

Risk Factors Associated with Depression among Tuberculosis Patients Attending Mbagala Hospital in Dar es Salaam, Tanzania

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Abstract

Tuberculosis (TB) is a major public health challenge worldwide and is frequently accompanied by mental health disorders, particularly depression. Depression among TB patients can negatively affect treatment adherence, recovery, and quality of life. This study aimed to identify the risk factors associated with depression among tuberculosis patients attending Mbagala Hospital in Dar es Salaam, Tanzania. A quantitative cross-sectional study design was employed among TB patients aged 18 years and above receiving treatment at the TB clinic in Mbagala Hospital. Data were collected using structured questionnaires and the Patient Health Questionnaire-9 (PHQ-9) to assess depressive symptoms. Descriptive statistics, including frequencies, percentages, and cross-tabulations, were used to identify socio-demographic, disease-related, and psychosocial risk factors associated with depression. The study identified several factors linked to depression among TB patients. Key determinants included stigma associated with tuberculosis, limited social support, and co-existing medical conditions such as hypertension. These factors were found to increase the likelihood of depressive symptoms among patients undergoing TB treatment. The cross-sectional design limits the ability to establish causal relationships between risk factors and depression. However, the findings provide important insights into the psychosocial challenges faced by TB patients and highlight the need for integrated mental health services in TB care programs. Integrating mental health screening into TB treatment programs may improve patient outcomes by addressing depression early. Strengthening social support mechanisms and reducing stigma within communities may also help reduce the burden of depression among TB patients.

INTRODUCTION

Tuberculosis (TB) remains one of the most significant infectious diseases worldwide and continues to pose a major public health challenge, particularly in low- and middle-income countries. Despite global efforts to control the disease, millions of new TB cases are reported annually, making it one of the leading causes of morbidity and mortality associated with infectious diseases. The burden of tuberculosis is especially high in sub-Saharan Africa, where socioeconomic challenges, limited healthcare resources, and high prevalence of comorbid conditions complicate disease management and treatment outcomes (Assefa et al., 2023).

In recent years, there has been increasing recognition of the interaction between tuberculosis and mental health disorders, particularly depression. Depression is one of the most common mental health conditions globally and is characterised by persistent sadness, loss of interest in activities, reduced energy, and impaired functioning. The coexistence of depression with chronic diseases such as tuberculosis has become an important public health concern because psychological distress can significantly influence treatment adherence, recovery, and quality of life among patients (Assefa et al., 2023).

Evidence from various studies indicates that depression is highly prevalent among tuberculosis patients. Research conducted in different countries has shown that a large proportion of individuals undergoing TB treatment experience symptoms of depression, often at moderate or severe levels. For instance, studies have reported that more than half of TB patients may experience depressive symptoms during treatment, highlighting the substantial psychological burden associated with the disease (Duko et al., 2020).

The coexistence of tuberculosis and depression has serious implications for patient outcomes. Depression can negatively influence medication adherence, reduce motivation to continue treatment, and increase the likelihood of treatment failure or disease relapse. Furthermore, psychological distress may weaken immune responses and exacerbate the physical burden of tuberculosis, ultimately worsening patient health outcomes (Kigozi-Male et al., 2024).

Several studies have identified multiple factors that contribute to depression among TB patients. These factors may include socio-demographic characteristics, clinical conditions, and psychosocial circumstances. Socio-demographic factors such as gender, age, unemployment, and low educational attainment have been associated with increased risk of depression among TB patients (Assefa et al., 2023).

Disease-related factors also play an important role in the development of depression among TB patients. These factors may include the severity of illness, duration of treatment, co-existing medical conditions such as HIV infection, and the side effects of anti-tuberculosis medications. Studies have demonstrated that patients in the intensive phase of TB treatment or those with multidrug-resistant tuberculosis may experience higher levels of psychological distress compared to others (Duko et al., 2020).

Psychosocial factors are also strongly associated with depression among TB patients. Perceived stigma, limited social support, financial hardship, and social isolation have been widely reported as significant determinants of psychological distress in individuals living with tuberculosis. TB-related stigma may lead to discrimination, social withdrawal, and reduced self-esteem, all of which contribute to the development of depressive symptoms (Liu et al., 2026).

Studies conducted in different settings have also shown that psychosocial stressors such as poverty, unemployment, and poor living conditions can further worsen the mental health status of TB patients. These socioeconomic challenges may limit patients' ability to access healthcare services, maintain treatment adherence, or receive adequate social support during the long TB treatment process (Kigozi-Male et al., 2024; Assefa et al., 2023).

Despite the growing body of evidence linking tuberculosis and depression, mental health screening is still not routinely integrated into TB treatment programs in many healthcare settings. Consequently, depressive symptoms often remain undiagnosed and untreated among TB patients, potentially compromising treatment outcomes and overall well-being (Liu et al., 2026).

Understanding the factors associated with depression among tuberculosis patients is therefore essential for improving patient care and treatment outcomes. Identifying socio-demographic, disease-related, and psychosocial determinants of depression can help healthcare providers design targeted interventions that address both the physical and psychological needs of TB patients. In Tanzania, tuberculosis remains a major public health concern, and many patients face additional challenges related to mental health during the course of treatment. However, limited research has examined the risk factors associated with depression among TB patients in local healthcare settings. This gap in evidence highlights the need for studies that explore the determinants of depression within the Tanzanian context. Therefore, this study aimed to identify the risk factors associated with depression among tuberculosis patients attending Mbagala Hospital in Dar es Salaam, Tanzania. Specifically, the study examined socio-demographic factors, disease-related factors, and psychosocial factors that may influence the occurrence of depression among TB patients receiving treatment at the facility.

METHOD

This section describes the research methodology used to examine the risk factors associated with depression among tuberculosis patients attending Mbagala Hospital in Dar es Salaam, Tanzania. It outlines the study design, study area, study population, sampling procedures, data collection methods, and statistical analysis used in the study.

Research Design

This study employed a quantitative cross-sectional study design to assess depression and its associated risk factors among tuberculosis (TB) patients. A quantitative approach allows researchers to measure variables objectively and analyse relationships using statistical techniques, making it appropriate for examining health-related risk factors in population studies (Creswell & Creswell, 2022; Polit & Beck, 2021).

A cross-sectional design involves collecting data from a population at a single point in time and is commonly used in public health research to determine the prevalence of health conditions and identify associated risk factors (Wang & Cheng, 2020). This design is particularly useful for investigating the relationship between chronic diseases and psychological conditions such as depression in healthcare settings. The cross-sectional approach was therefore considered suitable for this study because it enabled the researcher to assess the presence of depressive symptoms among TB patients and explore their association with socio-demographic, disease-related, and psychosocial factors during the study period.

Study Area

The study was conducted at Mbagala Hospital, located in Temeke Municipality in Dar es Salaam, Tanzania. Dar es Salaam is the largest city in Tanzania and serves as a major economic and healthcare hub. The city has a diverse population and a high demand for healthcare services, including tuberculosis treatment programs. Mbagala Hospital provides both inpatient and outpatient healthcare services, including tuberculosis diagnosis, treatment, and follow-up care. The facility serves a large catchment population and operates a TB clinic where patients receive anti-tuberculosis treatment, counselling services, and routine monitoring. The hospital was selected as the study site because it receives a significant number of TB patients and therefore provides an appropriate setting for investigating mental health conditions such as depression among individuals undergoing TB treatment.

Study Population

The study population consisted of adult tuberculosis patients receiving treatment at the TB clinic of Mbagala Hospital during the study period. Only patients aged 18 years and above were included in the study to ensure that participants could independently provide informed consent and respond to the study questionnaire.

Focusing on patients currently undergoing treatment allowed the study to capture the experiences of individuals facing the physical and psychosocial challenges associated with tuberculosis. Previous studies have shown that individuals receiving TB treatment are particularly vulnerable to psychological distress and depressive symptoms (Sweetland et al., 2018; Pachi et al., 2013).

Sampling Technique

A convenience sampling technique, which is a type of non-probability sampling method, was used to recruit participants for the study. Convenience sampling involves selecting participants who are readily available and willing to participate in the study (Etikan & Bala, 2021). Patients attending the TB clinic during the data collection period were approached and invited to participate in the study. Those who met the inclusion criteria and agreed to participate were enrolled until the required sample size was reached. Convenience sampling was chosen because it allowed efficient recruitment of participants within the available time and resources. This method is commonly used in health facility-based studies where participants are selected from patients attending a specific clinic or hospital (Taherdoost, 2022).

Sample Size

The sample size represents the number of participants required to adequately represent the study population. For this study, the sample size was calculated using Cochran's formula for a single population proportion, which is widely used in epidemiological studies to determine an appropriate sample size when estimating prevalence (Pourhoseingholi et al., 2021). Using a 95% confidence level, 5% margin of error, and an estimated prevalence of tuberculosis-related depression from previous studies, the calculated sample size was 259 participants. This sample size was considered sufficient to ensure adequate statistical power for identifying associations between depression and potential risk factors among TB patients. A pilot study involving approximately 10% of the calculated sample size was conducted in a similar healthcare setting to test the clarity, reliability, and validity of the research instruments before the main data collection process.

The study included tuberculosis patients aged 18 years and older who were attending the TB clinic at Mbagala Hospital, provided they were willing to participate and capable of providing informed consent. Individuals were excluded if they had a pre-existing mental health disorder that could affect the assessment of depressive symptoms, were too severely ill to complete the questionnaire, or declined to take part in the research.

Data Collection Methods

The study utilised primary quantitative data collected directly from tuberculosis patients attending the TB clinic at Mbagala Hospital.

Data Collection Tools

Data were collected using a structured questionnaire designed to capture information on socio-demographic characteristics, disease-related factors, and psychosocial variables associated with depression. Depressive symptoms were assessed using the Patient Health Questionnaire-9 (PHQ-9), a widely used and validated screening tool for detecting depression in clinical and community settings (Kroenke et al., 2001). The PHQ-9 consists of nine items that measure the frequency of depressive symptoms experienced over the previous two weeks. The PHQ-9 has been widely used in health research and has demonstrated strong reliability and validity for assessing depression in patients with chronic illnesses, including tuberculosis (Negeri et al., 2021).

Data Collection Procedure

Data collection was conducted during routine TB clinic visits. Eligible patients were approached by the researcher and provided with information about the study. After obtaining informed consent, participants were asked to complete the questionnaire.

Participants who required assistance were supported by the researcher to ensure that all questions were clearly understood. The completed questionnaires were then checked for completeness before being entered into the data analysis system.

Data Analysis

The collected data were analysed using Statistical Package for the Social Sciences (SPSS) software. Descriptive statistics such as frequencies, percentages, means, and standard deviations were used to summarise participants' socio-demographic characteristics and the prevalence of depressive symptoms. Inferential statistical analysis was conducted to identify factors associated with depression among TB patients. Chi-square tests were used to examine associations between categorical variables, while logistic regression analysis was used to identify significant predictors of depression. Statistical significance was determined at a p-value of less than 0.05, which is a commonly accepted threshold in epidemiological and public health research (Schober et al., 2021).

Ethical Considerations

Ethical principles were strictly observed throughout the research process. Participation in the study was **voluntary**, and all participants provided informed consent before data collection. Confidentiality and anonymity were maintained by ensuring that participants' personal information was not recorded on the questionnaires. The data collected were used strictly for research purposes. The study also adhered to standard ethical guidelines for research involving human participants to ensure the protection of participants' rights, dignity, and well-being

RESULTS

Socio-Demographic Characteristics of Participants

A total of 259 tuberculosis patients participated in the study. The majority were male (57.1%), while 42.9% were female. Most participants were aged 31–50 years (48.6%), followed by 18–30 years (39.0%). In terms of education level, more than half had primary education (53.7%). Nearly half of the participants were unemployed, and 82.2% reported earning less than TZS 500,000 per month.

Table 1: Socio-Demographic Characteristics of Participants (N = 259)

Variable	Category	Frequency (n)	Percentage (%)
Sex	Male	148	57.1
	Female	111	42.9
Age group	18–30 years	101	39.0
	31–50 years	126	48.6
	>50 years	32	12.4
Education level	No formal education	41	15.8
	Primary education	139	53.7
	Secondary education	66	25.5
	College/University	13	5.0
Marital status	Single	79	30.5
	Married/cohabiting	115	44.4
	Divorced/Widowed	65	25.1
Employment status	Employed	132	51.0
	Unemployed	127	49.0
Monthly income	<500,000 TZS	213	82.2
	≥500,000 TZS	46	17.8

Prevalence of Depression among Tuberculosis Patients

Depression was assessed using the Patient Health Questionnaire-9 (PHQ-9). The findings showed that depressive symptoms were common among the participants.

Table 2: Prevalence of Depression among Tuberculosis Patients (N = 259)

Depression Level	Frequency (n)	Percentage (%)
Minimal depression	114	44.0
Mild depression	122	47.1
Moderate depression	18	6.9
Moderately severe depression	5	2.0

Overall, 56% of participants experienced depressive symptoms, highlighting the substantial mental health burden among TB patients.

Clinical Characteristics of Tuberculosis Patients

Table 3 presents the clinical characteristics of the participants. Most participants were diagnosed with pulmonary tuberculosis, and a small proportion reported co-existing chronic diseases, including hypertension and diabetes.

Table 3: Clinical Characteristics of Tuberculosis Patients (N = 259)

Variable	Category	Frequency (n)	Percentage (%)
Type of TB	Pulmonary TB	211	81.5
	Extrapulmonary TB	48	18.5
Duration of treatment	<3 months	103	39.8
	3–6 months	121	46.7
	>6 months	35	13.5
Hypertension	Yes	21	8.1
	No	238	91.9
Diabetes	Yes	14	5.4
	No	245	94.6

Psychosocial Characteristics of Participants

Psychosocial factors such as stigma and social support were also assessed. A considerable proportion of participants reported experiencing TB-related stigma, while some participants reported inadequate social support.

Table 4: Psychosocial Characteristics of Participants (N = 259)

Variable	Category	Frequency (n)	Percentage (%)
TB-related stigma	Yes	76	29.3
	No	183	70.7
Social support	Adequate	167	64.5
	Poor	92	35.5

Bivariate Analysis of Factors Associated with Depression

Bivariate logistic regression analysis was performed to examine the relationship between independent variables and depression. Table 5 shows that hypertension, TB-related stigma, and poor social support were significantly associated with depression.

Table 5: Bivariate Analysis of Factors Associated with Depression

Variable	Category	Odds Ratio (OR)	95% CI	p-value
Hypertension	Yes vs No	8.12	2.10 – 31.40	0.004
TB-related stigma	Yes vs No	4.11	1.55 – 10.87	0.008
Social support	Poor vs Adequate	2.63	1.23 – 5.62	0.021
Sex	Female vs Male	1.32	0.78 – 2.25	0.301
Age	31–50 vs 18–30	1.28	0.72 – 2.18	0.337

The results indicate that hypertension, stigma, and inadequate social support were significantly associated with depression among TB patients, whereas demographic factors such as age and sex did not show statistically significant associations.

DISCUSSION

This study aimed to identify the risk factors associated with depression among tuberculosis patients attending Mbagala Hospital in Dar es Salaam, Tanzania. The findings revealed a high prevalence of depressive symptoms among TB patients and identified several clinical and psychosocial factors associated with depression.

Prevalence of Depression among TB Patients

The results showed that more than half of the participants experienced some level of depressive symptoms, with 47.1% reporting mild depression and 8.9% reporting moderate to moderately severe depression.

These findings are consistent with previous studies conducted in other low- and middle-income countries, which have reported high levels of depression among TB patients (Assefa et al., 2023; Duko, Bedaso, & Ayano, 2020). Depression among TB patients is often associated with the psychological stress of living with a chronic infectious disease, the lengthy treatment process, and concerns about stigma and social rejection.

Similarly, studies in sub-Saharan Africa have reported depression prevalence rates ranging from 40% to 60% among TB patients, emphasising the significant mental health burden associated with tuberculosis (Kigozi-Male et al., 2024; Sweetland et al., 2018).

Influence of Clinical Factors

One of the major findings of this study was the strong association between hypertension and depression among TB patients. Participants with hypertension were significantly more likely to experience depressive symptoms compared with those without hypertension.

This finding is consistent with previous research indicating that comorbid chronic diseases increase the risk of depression due to the combined physical and psychological burden experienced by patients (Pan et al., 2014; Rouf et al., 2021). Managing multiple health conditions simultaneously can increase stress levels, reduce quality of life, and contribute to feelings of hopelessness and emotional distress.

Role of Psychosocial Factors

Psychosocial factors played a significant role in the development of depression among TB patients. In particular, TB-related stigma was identified as one of the strongest predictors of depression. Patients who experienced stigma due to their TB diagnosis were significantly more likely to develop depressive symptoms. This finding aligns with previous studies demonstrating that stigma can lead to social isolation, discrimination, and reduced self-esteem, all of which contribute to psychological distress (Duko, et al., 2019; Fang et al., 2022).

Similarly, lack of social support was associated with increased depression among TB patients. Social support from family members, friends, and community networks plays an important role in helping patients cope with the challenges of chronic illness. When such support is lacking, patients may feel isolated and overwhelmed, increasing their vulnerability to depression (Ambaw et al., 2018).

Implications for Tuberculosis Care

The findings of this study highlight the importance of integrating mental health services into tuberculosis treatment programs. Addressing depression among TB patients can improve treatment adherence, enhance quality of life, and reduce the risk of poor treatment outcomes.

Healthcare providers should consider implementing routine depression screening using tools such as the PHQ-9 in TB clinics. In addition, interventions aimed at reducing stigma and strengthening social support networks may help mitigate the psychological burden experienced by TB patients.

CONCLUSION

This study examined the risk factors associated with depression among tuberculosis (TB) patients attending Mbagala Hospital in Dar es Salaam, Tanzania. The findings indicate that depression is a common mental health concern among TB patients, with more than half of the participants experiencing some level of depressive symptoms.

These results highlight the significant psychological burden faced by individuals undergoing TB treatment. The study identified several factors significantly associated with depression among TB patients. In particular, the presence of hypertension, TB-related stigma, and inadequate social support were found to increase the likelihood of depressive symptoms. These findings demonstrate that both clinical conditions and psychosocial challenges play an important role in influencing the mental health of individuals living with tuberculosis.

The results emphasise the importance of adopting a holistic approach to TB care that addresses not only the physical aspects of the disease but also the psychological well-being of patients. Integrating routine mental health screening into TB treatment programs, particularly using validated tools such as the PHQ-9, could help identify patients experiencing depression early and facilitate timely interventions.

Furthermore, strategies aimed at reducing TB-related stigma and strengthening social support systems within families and communities may significantly improve the mental health and treatment outcomes of TB patients. Healthcare providers, policymakers, and public health programs should therefore prioritise the integration of mental health services into tuberculosis care. Overall, addressing depression among TB patients is essential for improving treatment adherence, enhancing quality of life, and achieving better public health outcomes in tuberculosis control programs.

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