

Original Research

Psychological Distress Among Patients with Open Tibia Fractures at a Tertiary Level Hospital, Tanzania: A Cross-Sectional Study

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Abstract

Background

Psychological distress is a significant and growing public health concern in patients with musculoskeletal injuries. Open tibia fractures are among the most common injuries with both physical and psychological impacts. However, most care focuses on physical management, such as medications and surgery, with limited attention given to the mental aspect, leading to suboptimal outcomes.

Methods

A descriptive cross-sectional study was conducted among patients with open tibia fractures treated at Muhimbili Orthopaedic Institute. A consecutive sampling method was used, where a structured questionnaire was administered during face-to-face interviews to gather data from participants. The mental health domain scores of the short form 36 were utilized to evaluate the likelihood of psychological distress and emotional well-being among study participants.

Results

A total of 328 patients with a mean age of 35.04 ± 12.61 years were enrolled in the study after meeting the inclusion criteria. They were primarily male (80.8%) and roughly half had completed secondary education (54.3%). Most participants were single (70.1%), had no formal employment (81.1%), and lived below the poverty line, with 68% of them earning less than \$200 USD monthly. Notably, 91.5% of them lacked health insurance. The proportion of psychological distress was found to be 66.5%, which was significantly associated with lower education levels, unemployment, low income, acute post-injury phase (three weeks), clinical complications, and poor social support.

Conclusion

There is a higher level of psychological distress among patients with open tibia fractures in our setting, which warrants the need to consider the psychological component of treatment when caring for them based on their risk profile.

Introduction

Musculoskeletal injuries are among the major contributors to the global disease burden, affecting 20–50 million people worldwide each year, preventing patients from normal societal interactions and from working to meet their financial obligations.¹ Most of these injuries result from motor traffic

crashes and lead to significant morbidity and mortality, especially among the young population in low- and middle-income countries like Tanzania. Due to high-velocity impact and a limited soft tissue envelope, most of these patients sustain open tibia fractures with various complications.²⁻⁴



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These patients may experience anxiety and fear related to the injury, the healing process, and potential complications, including uncertainty about recovery outcome, pain levels, and the need for long-term rehabilitation.⁵ Body image concerns may arise from the visibility of the open wound and from the use of immobilization devices, causing self-consciousness, embarrassment, and a negative body image.⁶ Delays in recovery might affect the survivors' mental health, which may lead to the development of psychological distress following the trauma.^{7,8} Generally, the global proportion of psychological distress in orthopaedic trauma patients is stated to be 3–5 times higher than in the general population.⁹ Patients in developing countries are more likely to experience psychological distress when compared to those in the developed world.^{8,10} Despite the presence of psychosocial morbidity in patients with open tibia fractures, clinical assessment of psychological distress during pain management treatment may improve patients' clinical outcomes during post-injury care.¹¹

This study aimed to assess the rate of psychological distress and the associated factors among patients with open tibia fractures treated at Muhimbili Orthopaedic Institute (MOI).

Methodology

Study design and area

A hospital-based cross-sectional study was conducted at MOI in Tanzania. Patients requiring mental or psychological evaluation at MOI are normally attended by experts from the department of Psychiatry and Mental Health of Muhimbili National Hospital (MNH), located within the same compound, upon consultation.

Inclusion and exclusion criteria

We included all patients with an open tibia fracture aged 18 years and above, excluding those with preexisting limb deformity, pathological fractures, cognitive impairment (such as head injury, stroke, and dementia), or with established psychiatric diagnoses (such as schizophrenia, and major depressive disorder).

Study variables

The dependent variable was psychological distress. The short form 36 questions (SF-36) with mental health (MH) scores were used to assess quality of life, focusing on mental health functioning levels.^{12,13} Due to the absence of established normative data of the Tanzanian population on SF-36 scores, a 60% threshold was adopted from the quality-of-life study conducted at MOI, which identified 60% as the baseline for good mental functioning. Therefore, those who scored below that on the mental health domain in our

study were categorized as indicative of psychological distress.¹⁴

Independent variables included sociodemographic characteristics and trauma-related factors such as mechanism of injury, fracture classification, length of hospital stays, payment mode, and treatment provided.

Data collection procedure

A consecutive sampling technique was used to recruit the study participants at the inpatient or outpatient departments after obtaining their informed consent, where data were collected using a structured questionnaire in face-to-face interviews. To ensure its validity, the questionnaire was reviewed by experts in mental health, epidemiology, and biostatistics, followed by a pilot study involving 10% of the sample size ($n = 33$) before engaging in the actual study. The study's findings were used to refine the tool.

Data management and analysis

The collected data were analysed by SPSS (Statistical Package for Social Sciences) software version 24 (IBM Corp., Armonk, NY, USA). The variables were summarized by the frequency distribution table, and the description of continuous variables was done using mean and standard deviation. The Chi-square test was used for comparison of categorical variables, whereas the t-test was utilized for continuous variables. A P value of less than 0.05 was regarded as statistically significant. A logistic regression analysis was done to determine the effect of each independent variable. The proportion of patients with psychological distress was calculated as a ratio of those with psychological distress (numerator) to the total number of participants (denominator) in percentage.

The body mass index was assessed by dividing mass (Kg) by height² (meter²), while pain severity was assessed by the numeric pain rating scale, with 0 being no pain and 10 being the worst possible pain. The social support was assessed by the Oslo Social Support Scale (OSSS-3), where individuals with scores of 3–8 were termed as having poor social support, 9–11 as moderate, and 12–14 as strong¹⁰⁻¹²

Ethical consideration

Ethical approval was secured from the Muhimbili University Institutional Review Board (Ref: MUHAS-REC-01-2023-1496), and permission to collect data was obtained from MOI. Confidentiality was maintained throughout and after the study. To ensure respondent anonymity, a questionnaire was designed without names or identifiers. Additionally, all participants were informed of the study's objectives so they could make an informed and voluntary decision about participation. They were also given the right to withdraw from the study at any time without penalty. Consequently, study participants were asked to sign a written consent form before completing the question-

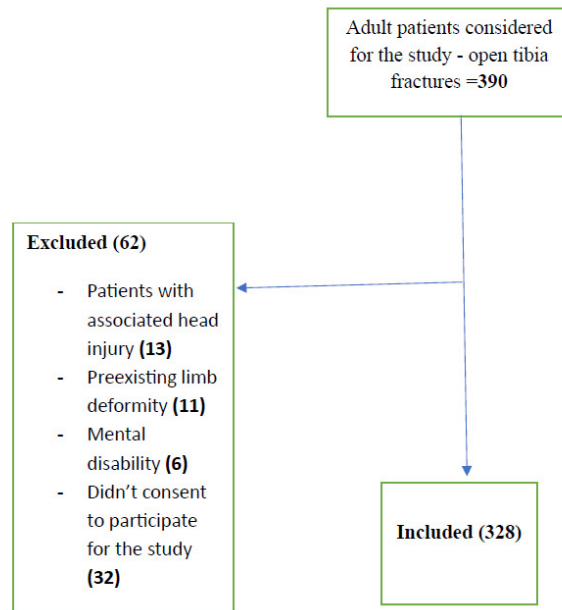


Figure 1. Population flow chart.

naire. Mental health services were offered for participants with marked psychological distress upon consultation from the expert department at MNH.

Results

We found 390 patients with open fractures, out of which 328 patients were enrolled after providing their informed consent ([Figure 1](#)).

Socio-demographic characteristics of patients with an open tibia fracture

The mean age of participants was 35.04 ± 12.61 years, with more than half of them (70.7%) aged 18–38 years. 265 were male, accounting for 80.8% of the total population. One 178 participants had completed secondary education, contributing to more than half of the participants (54.3%). The majority were single (70.1%) and privately or self-employed (81.1%). Most (68.3%) had a monthly income of less than \$200 USD and had no health insurance (91.5%) ([Table 1](#)).

Trauma-related factors among patients with an open tibia fracture

Most participants (39.0%) were more than 6 weeks post-injury, 33.8% of them had complications, including amputation, delayed union, infection, and non-union. 82.0% reported having pain.

Proportion of patients with psychological distress as a result of an open tibia fracture

Our study found 218 participants to have psychological distress based on their score, amounting to 66.5% of the total population.

Association between psychological distress and demographic characteristics of patients with open tibia fracture

We found a significant association between psychological distress and level of education (P value = 0.026), occupation status (P value = 0.001), monthly income (P value = 0.00), and social support (P value = 0.001). However, there was no significant association with age, BMI, sex, marital status, number of children, or religion ([Table 2](#)).

Association between psychological distress and trauma-related factors

There was a significant association between psychological distress and the time since the injury (P value = 0.016), the presence of complications (P value = 0.001), pain severity (P value = 0.003), and the modality of payment of hospital bills (P value = 0.006). However, there was no association with fracture severity, mechanism of injury, or type of surgical treatment received ([Table 3](#)). Factors with a P value of 0.2 or less, including education level, occupation status, income status, social support, duration since injury, presence of clinical complication, mode of hospital bill payment, age, marital status, and having children were

Table 1. Socio-demographic characteristics of the Participants

Variable	Categories	Frequency	Percentages (%)
Sex	Male	265	80.8
	Female	63	19.2
Age	18-38 years	232	70.7
	39-59 years	84	25.6
	60 and above	12	3.7
BMI	Normal weight (Kg/m ²)	123	37.5
	Obese (Kg/m ²)	205	62.5
Level of education	Primary education	91	27.7
	Secondary education	178	54.3
	University/college	59	18.0
Marital status	Married	98	29.9
	Single	230	70.1
Have children	Yes	242	73.8
	No	86	26.2
Religion	Christian	167	50.9
	Muslim	161	49.1
Occupation	Government employment	62	18.9
	Private/self-employed	266	81.1
Monthly income	Less than 200 USD	224	68.3
	More than 200 USD	104	31.7
Mode of payment	Insurance	28	8.5
Social support	Private payment/ cash	300	91.5
	Poor	220	67.0
	Moderate	92	28.0
	Good	16	5.0

Table 2. Relationship between demographic characteristics and psychological distress.

Variable	Categories	Higher level of psychological distress		Chi-square	p-Value
		n	%		
Age group	18-38 years	156	67.2%	1.896	0.169
	39-59 year	52	61.9%		
	More than 60 years	10	83.3%		
BMI ranks	Normal weight $\leq 25\text{Kg/m}^2$	83	67.5%	0.091	0.763
	Overweight $\geq 25\text{Kg/m}^2$	135	65.9%		
Sex	Male	177	66.8%	0.067	0.796
	Female	41	65.1%		
Level of education	Primary level	67	67.0%	7.297	0.026
	Secondary level	120	67.4%		
	College/university	31	31.0%		
Marital status	Married	60	61.2%	1.721	0.190
	Single	158	68.7%		
Having children	Yes	167	69.0%	2.682	0.102
	No	51	59.3%		
Religion	Christian	105	62.9%	1.966	0.161
	Muslim	113	70.2%		
Occupation status	Employed	30	48.4%	11.207	0.001
	Self/unemployed	188	70.7%		
Monthly income	More than 200 USD	53	51.0%	16.418	0.000
	Less than 200 USD	165	73.7%		
Social support	Poor	157	71.4%	14.750	0.001
	Moderate	57	62.0%		
	Good	4	25.0%		

involved in multivariate analysis. Poor social support (AOR = 4.1, 95% CI:1.171–14.666, $P = 0.027$), primary education level (AOR = 2.645, 95% CI:1.313–5.331, $P = 0.007$), unemployment (AOR = 2.394, 95% CI: 1.310–4.387, $P = 0.006$), low income (AOR = 2.366, 95% CI:1.286–4.350, $P = 0.005$), presence of clinical complications (AOR = 3.216,

Table 3. Relationship between psychological distress and trauma-related factors.

Variable	Categories	Higher Psychological distress		Chi-square	p-Value
		N	%		
Fracture Severity (Gustilo and Anderson Classification)	I	4	1.8%	1.015	0.314
	II	40	18.3%		
	IIIA	110	50.5%		
	IIIB	64	29.4%		
Surgical treatment	IM nail	98	64.9%	0.232	0.630
	Ex-Fix	118	67.4%		
Duration since injured	≤3week	84	76.4%	8.214	0.016
	4-6week	52	57.8%		
	≥6week	82	64.1%		
Complication	No	158	72.8%	11.591	0.001
	Yes	60	54.1%		
Pain	Yes	177	65.8%	0.296	0.586
	No	41	69.5%		
Pain intensity	Mid pain	6	35.3%	11.852	0.003
	Moderate	63	76.8%		
	Severe	108	63.5%		
Mode of payment	Insurance	12	42.9%	7.654	0.006
	Private payment	206	68.7%		
Causes of injury	Assault/sport/falling	20	76.9%	8.342	0.080
	Pedestrian	67	67.7%		
	Motorcycles collision	45	55.6%		
	crash	50	75.8%		
	Motors vehicles	36	64.3%		

Table 4. Factors associated with psychological distress among patients with Open tibia fractures

Variable	Categories	COR 95%CI; p-value	AOR 95%CI; p-value
Level of education	Primary level	2.522(1.263-5.036); 0.009	2.645(1.313-5.331); 0.007
	Secondary level	1.869(1.026-3.403); 0.041	1.364(0.777-2.395);0.279
	College/university	Ref	Ref
Occupation status	Non/Self-employed	2.571(1.463-4.518); 0.001	2.394(1.310-4.387); 0.006
	Employed	Ref	Ref
Income status	Less than 200 USD	2.691(1.655-4.375); 0.000	2.366(1.286-4.350); 0.005
	More than 200 USD	Ref	Ref
Social support	Poor	7.476(2.323-24.058); 0.001	4.145(1.171-14.666); 0.027
	Moderate	4.886(1.461-16.340); 0.010	3.862(1.114-13.391); 0.033
	Good	Ref	Ref
Duration since injured	≤3week	0.424(0.231-0.777); 0.006	3.057(1.526-6.124); 0.002
	4-6week	0.552(0.312-0.975); 0.041	2.246(0.396-1.375);0.338
	≥6week	Ref	Ref
Complication	Yes	2.276(1.411-3.672) 0.001	3.216(1.745-5.925); 0.00
	No	Ref	Ref
Mode of payment	Self-funded	2.922(1.330-6.420); 0.008	4.312(1.450-12.824); 0.009
	Health insurance	Ref	Ref

95% CI:1.745–5.925, $P = 0.00$), acute post-injury phase (less than three weeks; AOR = 3.057, 95% CI: 1.526–6.124, $P = 0.002$), and lack of health insurance (AOR = 4.312, 95% CI:1.450–12.824, $P = 0.009$) were found to be independent predictors of psychological distress (Table 4).

Discussion

Proportion of psychological distress

The proportion of psychological distress among patients with open tibia fractures from this study was 66.5%, which was higher than the results of a study conducted in Ethiopia that found 35.4% of the orthopaedic trauma patients to have psychological distress.⁸ These findings suggest that open fracture patients may exhibit a higher level of mental dis-

turbance compared to other orthopaedic conditions, which may be due to wounds that can affect body image perception, increase the need for prolonged care, or increase the risk of developing chronic complications. In the USA, 26% of the trauma patients had psychological distress,¹⁵ which is lower than ours. This could be attributed to the differences in patients' income levels, education levels, and employment status. Most of our patients had a monthly income below the poverty line with limited access to health resources, which might potentially impact their mental health and contribute to a higher proportion of psychological distress.¹⁶⁻¹⁸ Furthermore, variations in healthcare infrastructure, mental health awareness, and support systems between the countries may also affect stress management and treatment-seeking behaviours.

Factors associated with psychological distress among patients with an open tibia fracture

The poor quality of life of patients with tibia fractures can be influenced by poor mental health, exacerbated by levels of depression, anxiety, and psychological distress.^{10,19, 20} The following factors are associated with higher levels of psychological distress among patients treated in our setting.

Level of education

We found an association between psychological distress and lower education levels, which may result from limited access to resources and reduced opportunities, such as employment, income, and lack of social support.²¹ These findings were contrary to the study done in Ethiopia, where the education status was not significantly associated with psychological distress.²² This variation could be explained by the difference in the demographic profile of the study population, where only 13% of our study participants were above high school level, while 29% of the participants in Ethiopia were above it.

Employment status

Unemployed patients were 2.3 times more likely to report developing psychological distress when compared to employed patients. It has been reported that 40.6% of patients with orthopaedic conditions in Tanzania were at risk of depression after losing their jobs as a result of delayed recovery from injury and return to work.²³ A similar observation was reported by Becher et al.¹¹ Patients with long bone fractures have limited opportunities due to their incapacity to participate in regular activities,²⁴ whereby the stress of running a business, meeting deadlines, and dealing with financial risks can contribute to higher levels of psychological distress.

Income status

Patients with lower income levels (less than \$200 USD per month) were more highly associated with the development of psychological distress than those with higher levels of income above it. Our findings concur with a study done in the USA, which reported that injured patients with financial constraints were strongly related to limited access to rehabilitation services.²⁵ The association between lower income levels and psychological distress could be attributed to socioeconomic inequalities, stigma, and marginalization.^{26,27} Therefore, psychological distress associated with income disparity could be due to negative emotional feelings impacting mental health, resulting from limited access to healthcare.

Social support

Patients with poor social support were significantly associated with psychological distress compared to patients with good social support, which aligns with the results of other studies done in Ethiopia.^{22,28} Findings have suggested that, during the healing process, social support can help to provide emotional comfort, practical aid, motivation, information, and a sense of belonging.

Duration since injury

The patients in the acute post-injury phase were 3 times more likely to report psychological distress than those who had older injuries, emphasizing the importance of understanding and addressing the psychological impact during the early stages of recovery from an open tibia fracture. On the contrary, studies conducted in Australia and New Zealand reported that injured patients experienced significant psychological distress during hospitalization and 3–6 months following hospital discharge.^{29,30} Variation in these findings could be attributed to the difference in sample sizes and geographical location.

Presence of complication

Patients with open tibia fractures who developed complications were more likely to develop psychological distress than those who didn't, which is consistent with the findings of the study done in Addis Ababa, Ethiopia.²² Furthermore, the study by Ababu et al. in 2022 reported that psychological distress among orthopaedic patients in southern Ethiopia was commonly associated with complications such as depression, post-traumatic stress disorder, and personality disorder.²⁸ This reflects the significance of this factor across countries in sub-Saharan Africa.

Mode of healthcare payment

Participants who were not insured and paid cash for hospital bills were 4.3 times more likely to report psychological dis-

tress, according to a systematic review, which reported that the likelihood of psychological distress was significantly associated with a lack of health insurance among patients with open tibia fractures.³¹ The cost of medical care imposes a significant financial burden, resulting in financial strain associated with worries about medical expenses and severe psychological distress.

Injury severity

There was no significant association between the fracture severity based on Gustilo and Anderson grading and the psychological distress among our study participants, which implies that the psychosocial factors may be more important than the physical injury itself in determining the mental health outcomes.

Conclusion

We found a high proportion of psychological distress among patients with open tibia fractures, regardless of their severity or treatment offered in our setting. This is significantly associated with low education levels, unemployment, lower income, poor social support, the acute post-injury phase, and the presence of complications. Therefore, efforts should be directed to include the mental component of treatment when caring for patients with open fractures based on their risk profile, with more emphasis on psychosocial factors.

Study Limitations

There is a possibility of social desirability bias, where respondents may report what they believe the researcher wants to hear during a face-to-face interview. Furthermore,

while the use of 60% cut off point on the SF-36 was adopted from local literature, it has not been formally validated as the diagnostic threshold for psychological distress in Tanzania, calling for cautious interpretation.

Ethical approval

Ethical approval was obtained from the Muhimbili University Institutional Review Board (MUHAS-REC-01-2023-1496).

Informed consent

Written informed consent was obtained before the questionnaire was completed.

Data Availability

The data that support the findings for this study are available from the corresponding author upon reasonable request.

Conflict of Interest

None

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None

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