than that in high-income countries.<sup>[16]</sup>

TB ranks as the sixth leading cause of death in Nepal. About 45% of total population are infected with TB. In 2015, NTP registered 34,121 TB cases. Among them 15,655 (46%) were new smear positive TB cases. TB deaths in Nepal reached 5,506. This is 3.5% of total deaths (WHO, 2014). The age adjusted death rate is 27.80 per 100,000 of population. This ranks Nepal as 43 in the world.<sup>[12]</sup>

Co-morbidity of TB with depression leads to poor adherence to anti TB medication, which is important barrier to global control of TB and increases the risk of morbidity and mortality due to TB.<sup>[5]</sup> Various factors are found to be associated with the comorbidity of TB with depression. The co morbidity of TB and depression is influenced by the interaction of social demographic characteristics, psychological factors, presence of physical illness and the nature of the disease<sup>3</sup>. Chances of depression among TB patients were increased by hospital environment, economic problems, altered social relationship, stigma and duration of treatment rather than demographic characteristics.<sup>[14]</sup> Depression is often a comorbidity of TB, due to the nature of TB infection, side effects from medications, and other social determinants of health. Depressed patients are less likely to seek treatment or consistently take their medications and are more likely to result in default.

### Research Methodology

Descriptive cross sectional research design was used to identify the depression among patients with tuberculosis.

### Study Location

The study was conducted in DOTS centers of Pokhara. There are total 11 DOTS centers. All the DOTS centers were used as research setting with the expectation of covering wide range of population from different strata. Patients who were taking anti-tuberculosis treatment (ATT) from all DOTS centers in Pokhara were the research population.

**Sampling technique:** A non-probability, consecutive sampling technique was used for this study. This sampling technique involves recruiting all of people from an accessible population who meet the eligible criteria over a specific time interval or a specific sample size. Sample size was calculated by using standard formula. Total sample size is 122.

**Data collection:** Data was collected from the patients (exit patients) using interview schedule in the separate room (i.e. counselling room) of DOTS center, considering their convenient time. Generally the time taken was 20-25 minutes. About 7-8 respondents were interviewed in a day and data was collected for 4 weeks duration, from December 29 to January 30, 2016. Patients with moderate depression were referred to psychiatrist for further evaluation and management.

Patients who were under ATT for more than 2 weeks in DOTS clinics of Pokhara and age  $\geq 21$  years were sampled in the study. A structured interview schedule was developed according to the objectives of the study which consist of two parts.

Part I (A): Consisted questions related to socio-demographic information.

Part I (B): Standard tool was used to assess prevalence of depression. This part consisted of Beck Depression.

Inventory (BDI) developed by Beck in 1961. The Beck Depression Inventory (BDI) is a 21-item, self-report rating inventory that measures characteristic attitudes and symptoms of depression (Beck, Ward, Mendelson, Mock & Erbaugh, 1961). Each answer is scored on a scale value of 0-3 and then the total score is compared to a key to determine the depression's severity. According to Beck, Steer and Garbin (1988) current classificatory based on a University of Pennsylvania study are: (0-13) no depression, (14-19) mild depression, (20-28) moderate depression and (29-63) severe depression.

Part II: Consisted of questions related to TB disease characteristics, drugs side effects, comorbid illness, smoking and alcohol consumption habit and earning status. Researcher herself developed this tool through literature search, consultation with research advisors and peers.

The study was carried out after the approval of research proposal from Research Committee of TU, IOM, Pokhara Nursing Campus and Institutional Review Board of TU, IOM. Before collection of data, written request letter from Pokhara campus was submitted to

District Public Health Office (DPHO), Kaski for permission to conduct the research. Permission from DPHO was taken. Formal written letter regarding permission for data collection provided by DPHO was submitted to every DOTS center incharge and were briefed about the objective, process and importance of the study and formal verbal approval was taken for data collection from the incharges as well. Verbal and written consent was taken from participants.

After completion of data collection, collected data was checked, edited, organized, coded and entered in IBM Statistical Package for Social Science (IBM SPSS) 22 version by researcher herself for analysis. Obtained data was analysed by using descriptive statistics like frequency, percentage, mean and standard deviation. Inferential statistics chi-square test was used to find out the association between depression and selected variables. The level of significance was considered at 5% with  $p < .05$  and 95% confidence interval.

**Table 1: Distribution of Socio-demographic Characteristics of Patients with TB.**

Characteristics	Number	Percentage
<b>Age in years* (n=122)</b>		
21-39	74	60.7
40-59	30	24.6
60 and above	18	14.8
Mean age in years± S.D=38.57±14.42		
<b>Sex (n=122)</b>		
Male	76	62.3
Female	46	37.7
<b>Marital Status (n=122)</b>		
Married	66	54.1
Single	56	45.9
<b>Educational level (n=122)</b>		
Illiterate	23	18.9
Literate	99	81.1
<b>Among the literate # (n=99)</b>		
Can read and write only	26	26.3
Basic (grade 1-8)	27	27.3
Secondary (grade 9-12)	26	26.3
Higher level (more than 12)	20	20.2
<b>Occupation (n=122)</b>		
Unemployed	63	51.6
Employed	59	48.4
<b>Among the employed (n=59)</b>		
Service	24	40.7
Business	18	30.5
Labour	17	28.8
<b>Types of Family (n=122)</b>		
Nuclear	74	60.7
Joint	48	39.3

**Table 2: Distribution of Disease Related Characteristics of Patients with TB.**  
n= 122

Characteristics	Number	Percentage
<b>Duration of TB Treatment</b>		
Less than 3 months	53	43.4
3 months and above	69	56.6
<b>Category of TB Treatment</b>		
Category I	99	81.1
Category II	23	18.9
<b>Phase of TB Treatment</b>		
Intensive	56	45.9
Continuation	66	54.1
<b>Types of Tuberculosis</b>		
Pulmonary	92	75.4
Extra Pulmonary	30	24.6

Table 2 reveals that, 56.6 percent of patients with TB were having TB treatment for 3 months and above and 81.1 percent of them were from category I. Regarding

phase of TB treatment, 54.1 percent were from continuation phase and 75.4 percent of them had pulmonary tuberculosis.

**Table 3: Distribution of Prevalence of Depression among Patients with TB.**

Characteristics	Number	Percentage	95% CI
<b>Prevalence of Depression (n= 122)</b>			
Depression	47	38.5	29.9-47.8
<b>Level of Depression (n=47)</b>			
Mild depression	32	68.0	52.8-80.9
Moderate depression	15	32.0	19.1-47.1

Table 3 displays that, the prevalence of depression among patients with TB was found to be 38.5 percent. Among total depressed 68.0 percent of them had mild

depression and remaining 32.0 percent had moderate depression.

**Table 4: Distribution of Drugs Side Effects among Patients with TB.**

Characteristics	Number	Percentage
<b>Drugs Side Effects (n=122)</b>		
Yes	28	23.0
No	94	77.0
<b>If Yes (n=28)</b>		
Skin rashes	13	46.4
\Nausea/Vomiting	8	28.6
Joints Pain	5	17.9
Tinnitus	2	7.1

Table 4 shows that 23.0 percent of patients with tuberculosis had side effects of TB drugs. Among those having drugs side effects 46.4 percent had skin rashes.

**Table 5: Distribution of Comorbid Physical Illness among Patients with TB.**

Characteristics	Number	Percentage
<b>Comorbid Physical Illness (n= 122)</b>		
Yes	41	33.6
No	81	66.4
<b>If Yes (n= 41)*</b>		
Hypertension and Cardiac Diseases	21	51.2
Diabetes	11	26.8
Asthma	8	19.5

Hypothyroidism	5	12.2
Arthritis	3	7.3
Liver disease	4	9.8
<b>Number of comorbidity (n= 41)</b>		
One	31	75.6
Two	10	24.4

\*= Multiple response

Table 5 displays that only 33.6 percent of patients with TB had comorbid physical illness. Among those having comorbidity 51.2 percent of them had hypertension and

cardiac diseases and 73.2 percent had only one comorbidity.

**Table 6: Distribution of Smoking Habit of Patients with TB.**

Characteristics	Number	Percentage
<b>Smoking Habit (n= 122)</b>		
Never smoker	54	44.3
Current smoker	27	22.1
Past smoker	41	33.6
<b>If Current smoker (n=27)</b>		
<b>Duration of Smoking</b>		
Less than 10 years	7	25.9
10 years and above	20	74.1
<b>Smoking on average</b>		
Occasionally	12	44.4
Less than 10 sticks/day	15	55.6
<b>Past smoker (n=41)</b>		
<b>Duration of Smoking</b>		
Less than 10 years	9	22.0
10 years and above	32	78.0

Table 6 reveals that 22.1 percent of patients with TB were current smoker whereas 33.6 percent were past smoker. Among current smoker 74.1 percent had smoke for 10

years and above and 55.6 percent had smoked cigarettes less than 10 sticks per day. Regarding past smoker 78.0 percent had smoked for 10 years and above.

**Table 7: Distribution of Alcohol Consumption Habit of Patients with TB.**

Characteristics	Number	Percentage
<b>Alcohol Consumption Habit (n= 122)</b>		
Never drinker	43	35.2
Current drinker	28	23.0
Past drinker	51	41.8
<b>Current drinker (n=28)</b>		
<b>Duration of Alcohol Consumption</b>		
Less than 10 years	10	35.7
10 years and above	18	64.3
<b>Alcohol Consumption in Past 6 Months</b>		
Less than once in a month	5	17.9
Once/twice in a month	14	50.0
Weekly	8	28.6
Daily	1	3.6
<b>Past drinker (n= 51)</b>		
<b>Duration of Alcohol Consumption</b>		
Less than 10 years	13	25.5
<b>Main Earning Person in Family</b>		
Yes	40	67.8
No	19	32.2
<b>Effect on Earning</b>		
Yes	20	33.9
No	39	66.1

Table 7 shows that 41.8 percent of patients with TB were past drinker whereas 23.0 percent were current drinker. Among current drinker, 64.3 percent were drinking for

10 years and above and 50.0 percent had consumed alcohol once/twice in past 6 months. Regarding past drinker 74.5 percent had drank for 10 years and above.

**Table 8: Distribution of Earning Status of Employed Patients with TB.**  
n=59

Characteristics	Number	Percentage
<b>Main Earning Person in Family</b>		
Yes	40	67.8
No	19	32.2
<b>Effect on Earning</b>		
Yes	20	33.9
No	39	66.1

Table 8 depicts that among the total employed patients with TB, 67.8 percent were the main earning person in the family and 33.9 percent had effect on earning.

**Table 9: Association between Depression and Socio-demographic Variables.**  
n=122

Characteristics	Depression		X <sup>2</sup>	p Value
	Yes Number (%)	No Number (%)		
<b>Age</b>				
21-39	26 (35.1)	48 (64.9)	0.918	0.632
40-59	13 (43.3)	17 (56.7)		
60 and above	8 (44.4)	10 (55.6)		
<b>Sex</b>				
Male	31 (40.8)	45 (59.2)	0.437	0.509
Female	16 (34.8)	30 (65.2)		
<b>Marital status</b>				
Married	21 (31.8)	45 (68.2)	2.731	.098
Single	26 (46.4)	30 (53.6)		
<b>Educational status</b>				
Literate	34 (34.3)	65 (65.7)	3.876	.049*
Illiterate	13 (56.5)	10 (43.5)		
<b>Occupation</b>				
Employed	23 (39.0)	36 (61.0)	.010	0.920
Unemployed	24 (38.1)	39 (61.9)		
<b>Types of Family</b>				
Nuclear	29 (39.2)	45 (60.8)	.035	0.851
Joint	18 (37.5)	30 (62.5)		

\* *p* value significant (<.05)

Table 9 reveals that there was significant association of depression with educational status ( $p=.049$ ). Conversely, it depicted no significant association of depression in relation to age, sex, marital status, occupation and types of family.

**Table 10: Association between Depression and TB Diseases Characteristics, Drugs Side Effects and Comorbid Physical Illness.**

n=122

TB Diseases Characteristics	Depression		X <sup>2</sup>	p Value
	Yes Number (%)	No Number (%)		
<b>Duration of Treatment</b>				
Less than 3 months	24 (45.3)	29 (54.7)	1.807	0.179
3 months and above	23 (33.3)	46 (66.7)		
<b>Category of Treatment</b>				
Category I	32 (32.3)	67 (67.7)	8.527	.003*
Category II	15 (65.2)	8 (34.8)		
<b>Phase of TB Treatment</b>				
Intensive	22 (39.3)	34 (60.7)	.025	0.874
Continuation	25 (37.9)	41 (62.1)		
<b>Drugs Side Effects</b>				
Yes	18 (64.3)	10 (35.7)	10.183	.001*
No	29 (30.9)	65 (69.1)		
<b>Comorbid Physical Illness</b>				
Yes	31 (75.6)	10(24.4)	35.861	.001*
No	16 (19.8)	65(80.2)		
<b>Number of comorbidity</b>				
One	22 (71.0)	9 (29.0)	1.485	0.223
Two	9 (90.0)	1 (10.0)		

\* *p* value significant (<.05)

Table 10 shows significant association of depression with category of treatment ( $p=.003$ ), types of tuberculosis ( $p=.001$ ), drugs side effects ( $p=.001$ ) and comorbid physical illness ( $p<.000$ ) among patients with

tuberculosis. However, there was no significant association of depression in relation to duration of treatment, phase of TB treatment and number of comorbidity.

**Table 11: Association between Depression with Smoking and Alcohol Consumption Habit.**

n=122

Characteristics	Depression		X <sup>2</sup>	p Value
	Yes Number (%)	No Number (%)		
<b>Smoking Habit</b>				
Smoker	20 (74.1)	7 (25.9)	18.502	.001*
Non- smoker	27 (28.4)	68 (71.6)		
<b>Alcohol Consumption Habit</b>				
Drinker	18 (64.3)	10 (35.7)	10.183	.001*
Non-drinker	29 (30.9)	65 (69.1)		

\* *p* value significant (<.05)

Table 12 shows that there was significant association of depression with smoking ( $p<.000$ ) and alcohol consumption status ( $p=.001$ ) habit of patients with TB.

For the ease in computing association past smoker and never smoker were grouped into non smoker and never drinker and past drinker were grouped into non drinker.

**Table 12: Association of Depression and Earning Status of Employed Patients with TB.**  
n=59

Characteristics	Depression		X <sup>2</sup>	p Value
	Yes Number (%)	No Number (%)		
<b>Main Earning Person in Family</b>				
Yes	19(46.3)	22 (53.7)	2.175	0.140
No	6 (27.3)	16 (72.7)		
<b>Effect on Earning</b>				
Yes	13 (65.0)	7 (35.0)	8.610	.003*
No	10 (25.6)	29 (74.4)		

\* *p* value significant (<.05)

**Table 13 depicts that there was significant association of depression and effect on earning (*p*=.003).**

## DISCUSSION

This study reveals that the prevalence of depression among patients with TB is 38.5%. Among the total depressed patients, 68.0% have mild depression and remaining (32.0%) have moderate depression. None of the patients are found to be experiencing severe depression. Psychiatric conditions like depression and anxiety are high among TB patients, major reason being misconception about TB. They considered TB as a dangerous disease that had less chances of survival and cure that resulted in discontinuation of treatment (Aamir & Aisha, 2010). Different studies carried out in different countries reflect a varied pattern of depression among patients with TB. These variation in prevalence rates might possibly due to differences in the sensitivity of the screening instruments used, study design, sample size and characteristics of study population (Buberwa, 2013; Issa et al., 2009; Kehbila et al., 2016). Education is the important factors for proper adaptation to treatment (Kumar et al., 2016). This study reveals that there is significant association of depression with educational status (*p*=.049). In contrast to this study, studies conducted in Tanzania and Cameroon showed no any statistical significance (Buberwa, 2013; Kehbila et al., 2016). Kehbila et al. (2016) reported that prevalence of depression was higher in those who never attended the school though no significant relationship was observed. Current study reveals no any significant association between depression and marital status which is consistent with different findings observed in previous studies done by Issa et al. (2009); Kehbila et al. (2016). In contrast to this study, the study done by Ige & Lasebikan (2011) revealed a significant association. Being married or cohabitating provides social support thereby reducing the levels of psychological distress (Carter et al., 2012). Likewise no any association has observed between types of family and depression. This is contradictory with study in Nigeria as it revealed a significant association and depression was more prevalent among those from nuclear family (Ige & Lasebikan, 2011). This study depicts that there is significant association of depression with category of treatment (*p*=.003). This was supported by the findings of Ige & Lasebikan (2011) in Nigeria. Likewise, there is significant association between

depression and types of tuberculosis (*p*=.001). This finding is different from the studies carried out in Tanzania and Nigeria as they showed no any statistical significance (Buberwa, 2013; Ige & Lasebikan, 2011). Cough is probably one of the most prominent and burdensome disease-related symptoms in pulmonary TB and its persistence might be perceived by the patient and care giver as evidence of worsening illness or ineffective treatment, so increasing patient's worry (Issa et al., 2009). However, there is no any significant association of depression in relation to phase of TB treatment. This finding is consistent with the findings of Duko et al. (2015); Lee (2015). Unlike this study, the study carried out by Buberwa (2013) revealed a significant association of depression with phase of TB treatment. Similarly no any association is observed between duration of treatment and depression which was contradicted by the findings of Buberwa (2013); Mandaknalli and Giriraj (2015). Patients who are in the intensive phase and within first two months of TB treatment are more likely to have depression compare to those who are in the continuation phase and more than 2 months of TB treatment. It could be due to the fact that TB patients are still experiencing severe TB related symptoms, tolerating more medications used in this phase and also adjusting to the diagnosis and management plan of disease (Ige & Lasebikan, 2011). Similarly symptoms of tuberculosis tend to be prominent in the intensive phase where patients get relieved as they progress to continuation phase of TB treatment. This may indicate Patients in the phase of anti-TB treatment, the physical and functional status of the patients could improve significantly which in turn brings improved mental health status of individuals (Duko et al., 2015). A significant association has established between side effects of drugs and depression in current study which is similar to the other studies carried out in Kenya and India (Lee, 2015; Mandaknalli & Giriraj, 2015). Depression was significantly high among those patients with TB reporting the side effects of drugs (Basu et al., 2012). This study depicts that there is statistical significant association between prevalence of depression and comorbid physical illness (*p*<.001). Similar result was reported in other studies (Buberwa, 2013; Duko et al.,

2015; Kehbila et al., 2016). No statistical significance has been observed between number of comorbidity and depression. Buberwa (2013) mentions that the presence of at least one additional physical illness was associated with six fold risk for mild depression and a fourfold risk for moderate depression. Chronic physical illnesses by themselves are associated with depression in a bidirectional manner (Shyangwa et al., 2009). A significant association was found between depression and smoking ( $p < .001$ ) and between depression and alcohol consumption status ( $p = .001$ ) of patients with TB. Study conducted in South Ethiopia also supports this finding (Duko et al., 2015). Anxious patients are more prone to use substances to relieve themselves from the stress or anxiety symptoms (Duko et al., 2015). Among the total employed patients with TB, many of them have reported on reduced in their monthly income/salary after having TB because they were not able to go on work regularly. Statistical significance is observed between depression and effect on earning ( $p = .003$ ) in the current study. It might be due to physical weakness associated with disease which leads to frequent abstinence from the workplace, which in turn adds to more stress financially (Kumar et al., 2016). Financial empowerment of patients may reduce their levels of depression, and improve the compliance rate to anti-TB medication which could ultimately result in an improved quality of life (Issa et al., 2009). This study concludes that about one third of the patients with TB have depression of varying severity. There is association of depression with various variables such as educational level, category of treatment, types of tuberculosis, drugs side effects, comorbid physical illness, smoking and alcohol consumption habit and effects on earning. Health care personnel in DOTS centers should draw attention and take correct measures to screen and treat depression among patients with TB.

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