PROPORTION OF PSYCHOLOGICAL STRESS AND ASSOCIATED FACTORS AMONG PATIENTS WITH OPEN TIBIA FRACTURE TREATED AT MUHIMBILI ORTHOPEDIC INSTITUTE.

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By

Deogratias Adolar Hyera

A Dissertation Submitted in (Partial Fulfilment of the Requirements for the Degree of Master of Medicine (Orthopaedics and Traumatology) of

Muhimbili University of Health and Allied Sciences

October, 2024

CERTIFICATION

The undersigned certifies that they have read and hereby recommends for acceptance by the Muhimbili University of Health and Allied Sciences a dissertation entitled **"Proportion of psychological stress and associated factors among patients with open tibia fracture treated at Muhimbili Orthopaedics Institute"** in partial fulfilment of the requirements for the degree of Master of Medicine (Orthopaedics and Traumatology) of Muhimbili University of Health and Allied Sciences.

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DECLARATION AND COPYRIGHT

I, **Deogratias Adolar Hyera**, declare that this dissertation entitled **"Proportion of psychological stress and associated factors among patients with open tibia fracture treated at Muhimbili Orthopaedics Institute"** is my original work and it has not been presented and will not be presented to any other University for a similar or any other degree award.

Signature……. Date……

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Lastly but not for importance, it is not possible to complete work of this nature without involving my colleagues. Their critical focus and attention to detail was exactly what was needed to make this a better dissertation, and I thank them for their contributions.

With utmost admiration and respect,

Dr. Deogratias Adolar Hyera.

DEDICATIONS

I dedicate this research dissertation with boundless love and gratitude to the most important people in my life. To my beloved wife, Sophia Raphael Msakusy, this dissertation stands as a testament to your unwavering love, support, and encouragement throughout this academic journey. Your presence in my life has been a constant source of strength, inspiration, and motivation.

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Lastly, I dedicate this research dissertation to the memory of my late father, Adolar Solomon Hyera. Though you are no longer with us, your memory and the values you instilled in me continue to inspire and guide me. Your unwavering support and belief in my abilities will forever be cherished. This dedication is a tribute to your legacy and the lasting impact you have had on my life.

With all my love and gratitude,

Deogratias Adolar Hyera

ABSTRACT

Background: Psychological stress is a significant and rapidly increasing public health problem in patients' long-term rehabilitation around the world. There are several reported cases of patients with open tibia fractures whose health outcomes were affected by stress disorder. This indicates that little is known regarding the proportion of psychological stress and associated factors in patients with open fractures of the tibia.

Objective: The study intended to determine the proportion of psychological stress and associated factors among patients with open tibia fracture treated at Muhimbili Orthopedic Institute.

Methodology and methods: A cross-sectional descriptive study was carried out at Muhimbili orthopaedic Institute. A simple sampling technique was employed to obtain 386 patients after they have met inclusion and exclusion criteria. A structured questionnaire was utilized as a data collection tool and a short form with 36 questions (SF-36) was used containing questions that examined quality of life that was then interpreted in relation to psychological stress. IBM Statistical Package for Social Sciences (SPSS) version 23 software was used to describe socio-demographic characteristics and the proportion of psychological stress among patients with open tibia fractures. Multivariate logistic regression was used to obtain an adjusted odd ratio and 95% confidence interval to identify the strength of the association between dependent and independent variables. A variable with $p<0.05$ was considered statistically significant.

Result: A total of 386 patients were enrolled to the study. The mean age was 35.04 ±12.61, 70.7% were in the age group of 18- 38years. The mean BMI was 26.9±4.2, and 62.6% were obese. The majority of the patients were males accounting for 80.8%. The proportion of psychological stress was found to be 66.5%.

Conclusion and recommendation: A higher level of psychological stress among patients with open tibia fracture was associated with having a lower level of education self-employment, lower level of income, a period of fewer than three weeks following injury, complications of injury, and poor social support. Then, the study recommends provision of public health education as a coping strategy and conducting routine psychosocial assessments to effectively support the psychological well-being of patients.

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LIST OF ABBREVIATIONS

G. A	Gustilo-Anderson open fracture classification
IRB	Institutional Review Board (MUHAS Institutional Review Board)
MMed	Master of Medicine.
MOH	Ministry of Health
MOI:	Muhimbili Orthopaedic Institute
MUHAS	Muhimbili University of Health and Allied Sciences
ORIF	Open Reduction and Internal Fixation
SF-36:	Short Form 36 Health Survey Questionnaire (SF-36).
UK:	United Kingdom
WHO:	World Health Organisation
PTSD	Post-Traumatic Stress Disorder

DEFINITION OF TERMS

Psychological stress: Psychological stress refers to the emotional and cognitive response that individuals experience when they perceive an imbalance between the demands placed upon them and their ability to cope with those demands. It is a subjective experience characterized by feelings of pressure, tension, and strain (1).

Open tibia fracture: A fracture of the tibia where the fracture haematoma is in communication with the external environment. This type of fracture is considered a severe injury and requires immediate medical attention (2).

CHAPTER ONE

1.0 INTRODUCTION

1.1 Background information

Open tibia fracture is a serious and developing public health concern caused by direct or indirect trauma because cutaneous and subcutaneous tissues anterior to the tibia shaft are thin (3). Furthermore, most orthopaedic trauma, such as traumatic open fractures of the tibia, are the leading cause of mortality and morbidity(4). According to WHO, about 20-50 million people experience musculoskeletal injuries each year worldwide (5). The tibia open fracture occurs in 3.4 per 100,000 young adult males and old females with an average age of 43.3 years(6). Motor traffic crashes and falls from heights account for more than 90% of injuries in lower and middle-income nations compared to higher-income ones. (5). Therefore, traumatic injuries of the open tibia fracture should be put to caution as a possibility of substantial causes of morbidities and mortalities in lower and middle-income countries like Tanzania.

Management of soft-tissue injuries is the basic principle in treating a patient with an open tibia fracture to reduce the risk of infection, stabilize and repair the skeletal injury, as well as restoring the function of the affected extremity (6). Infection, complicated regional pain syndrome, non-union, and amputation are some of the reported complications that can affect the patient's prognosis, although they can vary depending on the treatment method, the severity of the injury, and the patient's psychological support/care. (7,8). Treatment for open tibia fractures is guided by the fracture classification and extent of the injury of soft tissue. (6). Complication of open tibia fracture may vary due to individuals physical pain, functional limitations, and changes in their daily routines due to the injury (9).

In addition, patients with an open tibia fracture commonly 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 (10). The physical limitations imposed by the fracture can lead to feelings of helplessness and dependency, contributing to sadness and depression, exacerbated by the inability to engage in regular activities. Some patients may develop symptoms of post-traumatic stress disorder (PTSD), such as intrusive thoughts, nightmares, flashbacks, hyperarousal, and avoidance

behaviours (11). Body image concerns arise from the visibility of the open wound and the use of immobilization devices, causing self-consciousness, embarrassment, and negative body image (12). The fracture and recovery process can result in decreased social interactions, leading to social isolation, disconnection from support networks, and feelings of loneliness.

Traumatic bone fracture has a significant impact on various aspects of life, however, a recent review of the literature revealed that a long bone fracture prevents patients from normal societal interactions and working to meet their financial obligations (5). Besides, the patient who understand the relationship between psychological stress and pain are more likely to recover from injury between one month to 12 months post-injury(13). Then, it is well known that delay in recovery might affect the survivors' mental health which may lead to the development of psychological stresses following the trauma (14,15). Furthermore, a study conducted in the northern part of Tanzania on the psychological stress of patients getting orthopaedic treatments emphasizes the importance of developing mental health services as an important component of orthopaedics care in both high and low-resource settings (16). Yet studies assessing the psychological stress of traumatic patients are scarce. Therefore, this motivated the researcher to investigate factors associated with a proportional increase in psychological stress and associated factors among patients with open tibia fractures who received treatments at MOI.

1.2 Problem statement

Generally, the global proportion of psychological stress in orthopedic trauma patients is stated to be 3 - 5 times compared to the general population (17). Trauma patients are more than three times at a higher risk of experiencing stress compared to the general population. The research team, including scientists from Canada and Japan, found that certain immune cells respond to stress by producing an enzyme that promotes the release of stress hormones (18). Higher-income countries like China have a lower proportion of patients with psychological stress, emphasizing the need for greater attention to factors contributing to this issue(14,15).

Despite various studies have been done regarding the physical and treatment of open tibia fracture, however, information is scarce regarding factors associated with an increase in psychological stress among patients with open tibia fracture, especially in low resource countries like Tanzania. Therefore, it's necessary to study the relationship between open tibia fractures and psychological stress.

1.3 Rationale of the study

Open tibia fractures are a serious and developing public health concern caused by direct or indirect trauma on the tibial bone. Due to anatomical structures such as cutaneous and subcutaneous tissues anterior to the tibia shaft being thin, and also because of an increase of lower limb fractures in both low- and high-income countries, this could lead to increase of cases with open tibia fractures. Little has been studied on the issue of psychosocial stress amongst patients with open tibial fracture. The study findings will provide information regarding factors that are associated with a proportional increase in psychological stress among patients with an open tibia fracture. The findings of the study will provide baseline information to be used in the development of mental health services to encounter an increased proportion of patients with psychological stress among patients with open tibia fractures. Hence, information will lay down the basis for further study in the formulation of intervention for achieving better control and improved standard of life among those with traumatic Open Tibia fracture in Tanzania.

1.4 Overall research question

What is the proportion of psychological stress among patients with open tibia fractures treated at MOI, and what are the factors associated with it?

1.5 Research objectives

1.5.1 Broad objective

To determine the proportion of psychological stress and associated factors among patients with open tibia fracture at MOI.

1.5.2 Specific objective.

i. To determine the proportion of patients with psychological stress as a result of open tibia fracture treated at MOI.
ii. To determine the social demographic factors associated with psychological stress among patients with open tibia fractures treated at MOI
iii. To determine trauma-related factors associated with psychological stress among patients with open tibia fractures treated at MOI

1.6 Conceptual framework

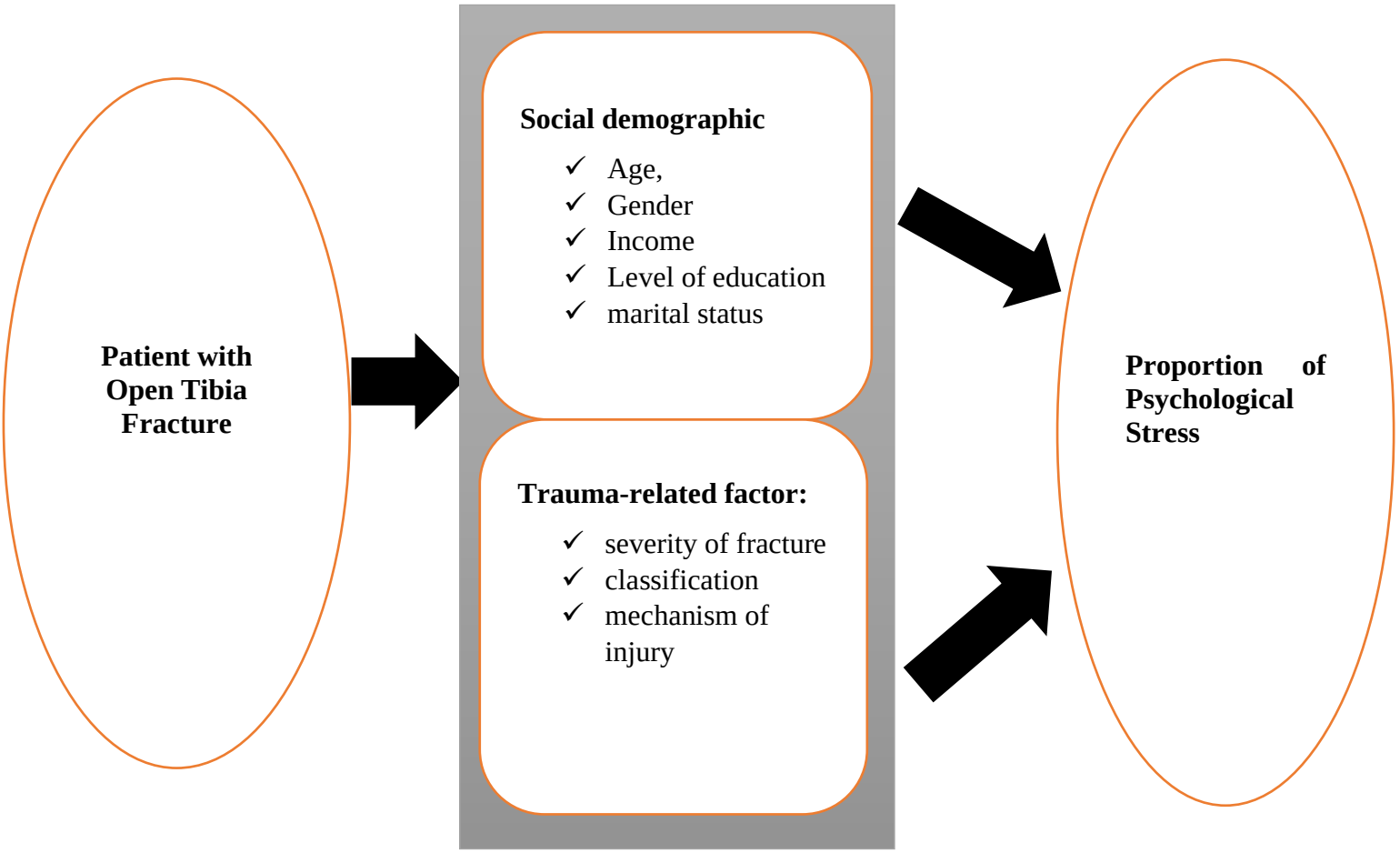


Figure 1: Conceptual framework on the factors associated with psychological stress among patients with an open tibia fracture

Source: Research own constructs.

1.6.1 Description of conceptual framework

Psychological stress is measured by using dependent variables such as bodily pain, vitality, limitations of physical and social activity as well as limitations of activity of daily living. The dependent variable was influenced by demographic variables, such as age and sex, and other independent variables such as level of education, Body mass index (BMI), religion, occupation, monthly income, mode of payment, together with care of injury. These variables were selected because they provide accurate predictions for the study objectives.

CHAPTER TWO

2.0 LITERATURE REVIEW

2.1 Proportion of psychological stress among patients with open tibia fractures.

There is an increase in fractures and their incidences are growing in numbers on a global basis. For example, from 1990 to 2019, a period of three decades, there were 178 million new fractures which is an increase from 33.4%. This has ranked trauma as one of the top 5 leading causes of death worldwide by WHO and CDC statistics reports. In the same year of 2019, it was recorded that lower leg fractures of the patella, tibia or fibula, or ankle were the most common and burdensome fractures (4). Annual data from the WHO states that about 20-50 million people experience musculoskeletal injuries each year worldwide (5). The proportion of these fractures is in young adults for males and with females it is mostly in the elderly, with a proportion rate of 3.4 per 100,000 young adult males and old females with an average age of 43.3 years(6). In the developed world, the proportion is higher at 51.7 per 100,000 and year as shown by a study that was done in Sweden.

There are several causes of open tibia fractures but road traffic crashes/ RCTs and falls from great heights account for more than 90% of injuries in lower and middle-income nations compared to higher-income ones. In the elderly, the causes are non-fit patients with osteoporotic bone. (20) Depending on the location of the fractures, tibial plateau fractures can result from direct trauma or indirect compressive forces which result in significant soft tissue disruption, and ligamentous disturbance in addition to bone fractures. (21) The most common cause of shaft fractures is road accidents with about 46% of them resulting in open fractures. (22) The death rate following RTCs in low-income countries averages 27.5 deaths per 100,000 population compared with 8.3 per 100,000 in high-income countries (5).

Social and psychosocial factors are thought to be important in the recovery from fractures, such interventions include reorientation measures, intensive occupational therapy, and cognitive behavioural therapy. (23) A systematic review tested specialist nurse care post-discharge and found some benefits after three months, coaching (educational and motivational interventions) improved self-efficacy expectations at six months, although not when combined with exercise. It also tested home rehabilitation and group learning program but these showed no significant differences in outcomes after 12 months. (23) The use of

enhanced communication with enabling and empowering language should be applied by health care professionals as it speeds the early recovery process and supports greater attention to mental healthcare. (24) Care coordination with families and healthcare professions with sufficient training, routine mental health screening by a social worker, and referrals to psychologists and psychiatrists, caregiver emotional adjustments were found to improve the lives of the patients in a study done in the USA.(25).

Despite all evidence that musculoskeletal injuries cause considerable psychopathology, orthopaedic physicians and therapists have historically underutilized mental health care. Long-term physical symptoms were primarily reported by severely damaged patients who also had psychological complaints, according to studies. Patients who experience psychological stress are more prone to experience physical discomfort, as is widely recognized (26,27)

Psychiatric symptoms were found to be responsible for a greater proportion of impairment twelve months after severe injury than both physical causes and pain severity. Research in China, revealed the proportion of one percent of enrolled individuals with traumatic injuries had severe psychological stresses caused by higher injury severity, higher visual analogue, and type of surgery (19). As a result, all of the data point to the reality that a patient's mental health has a direct impact on their physical experience of an injury and their capacity to recover successfully. Another study conducted in a specialized Ethiopian medical centre shows in 35.4% of patients had psychological stress and anxiety 36.1% and 39.8% respectively among the patient visiting an orthopaedic outpatient whereby the proportion was higher (47%) in the female who was screened for psychological stress (27).

However, the study performed in the United States of America shows 1 out of 4 individuals suffering traumatic injuries screened positive for psychological stress indicating that the proportional increase in psychological stress among trauma individuals far surpasses the general public(28). Then, in Tanzania, little is known regarding the proportion of psychological stress amongst patients with open tibia fracture, however, research from a tertiary medical centre in a northern zone shows 61% of orthopaedic inpatients exhibited some form of psychological stress (16). Therefore, this highlights the necessity of assessing the proportional increase in patients suffering from psychological stress as a result of poor or non-existent psychosocial health care provided to orthopaedic trauma patients.

2.2 Factors associated with psychological stress among patients with an open tibia fracture.

Psychological stress following open fractures is common and should receive attention alongside the physical effects of injury to help improve long-term functioning because we want to eliminate the presence of persisting psychological disturbance in them. Psychological stress could also in the long run cause mental illness and put patients at high risk for perilous behaviours and subsequent fractures (29). In recent years, there has been a growing interest in learning more about the elements that contribute to psychological stress in traumatic injury patients. However, early screening and identification of mental health problems after a traumatic physical injury are inconsistent and not routine during the hospital admission process for physically injured patients (30).

Marital status.: Unmarried patients had a higher risk of psychological stress than married patients, according to several studies examining psychological stress in orthopaedic trauma (19,31,32). Furthermore, a study conducted at a specialized hospital in Addis Ababa, Ethiopia shows marital status was an independent variable; however, orthopaedic trauma patients with poor social support were 3.51 times more likely to develop psychosocial stress than those with good social support(15). A study conducted in China revealed an adjusted odds ratio of 2.62 for females to develop psychological distress than male's post-trauma. This study was supported by studies conducted in the US, United Kingdom, Korea, Jordan, Hong Kong Pakistan, and India. (14,32–39). This suggested the need to understand the importance of family support in improving mental health and recovery in patients with a traumatic injury, especially with an open tibia fracture.

Level of Education: There is a link between educational attainment and psychological stress, according to studies. Studies on the factors associated with psychological stress found that the level of education was an independent variable among orthopaedic trauma patients (15,19). However, the relationship between education level and psychological stress has not been adequately investigated, particularly in patients with an open tibia fracture.

Age and sex. : Demographic Characteristics of the patients with open tibia fractures are listed among the factors associated with psychosocial stress, and these vary in different studies and settings. Several studies have been done to assess psychological stress in orthopedic patients and have shown that due to the likelihood of youths being involved in

assaultive trauma, younger age patients tend to be a predictor of posttraumatic stress disorder(28). However, a study conducted in the UK suggested that female patients at the orthopedic outpatient clinic had been associated with having higher psychological stress (32). A survey study administered a PTSD checklist on trauma patients upon their post-hospital clinic visit and found that the majority who screened positive were young (35 vs 45 years old), and more commonly African American (56% vs 43% Caucasian). In another study, there were more females (52%) who experienced psychosocial stress after severe trauma and admission to the intensive care unit, with no statistical significance in their age scores (40). In Tanzania, little is known regarding the association between psychological stress and sex as well as age.

Employment status: Orthopedic patients heal from their injuries in around a month to a year. According to a study, having a severe injury, as opposed to a minor injury, and being unemployed as opposed to employed, were both linked to significantly poorer recovery odds. (13). The Orthopedic injury had a significant impact when75·3% of orthopedic trauma individuals at KCMC in Tanzania had lost more than one month of functionality secondary to trauma and about forty percent of the individuals lost their employment following trauma(16), Contributing to psychological stress and hence affecting healing.

Trauma-related factors: This includes factors like limb injury, causes of injury, type of injury, complication, duration since injured or hospital stay, pain intensity, and Medical illness that had both psychological and physiological impacts on patient recovery (16). A study on post-traumatic stress disorder shows in acute traumatic patients, the type of injury, its mechanism, and severity have all been associated with psychological stress(28). Also, injury location and length of hospital stay were related to psychological stress among patients receiving treatment in Tanzania (16). A study done in Pakistan, a low- and middle-income country compared psychological stress in orthopaedics patients with major fractures versus those with other pathologies like arthritis and backache/ prolapse of intervertebral disc. Other bone pathology and major fracture continued to be associated with raised SRQ scores indicating greater psychological distress. (32).

CHAPTER THREE

3.0 METHODOLOGY

3.1. Study design

A hospital-based cross-sectional design study was conducted at Muhimbili Orthopedics Institute.

3.2. Study area

The study was conducted at Muhimbili Orthopedics Institute, in Dar es Salaam, Tanzania. Dar es Salaam lies between these coordinates 6° 48' 8.4708" S and 39° 16' 46.4016" E and covers an area of 1590km^2. The region accounts for about 10% of Tanzania's population(41). MOI has a bed capacity of 362 beds which is the leading institution that provides equitable, affordable, accessible quality services of Orthopaedics, Neurosurgery, and Trauma management, training, and research in East and Central Africa by using efficient and effective hospital management systems and modern technologies supported by trained staffs. The hospital is suitable for this study since it is estimated to receive about 500 trauma patients per month and with an average of 80 patients per month with open tibia fracture patients attending the department of orthopedics for receiving care.

3.3. Study population

The study population targeted all individuals with an open tibia fracture treated at Muhimbili Orthopaedic Institute in Dar es Salaam Tanzania.

3.4 Study duration

The research was carried out from Jan 2023 to June 2023.

3.5. Exclusion and inclusion criteria.

3.5.1 Inclusion criteria

Inclusion criteria for the study:

i. All orthopaedic traumatic patients with an open tibia fracture aged 18 years and above.
ii. All orthopaedic traumatic patients with an open tibia fracture had clinical follow-ups within the period of research, regardless if the patient being followed up was in the acute fracture phase or chronic.

3.5.2. Exclusion criteria

Excluded criteria for the study:

i. All orthopaedic patients with pre-existing limb deformity, pathological fractures, and physical conditions or comorbidities that impair their ability to participate in the study. We ruled out those with limb deformities because maybe the patient had already developed psychological stress before the open tibia fracture.
ii. All orthopaedic patients with cognitive impairment or cognitive disorder that may impair the ability to participate in the study.
iii. Patients with pre-existing stress disorders.

3.5. Sample size calculation

The sample size for this study was calculated by using Cochran's formula for an infinite population, given by.

$$\mathbf{n} = \frac{\boldsymbol{Z^2 p(1-p)}}{\boldsymbol{e^2}}$$

Whereby: n= sample size for the study

Z= 1.96

P= (proportion of lower limb fracture patients with psychological stress according to (15)).

e=0.05

Then, required sample size = $\frac{1.96^2 \text{x} 0.354\ (1-0.354)}{0.05^2}$

Therefore, the minimum sample size required was 351.

The minimum sample size was adjusted for 10% of the non-response rate due to the loss of follow-up during data collection.
Therefore, the sample size for the study was 386 patients with open tibia fractures treated at MOI.

3.7. Sampling procedures and technique

A simple sampling technique method was employed to recruit study participants at the orthopaedic clinic of MOI, who were voluntarily accepted to participate in the study (42). A sampling frame detailing patient information attended on a particular day at MOI was obtained from the nurses at the registry desk. This facilitated process of selecting eligible study participants for data collection. Participants were recruited as they attended clinic and those that accepted were consented until the sample size was reached.

3.7. Variables

The following were dependent and independent variables in this study.

3.7.1. Dependent variables:

The dependent variable in this study was psychological stress assessed by the SF-36 questionnaire that evaluates quality of life, physical and mental component summary scores. The tools had eight components namely**:** vitality, physical well-being, emotional well-being, limitations of physical activities due to psychological stress, limitations of social activities due to psychological stress, bodily pains, psychological stress and well-being, and general health perception (43). The tool does not directly diagnose the presence or amount of stress, but it has components that rate stress behaviors. Assessment of stress was conducted to all participants regardless of the time between injury and data collection, and they were divided into the following categories according to duration of injury: <3 weeks, 4-6 weeks and more than 6 weeks. The tool was translated into Swahili as per standard protocol and the Swahili version has been validated and used in a representative sample of an urban population in Tanzania (44).

3.7.2. Independent variables

Independent variables for the study include:

(a) **Socio-demographic factors**: this included the following Age (Years), Sex (Male/Female), Occupation (Employed, self-employed or unemployed), Level of education (secondary education/college education), Marital status (married/single), Income (high or low)

(b) **Trauma-related factors**: the treatment modality included, mechanism of injury, length of hospital stay, fracture classification, mode of payment

3.8. Data collection procedure

Before the commencement of the data collection process, both Researcher and Trained Researcher Assistants (TRA) visited the patients at the hospitals from the moment of hospital admission and were introduced by the Nurses in charge. The researcher described the purpose, benefits, and risks of participating in the study including the eligibility criteria for the study participants. To attain the required sample size, the consecutive method was used to recruit eligible patients for the study.

The researcher and TRA used a structured interviewed-administered questionnaire during the collection of data collection from study participants. About 30 minutes was used for conducting face-to-face interviews per study participant. To safeguard anonymity and privacy, a face-to-face interview in the Swahili language was done with study participants in a quiet room. The method was appropriate for those who are unable to read and communicate due to their illness. The filled questionnaire was collected by TRA, and the researcher reviewed its accuracy and completeness for data entry and analysis.

3.9 Data collection tools.

A structured interview questionnaire was used to collect data from study participants. The tools comprised closed-ended questions divided into three sections to full fill study objectives. The first section addressed, social demographic characteristics like age, sex, and level of education, which were input/ filled in the data tool. The next section addressed the trauma-related factors which contain five items including type of fracture, types of treatment, duration of treatment, length of hospital stay, and mode of payment. In this section, the study

participant selected the correct answer from the multiple choice provided. Then, a third section was covered with ten items of psychological stress. These items include individuals' tolerance and ability to adjust to one's behaviour under stress, how pain affects physical health, one's perception about their wellbeing at the present and a year ago. The item named general condition, grading of overall health, measured by a 5-point Likert scale (43). 1 and 2 were the scores that defined mild, 3 defined moderate and 4 -5 scores defined severe stress. An observational study that was conducted in both Canada and Switzerland on psychological distress and quality of life after orthopaedic trauma used the similar SF-36 scale that assessed both physical and mental component summary scores.(45)

A similar study in India on psychological distress in lower limb long bone fractures used the Impact of Events Scale- Revised (IES-R) and the total scores and each subscale was presented by a 5 point scale as follows: 0 no symptoms, 1 few symptoms, 2 moderate symptoms, 3 a high level of symptoms and 4 an extremely high level of symptoms.(46) In south Africa, a cross sectional study on the psychological impact of long bone fractures in KwaZulu Natal used Patient Health Questionnaire – 9 (PHQ-9) that comprises of 4 point scale of 0= not at all, 1= several days, 2= more than ½ the days and 3= nearly every day.(4) An English version questionnaire was translated into Swahili, by a researcher with a strong command of Swahili language as a mother tongue. Terms or phrases with the problem during an initial translation were highlighted. The Swahili version was then, translated back to an English version by an independent translator who was blinded to the original version. Furthermore, the researcher who is was trained in the use of the tool had a group discussion, to ensure the meaning of the original text was clarified and the translation is coherent (47–49).

3.10 Training of research assistance

The researcher recruited two researcher assistants with a diploma in nursing who have good communication skills in both English and Swahili languages. The research assistants were nurses with experience in quantitative data collection. They were trained for two (2) days on the main familiarization of the study objective, methodology, data collection, and sampling techniques. Moreover, the use of different strategies to maximize the response rate during

data collection was used such as being good-mannered during administering and collecting questionnaires.

3.11 Pre-testing of the tool

A data collection tool was tested before the initiation of data collection. This includes thirty-five (35) orthopaedic patients at Muhimbili Orthopaedics Institute, but they were not included in the actual study. The pre-test assisted to check the relevance of questions on the abstraction form and the questionnaire in the overall research approach. The data collection tools were reviewed and rephrased, if any misinterpretation of the questions and the comments were taken into consideration modify the tools before the actual data collection to ensure the validity and reliability of the tool. Gaps in research design, sampling, time, and costs were promptly attended to by both the supervisor and the primary investigator. From this pilot study experience gained, was used to improve strategies before going for the main data collection

3.12. Data management

The researcher was responsible to check the accuracy and completeness of the questionnaire before coding and entering it into IBM Statistical Package for Social Sciences (SPSS) version 23. In case of missing data, the researcher provided the possible data by using average and backfilling. The filled questionnaires were stored in a locked file cabinet while SPSS data files were stored in a computer with an authorized password accessed by a researcher only.

3.13 Data analysis plan

The statistical Package for Social Sciences (SPSS) version 24 was used for data entry and analysis. To create summaries for socio-demographic categorical variables like gender and occupation, descriptive-analytical data was performed using proportions, percentages, and frequencies. The mean (standard deviation) and median were used to describe continuous data like age and BMI (range). Tables, bars, and/or pie charts were used to illustrate the results. The Chi-square test was used for categorical variables and the outcome variable (psychological stress), whereas the t-test was utilized for continuous variables. The logistic

regression analysis was used to determine the effect of each independent variable. Each independent variable was subjected to a Univariate analysis, and those with p-values less than 0.2 were included in the final multivariable model. Multivariate linear regression was used to investigate the relationship among sociodemographic and psychosocial stress components, with a statistical significance p-value of 0.05.

Table 1: Data analysis strategies according to specific objectives

S/N	Specific Objectives	Variables	Statistical Analysis Measures
1	Socio-demographic characteristics	Sex Age, Level of education, Marital status,	Descriptive statistics
2.	Determine the proportion of patients with psychological stress as a result of open tibia fracture treated at MOI	The proportion of patients with physical and mental component summary scores of stresses by Likert scale, as a result of open tibia fracture	Descriptive statistics
3.	assess the social demographic factors associated with psychological stress among patients with open tibia fractures treated at MOI	Social demographic factors associated with scores physical and mental component summary scores of stresses by Likert scale among patients with an open tibia fracture	Descriptive statistics Cross tabulation Logistic regression
4.	Determine trauma-related factors associated with psychological stress among patients with open tibia fractures treated at MOI	Determine trauma-related factors associated with physical and mental component summary scores of stresses by Likert scale stress among patients with an open tibia fracture	Descriptive statistics Cross tabulation Logistic regression

3.14 Ethical issues

The Institutional Ethical Review Board of the Muhimbili University of Health and Allied Sciences (MUHAS) was approached for ethical approval to perform the study. Before beginning data collection, the researcher requested authorization from management to enrol study participants at Muhimbili Orthopaedic Institute. Confidentiality was maintained throughout and after the study. To maintain the anonymity of the respondent; a questionnaire was designed with no names or any individuals to be identified. Moreover; all participants were informed of the study objectives for them to make an informed and voluntary decision to participate or not to participate in the study. They were granted a right to withdraw from the study without any penalty. Therefore, study participants were requested to sign a written consent form before administering the questionnaire.

3.15 Dissemination plan

After completion, the documents and manuscripts of this research shall be submitted to the DPGS office at MUHAS for completing MMed Orthopedics and Traumatology requirements. The report's manuscript will be peer-reviewed, and abstracts will be presented at conferences.

CHAPTER FOUR

4.0 RESULT

4.1: Presentation and analysis of the result

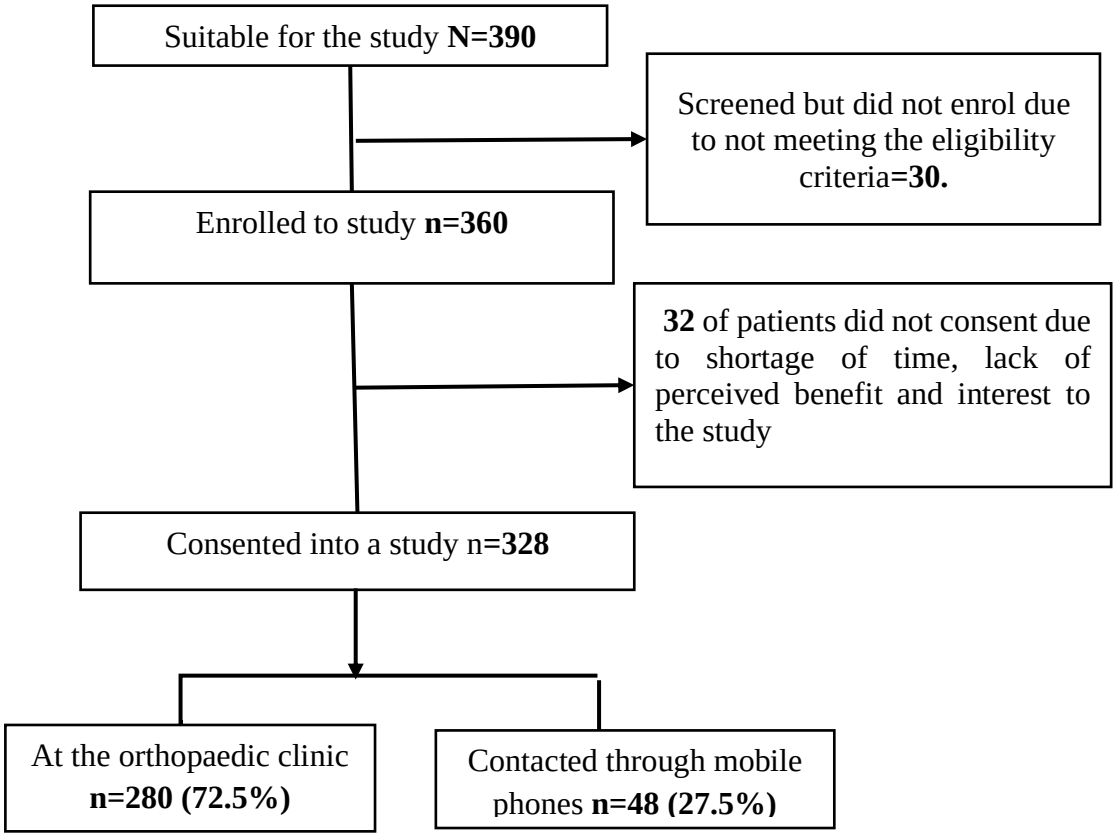


Figure 2: A schematic flow of enrolled study participants

4.1.1 Research main findings

The study aimed to examine the proportion of psychological stress and its associated factors among patients with open tibia fractures at Muhimbili Orthopaedics Institute. A higher level of psychological stress was experienced by two-thirds of patients with open tibia fractures. Moreover, patients with a higher level of psychological stress were associated with several factors. These include the primary level of education, self-employment, a monthly income of less than 500,000 Tsh, a period of fewer than three weeks following injury, the presence of complications, severe pain poor, and moderate social support.

4.2 Socio-demographic characteristics of patient with an open tibia fracture.

A total of 328 patients with Open Tibia Fracture (OTF) treated at MOI were interviewed. The mean age of participants was 35.04 years with a standard deviation (SD) of ±12.61years ranging between 18 to 79 years. More than half of the participants 232(70.7%) were between the age of 18 and 38 years, and 26.90 Kg/m^2 was the mean body mass index (BMI). Those above the normal BMI range were considered obese.

The majority of participants 265(80.8%) were male, more than half 178(54.3%) had completed secondary education, 230(70.1%) were single and 167(20.9%) identified themselves as Christian religious followers. 266(81.1%) had private or self-employment, 224(68.3%) reported a monthly income of less than 500,000 Tsh, and 300(91.5%) paid for health insurance privately. Social support was measured by asking some questions directly to the participants, but it was subjective. Also, 99 (30.2%) of study participants were pedestrians that were assaulted Some participants were contacted by phone after they met the eligibility criteria but for some reason did not make it to the clinics for follow up during the time of data collection.

Table 2: patient socio-demographic characteristics

Variable	Categories	Frequency	Percentages (%)
Sex	Male	265	80.8
	Female	63	19.5
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	73.6
	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 500,000	224	68.3
	More than 500,000	104	31.7
Mode of payment	Insurance	28	8.5
	Private payment/ cash	300	91.5
Social support	Poor	220	67.0
	Moderate	92	28.0
	Good	16	5.0
Causes of injury	Assault/sport/falling	26	7.9
	Pedestrian	99	30.2
	Motorcycles collision	81	24.7
	Crash Motors vehicles	66	20.1
		56	17.1

4.3 Trauma-related factors among patients with an open tibia fracture

Among 328, participants, 326 (99.4%) had received surgical treatment, 210 (64.0%) had a serious fracture of GA III-A, and 128 (39.0%) had more than six weeks since injured. In addition, 217 (66.2%) had experienced no complications, while 80 (24.4%) of participants had acquired an infection, 269 (82.0%) reported pain, and over half 170 (51.8%) reported severe pain.

Table 3: Trauma-related factors among patients with an open tibia fracture

Variable	Categories	Frequency	Percentages (%)
Severity of fracture	GA III-A	210	64.0
	GA III-B	118	36.0
Type of treatment	Non-surgical	2	0.6
	Surgical	326	99.4
Duration since injured	≤ 3 week	110	33.5
	4-6 week	90	27.4
	≥ 6 week	128	39.0
Complication	No	217	66.2
	Yes	111	33.8
Type of complication	Amputation	3	0.9
	Delayed union	24	7.3
	Infection	80	24.4
	Non-union	4	1.2
Pain intensity	Mid pain	17	5.2
	Moderate	82	25.0
	Severe	170	51.8

4.4 **Proportion of patients with psychological stress as a result of open tibia fracture**

The proportion of patients with psychological stress was calculated by dividing the total number of participants with higher levels of psychological stress **(N_{hp}) by the number of** participants included in the study **(N_t)** times a hundred.

The formula used to calculate the proportion of patients with psychological stress= [**(N_{hp})/ (N_t)*100]**. Open tibia fracture patients whose scores were less than 60%, were considered to have poor and/or not good quality of life. (15). Therefore, among 328 patients with open tibia fractures enrolled in this study, 218 (66.5%) were found to have psychological stress while the remaining 33.5 did not. **(figure 4).**

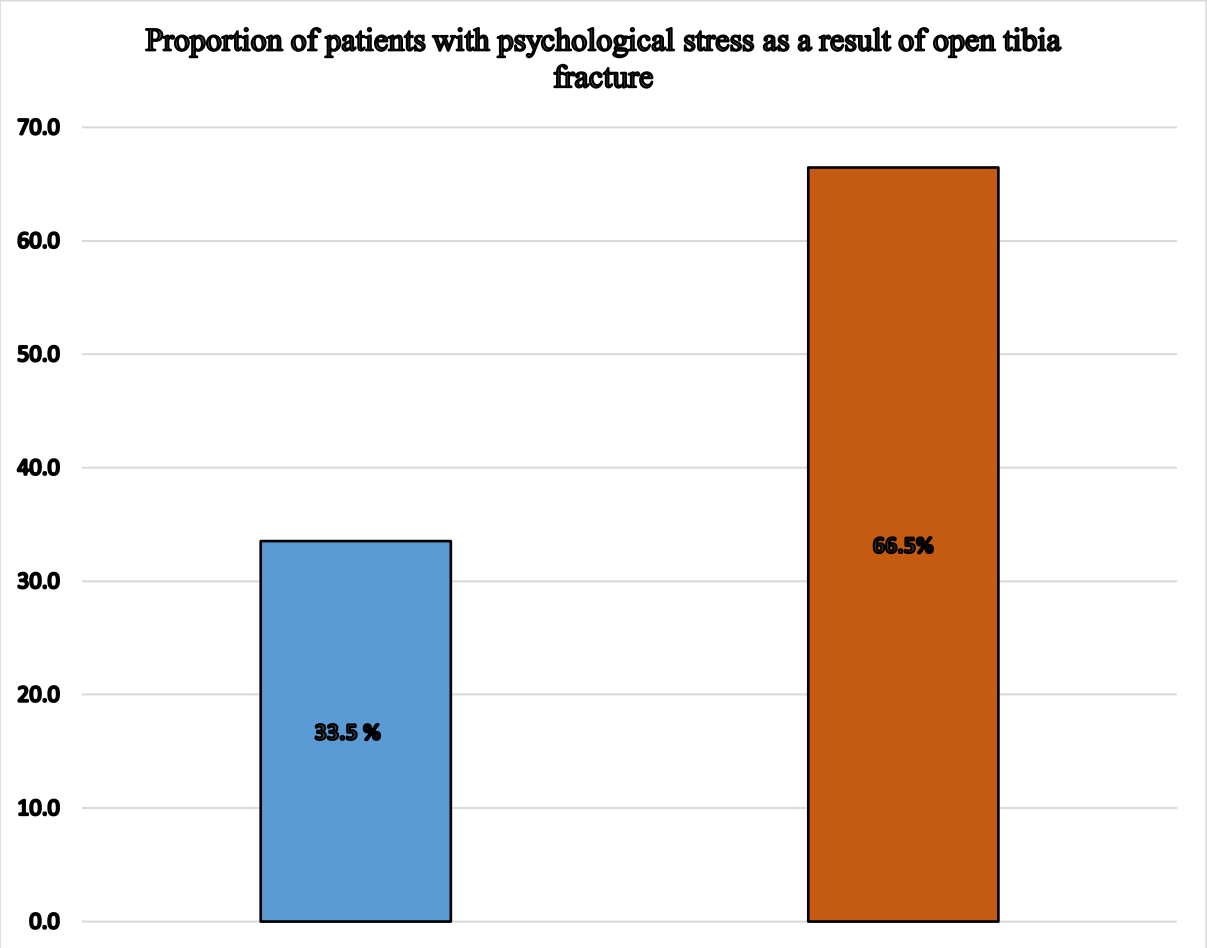


Figure 3: Proportion of psychological stress among patients with an open tibia fracture

Orange bar = proportion of psychological stress

Blue bar = proportion of absence of psychological stress.

4.5 Association between psychological stress and demographic characteristics of patients with open tibia fracture treated at MOI.

The study identified there is a statistically significant relationship in psychological stress among patients with open tibia fractures based on their level of education, occupation status, monthly income, and social support received. However, psychological stress did not show a statistical relationship with age, BMI, sex, marital status, number of children, and religion (**Table 4**).

Table 4: Relationship between demographic characteristics among patients with an open tibia fracture.

Variable	Categories	Higher level of psychological stress		Chi-square	p-Value
		n	%		
Age group	18-38years	156	67.2%		
	39-59year	52	61.9%	1.896	0.169
	More than 60 years	10	83.3%		
BMI ranks	Normal weight ≤25Kg/m^2	83	67.5%		
	Obese weight ≥25Kg/m^2	135	65.9%	0.091	0.763
Sex	Male	177	66.8%		
	Female	41	65.1%	0.067	0.796
Level of education	Primary level	67	67.0%		
	Secondary level	120	67.4%	**7.297**	**0.026**
	College/university	31	31.0%		
Marital status	Married	60	61.2%		
	Single	158	68.7%	1.721	0.190
Do you have children	Yes	167	69.0%		
	No	51	59.3%	2.682	0.102
Religion	Christian	105	62.9%		
	Muslim	113	70.2%	1.966	0.161
Occupation status	Employed	30	48.4%		
	Self/unemployed	188	70.7%	**11.207**	**0.001**
Monthly income	More than 500,000	53	51.0%		
	Less than 500,000	165	73.7%	**16.418**	**0.000**
Social support	Poor	157	71.4%		
	Moderate	57	62.0%	**14.750**	**0.001**
	Good	4	25.0%		

4.6 Association between psychological stress and trauma-related factors

According to the study, there is a statistically significant difference in psychological stress among patients with open tibia fractures based on the time since the injury, the existence of complications, the severity of pain, and the mode of payment for health insurance. In contrast, psychological stress was found to have no association with fracture severity, mechanism of injury, treatment received, and presence of pain.

Table 5: Relationship between psychological stress and trauma-related factors among patients with an open tibia fracture.

Variable	Categories	Higher Psychological stress		Chi-square	p-Value
		n	%		
Type of severity	**GAIII-A**	134	63.8%	1.844	0.174
	GAIII-B	84	71.2%		
Type of treatment	Non-surgical	2	100%	1.015	0.314
	Surgical	216	66.3%		
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%		
	Moderate	63	76.8%	**11.852**	**0.003**
	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%		
	Pedestrian	67	67.7%		
	Motorcycles collision	45	55.6%	8.342	0.080
	crash	50	75.8%		
	Motors vehicles		64.3%		
		36			

4.7 Factors associated with psychological stress among patients with an open tibia fracture

Several factors might contribute to psychological stress among patients with open tibia fractures. These factors can be categorized into socio-economic, demographic characteristics, psychosocial, and trauma-related factors. The factors contributing to psychological stress had been discussed below.

The bivariate analysis identified several independent variables associated with psychological stress: a primary level of education [COR: 2.522, 95% CI: 1.263 – 5.036, *p=0.009*], a secondary level of education [COR:1.869, 95% CI: 1.026– 3.403, *p=0.041*]; Non/Self-employed [COR:2.571, 95% CI: 1.463 – 4.518, *p=0.001*], less than 500,000Tsh of income per month [COR:2.691, 95% CI: 1.655–4.375, *p=0.000*], poor social support [COR:7.476, 95% CI: 2.323– 24.058, *p=0.001*], moderate social support [COR:4.886, 95% CI: 1.461–16.340, *p=0.01*], less than three weeks since the injury [COR:0.424, 95% CI: 0.231 – 0.777, *p=0.006*], four to six week since the injured [COR:0.552, 95% CI: 0.312 – 0.975, *p=0.0041*], development of complications [COR: 2.276, 95% CI: 1.411– 3.672, *p=0.02*], severe pain [COR:1.904, 95% CI: 1.044–3.470, *p=0.036*], moderate pain [COR:0.313, 95% CI: 0.110–0.888, *p=0.029*]; and private mode of payment for health insurance [COR:2.922, 95% CI: 1.330– 6.420, *p=0.008*]. These were potential variables for multivariate analysis, based on a p-value of less than 0.25.

After adjusting for confounding variables, the potential variables identified in the bivariate analysis were further examined using multivariate logistic regression. Multivariate analysis shows that primary level of education [AOR: 2.645, 95% CI: 1.313 – 5.331, *p=0.007*]; Self-employed [AOR:2.394, 95% CI: 1.310 – 4.387, *p=0.006*], less than 500,000Tsh of income per month [AOR:2.366, 95% CI: 1.286–4.350, *p=0.005*], poor social support [AOR:4.145, 95% CI: 1.171– 14.666, *p=0.027*], moderate social support [AOR:3.862, 95% CI: 1.114–13.391, *p=0.033*], less than three weeks since the injury [AOR:3.057, 95% CI: 1.526–6.124, *p=0.002*], development of complications [AOR: 3.216, 95% CI: 1.745– 5.925, *p=0.00*], severe pain [AOR: 5.952, 95% CI: 1.850–19.147, *p=0.003*]; and private mode of payment for health insurance [COR:4.312, 95% CI: 1.450– 12.824, *p=0.009*] were statistically significance associated with higher psychological stress among patient with open tibia fracture since the p-value is less than 0.05.

Table 6: Factors associated with psychological stress among patients with an open tibia fracture

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 500,000	2.691(1.655-4.375);**0.000**	2.366(1.286-4.350);**0.005**
	More than 500,000	**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	≤3week	0.424(0.231-0.777);**0.006**	3.057(1.526-6.124);**0.002**
injured	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**

CHAPTER FIVE

5.0 DISCUSSION

5.2 The proportion of patients with psychological stress as a result of open tibia fracture

The finding of the study revealed the proportion of psychological stress was 66.5% among patients with open tibia fractures treated at MOI. These findings were found to be higher than a study conducted in the United States of America (USA) 26% (28). The discrepancy in psychological stress could be attributed to different socio-economic factors such as income level, education, and employment, which play a role in the proportion of psychological stress. Therefore, higher levels of poverty, limited access to resources, and economic challenges have a significant impact on mental health and contribute to a higher proportion of psychological stress among patients with open tibia fractures (50,51).

In addition, patients with open tibia fractures experienced psychological stress which is attributed to excessive worry, fear, irritability, and difficulty concentrating, which was similar to the study conducted in the USA, which reported 26% of participants had depression (52). A variation could be explained by differences in healthcare infrastructure, mental health awareness, and support systems between the countries which affect stress management and treatment-seeking behaviours. Hence, the research highlights the significance of orthopaedic surgeons being attentive in evaluating signs of depression, facilitating suitable referrals, and decreasing the occurrence of psychological stress (52,53).

Also, a result of the study shows, about 30.2% of study participants were injured as a result of pedestrian accidents, which is similar to the study done in Nigeria (54), which reported 19% of participants were injured as a result of pedestrian accidents. The finding of this study revealed there is no significant association in psychological stress among study participants with a pedestrian accident. Despite variations in the causes of injury, the evidence from a study conducted in the USA (28) differs from the findings of our study, which indicated that 59% of pedestrians struck by cars were more likely on developing psychological stress. The difference can be contributed to the study design which was a prospective longitudinal study, larger sample size, and assessment tools which were Posttraumatic Stress Disorder (PTSD) used in the USA (28).

5.3 Factors associated with psychological stress among patients with an open tibia fracture

Although, various studies documented that the quality of life of patients with tibia fractures can be influenced by poor mental health elevated by the level of depression, anxiety, and psychological stress (8,19,46,53). Therefore, the finding of the study documented the following factors associated with higher levels of psychological stress among patients treated at Muhimbili orthopaedics institute.

Level of education

The finding of this study indicated, having higher levels of psychological stress was statistically significantly associated with having a lower level of education. Besides, lower socioeconomic status was frequently associated with lower levels of education, which resulted in increased stress due to limited access to resources, and reduced opportunities like employment, income, and lack of social support (55). Then, the finding of this study was not supported by the study conducted in Ethiopia which documented that, education status among orthopaedics patients was not associated with the level of depression and anxiety (56). Therefore, the study finding from Ethiopia contradicts the finding of the current study. This suggested the relationship between education level and mental health outcomes among orthopaedics patients varies depending on the study area, sample size, or assessment tools for assessing education, depression, anxiety, and psychological stress.

Employment status

The finding of the current study revealed a higher level of psychological stress was 2.3 times more likely to occur in self-employed patients. The study is consistent with a study done by Becher which reported self-employed orthopaedics patients to have a greater risk of developing psychological problems (13). One possible reason for the similarity among studies can be due to job demand and pressure. Patients with long bone fractures have limited opportunities due to their incapacity of participating in regular activities (57). It can be seen that the stress of running a business, meeting deadlines, and dealing with financial risks can contribute to higher levels of psychological stress. For instance, 40.6% of Tanzanian orthopaedics patients were at risk for depression after losing their jobs as a result of delayed recovery from injury and return to work (16).

Income status

Another finding in this study was about the level of income among patients with open tibia fractures. Our study finding shows that patients with lower income levels of less than 500,000Tsh per month were highly associated with the development of psychological stress than those with higher levels of income above 500,000Tsh per month. The finding of our study concurs with a study conducted in the United States of America (USA) which reported, injured patients with financial constrain were strongly related to limited access to rehabilitation services (58). The relationship between lower income levels and psychological stress could be attributed to socioeconomic inequalities, stigma, and marginalization (59,60). Therefore, psychological stress associated with income disparity could be due to negative emotional feelings impacting mental health resulting from limited access to healthcare.

Social support

Social support plays a vital role in the physical and psychological recovery of open tibia fracture patients. But the finding of the current study revealed poor social support has higher odds of developing psychological stress compared to patients with good social support. This concurs with the study conducted in Addis Ababa, Ethiopia, which reported depression and anxiety was significantly associated with a lack of social support (56). Another study from South Ethiopia supported the finding of our study, which reported those who had good social support had a lower risk of experiencing psychological distress (29). Therefore, findings 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 injured

The finding of our study shows the odds of developing psychological distress were found to be 3.0 among patients who had been injured in less than three weeks. Moreover, the finding of our study was inconsistent with the study conducted in Australia and New Zealand. Studies report that injured patients experienced significant psychological distress during hospitalization and three to six months following hospital discharge (61,62). Emphasises shall be on the importance of understanding and addressing the psychological impact during the early stages of recovery from an open tibia fracture. Therefore, variation in the study's findings should be attributed to the difference in the assessment tool and geographical location.

Complication

The result of our study shows patients with open tibia fracture who had complications due to fracture were 3.2 times more likely to develop psychological stress; which is consistent with the study finding from, Addis Ababa, Ethiopia (56). Moreover, the current study findings have been validated by Ababu (29) , who found that psychological distress among orthopaedics patients in southern Ethiopia was commonly associated with complications such as mental diseases such as depression, post-traumatic stress disorder, and personality disorder (29). This suggests the association between complications and psychological stress may be observed across different populations and contexts.

Mode of healthcare payment

The findings of the current study show that participants with a private mode of payment were 4.3 times more likely to develop psychological stress. The finding of the present study was similar to a systematic review of the literature, which reported the likelihood of psychological distress was significantly associated with a lack of health insurance among patients with open tibia fractures (63). The cost of medical care imposes a significant financial burden, resulting in financial strain associated with worries about medical expenses and severe psychological stress. This study conducted in the USA (30) emphasize providing financial support to patients to better manage the cost of medical care and eliminate the negative emotional feeling and buffering psychological stress (63).

CHAPTER SIX

6.0 STUDY LIMITATION OF MITIGATION CONCLUSION AND RECOMMENDATION

6.1 Study limitation and mitigation.

This study was limited to social desirability bias because of face-to-face administering the questionnaire whereby respondents may report what they believe the researcher wants to hear. Bias was minimized during data collection to guarantee that truthful answers were supplied by offering detailed information to study participants about the right or wrong response.

Respondents' answers in regards to income status could have also been biased as people in most cases have a tendency of hiding their actual earnings. And also, as a retrospective study, one's earnings could be different/ have changed. Social support was also a subjective parameter as the interviewer could be biased in regards to how the participant answered the questions that were evaluating the parameter.

6.2 Conclusion

It has been shown that there is a high proportion of psychological stress among patients with open tibia fractures (66.5%). Several factors were identified as being associated with higher levels of psychological stress in this patient population. These demographic factors leading to psychological stress were low levels of education, self-employment, lower income levels, and lack of social support. Whereby trauma-related factors were less than three weeks following the injury, and the presence of complications

6.3 Recommendation.

The study recommended the following to reduce the proportion of psychological stress among patients with open tibia fractures.

1. Provide social support
2. Education for self-awareness and care
3. Conduct further study with long follow up.

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APPENDICES

Appendix I: Questionnaire (English version)

Title: Proportion of psychological stress and associated factors among patients with open tibia fracture at Muhimbili Orthopaedic Institute.

SECTION 1: SOCIO DEMOGRAPHIC

1. Age_____
2. BMI _____ (kg/m2)
3. Gender
    1. Male []
    2. Female []
4. Highest level of education
    1. No formal education []
    2. Primary level []
    3. Secondary level []
    4. University/college level []
5. Marital status
    1-Married []
    2- Single []
    3-Widower []
    4-Separated []
    5-Cohabiting []
6. Do you have children
    1. Yes []
    2. No [] (if "NO" skip question 7 below)
7. What is the number of children do you have?
    1. 1-3 []
    2. >=4 []
8. Where do you live (place of residence)?
    1. Within Dar es salaam []
    2. Outside Dar es salaam[]
9. What is your religion
    1. Christian []
    2. Muslims []
    3. Protestants []
    4. Others []
10. Occupation status
    1. Employed []
    2. Self-employed []
    3. Non-employed []

11. Monthly income
    1. <500,000/= []
    2. 500,001 – 2100,000 []
    3. >2,100,001 []
12. The following are the questions on assessing the level of social support among patients with open tibia fractures.

Question	Circle the appropriate answers
How many people are so close to you that you can count on them if you have great personal problems?	5.1.1.1 None 5.1.1.2 1-2 5.1.1.3 3-5 5.1.1.4 5 and more
How much interest and concern do people show in what you do	1. None 2. Little 3. Uncertain 4. Some 5. A lot
How easy is it to get practical help from neighbors in you should need it	1. Very difficult 2. Difficult 3. Possible 4. Easy 5. Very easy

SECTION 2: TRAUMA-RELATED FACTORS AMONG PATIENTS WITH OPEN TIBIA FRACTURE TREATED AT MOI

13. Type/severity of the fracture
    1. GA I []
    2. GA II []
    3. GA III-A []
    4. GA III-B []
    5. GA III-C []
14. What is the mechanism or causes of injury?
    1. Motor vehicle accident []
    2. Assault []
    3. Sports injury []
    4. Injury due to falls from height > 3 feet []
    5. Injury due to falls from standing < 3 feet []
    6. Motorcycle collision []
    7. Pedestrian struck []
    8. Crush/work injury []

15. Type of treatment
    1. Surgical []
    2. Non- surgical []
16. Duration of a treatment since injured
    1. <4 []
    2. 4-6 weeks []
    3. 7-8 weeks []
    4. 9-10 weeks []
    5. 11-12 weeks []
    6. >12 weeks []
17. Is there any complication developed?
    1. Yes []
    2. No [] (if "NO" skip question 17)
18. What is the type of complication developed?
    1. Infection []
    2. Gangrene []
    3. Sepsis []
    4. Fibrosis []
19. Length of hospital stay
    1. 1-2 weeks []
    2. 3-4 weeks []
    3. 5-6 weeks []
    4. >7 weeks []
20. Mode of payment
    1. Insurance []
    2. Private payment []

SECTION 3:

PSYCHOLOGICAL STRESS AMONG PATIENTS WITH OPEN TIBIA FRACTURE TREATED AT MOI

Instruction: *Please select the option that best describes how you've been feeling for each question.*

21. Generally, how is your healthy today?
    1. Poor []
    2. Fair []
    3. Good []
    4. Very good []
    5. Excellent []
22. How would you grade your overall health now compared to a year ago?
    1. Much worse now []
    2. Sometimes []
    3. About the same []
    4. Somewhat better []
    5. Much better []

23. How much has pain interfered with your normal work (both outside the home and housework) over the last four weeks

1. Not at all []
2. Al little bit []
3. Moderately []
4. Quite a bit []

The questions that follow are about things that you would conduct on a regular day. Is your health preventing you from participating in these activities? If so, how much will it cost?		Not limited at all	Of little Limited	Of average limited	Very limited	Limited
24.	Running, lifting heavy objects, and participating in intense sports and activities					
25.	Moderate activities, such as moving a table and other household objects, sweeping and moping					
26.	Lifting or carrying groceries					
27.	Climbing several flights of stairs					
28.	Climbing one flight of stairs					
29.	Bending, kneeling, or stooping					
30.	Walking more than a mile					
31.	Walking several blocks					
32.	Walking one block					
33.	Bathing or dressing yourself					

How much of the time have you had any of the following problems with your work or other daily activities as a result of your physical health over the last four weeks?		None of the time	A little of the time	Some of the time	Most of the time	All of the time
34.	Reduce the amount of time you spend working or doing other things					
35.	Accomplished less than you would like					
36.	Were there restrictions on the kind of work or other activities					
37.	Had difficulty performing the work or other activities (eg. It took extra effort)					
38.	How much has your physical health or mental problems interfered with your social activities (seeing friends, family, etc.) in the last four weeks?					

These questions are about how you've been feeling and how things have gone for you over the last four weeks.

How much time did you spend in the last four weeks		Not at all	Slightly	Moderate	Quite a bit	All of the time
39.	Did you feel energized					
40.	Have you been nervous?					
41.	Have you felt so down in the dumps that nothing could cheer you up					
42.	Have you felt calm and peaceful?					
43.	Did you have a lot of energy?					

44.	Have you felt downhearted and depressed					
45.	Did you feel worn out					
46.	Have you been happy					
47.	Did you feel exhausted?					
How TRUE or FALSE is each of the following statements for you?		False	Mostly false	Don’ t know	Mostly true	True
48.	I seem to get sick a little more frequently than others.					
49.	I am just as healthy aseverybody					
50.	I expect my health to deteriorate					
51.	My health is terrific					

Appendix II: Questionnaire (Swahili version).

Kichwa: Kuenea Kwa msongo WA mawazo Na mambo yanayohusiana miongoni mwa wagonjwa walio Na mvunjiko WA wazi WA tibia katika Taasisi ya Mifupa ya Muhimbili.

SEHEMU YA 1: DEMOGRAPHIC YA JAMII

1. Umri _____
2. BMI _____ (kg/m2)
3. Jinsia
    3. Mwanaume []
    4. Mwanamke []
4. Kiwango cha juu cha elimu
    5. Hakuna elimu rasmi []
    6. Kiwango cha msingi []
    7. Kiwango cha sekondari []
    8. Kiwango cha chuo kikuu/chuo []
5. Hali ya ndoa
    1-Aliyeolewa []
    2- Mmoja []
    3-Wajane []
    4-Imetenganishwa []
    5-Kuishi pamoja []
6. Je, una watoto
    1. Ndiyo []
    2. Hapana [] (kama “HAPANA” ruka swali la 7 hapa chini)
7. Je! una idadi gani ya watoto?
    1. 1-3 []
    2. >=4 []
8. Unaishi wapi (mahali pa kuishi)
    1. Ndani ya Dar es salaam []
    2. Nje ya Dar es salaam []
9. Dini yako ni ipi
    1. Mkristo []
    2. Waislamu []
    3. Waprotestanti []
    4. Nyingine []
10. Hali ya kazi
    4. Kuajiriwa []
    5. Kazi binafsi []
    6. Wasio na ajira []
11. Kipato cha mwezi
    1. <500,000/= []
    2. 500,001 – 2100,000 []
    3. >2,100,001 []

12. Yafuatayo ni maswali juu ya kutathmini kiwango cha usaidizi wa kijamii kati ya wagonjwa walio na fracture ya wazi ya tibia.

Swali	Zungushia majibu yanayofaa
Ni watu wangapi walio karibu nawe hivi kwamba unaoweza kuwategemea ikiwa una shida kubwa za kibinafsi?	1. Hakuna 2. 1-2 3. 3-5 4. 5 na zaidi
Je, watu wanaonyesha kupendezwa na kujali kiasi gani katika kile unachofanya	1. Hakuna 2. Kidogo 3. Sina uhakika 4. Baadhi 5. Mengi
Ni rahisi jinsi gani kupata msaada wa vitendo kutoka kwa majirani ndani yako unapaswa kuhitaji	1. Ngumu sana 2. Ngumu 3. Inawezekana 4. Rahisi 5. Rahisi sana

SEHEMU YA 2: MAMBO YANAYOHUSIANA NA kiwewe MIONGONI MWA WAGONJWA WANAOPANDA WAZI WA TIBIA WANAOTIbiwa MOI.

13. Aina / ukali wa fracture
    1. GA mimi []
    2. GA II []
    3. GA III-A []
    4. GA III-B []
    5. GA III-C []
14. Ni nini utaratibu au sababu za kuumia
    1. Ajali ya gari []
    2. Shambulio []
    3. Jeraha la michezo []
    4. Jeraha kutokana na kuanguka kutoka urefu > futi 3 []
    5. Jeraha kutokana na kuanguka kutoka kwa kusimama <3feet []
    6. Mgongano wa pikipiki []
    7. Watembea kwa miguu waligongwa []
    8. Kuponda/kujeruhiwa kazini []
15. Aina ya matibabu
    1. Upasuaji []
    2. Isiyo ya upasuaji []

16. Muda wa matibabu tangu kujeruhiwa
    1. <4 []
    2. Wiki 4-6 []
    3. Wiki 7-8 []
    4. Wiki 9-10 []
    5. Wiki 11-12 []
    6. Wiki 12 []
17. Je, kuna matatizo yoyote yaliyotengenezwa
    1. Ndiyo []
    2. Hapana [] (kama “HAPANA” ruka swali la 17)
18. Je, ni aina gani ya matatizo yaliyotengenezwa
    1. Maambukizi []
    2. Gangrene []
    3. Sepsis []
    4. Fibrosis []
19. Muda wa kukaa hospitalini
    1. Wiki 1-2 []
    2. Wiki 3-4 []
    3. Wiki 5-6 []
    4. > Wiki 7 []
20. Unawezaje kupima maumivu yako?
    1. Hakuna maumivu []
    2. Maumivu kidogo []
    3. Maumivu kidogo []
    4. Maumivu ya wastani []
    5. Maumivu makali []
    6. Maumivu makali []
    7. Maumivu mabaya zaidi []

21. Njia ya malipo
    1. Bima []
    2. Malipo ya kibinafsi []

SEHEMU YA 3:

MSONGO WA KISAIKOLOJIA MIONGONI MWA WAGONJWA WANAOFUNGUKA TIBIA FRACTURE WALIYOTIbiwa MOI.

Maagizo: *Tafadhali chagua chaguo ambalo linafafanua vizuri zaidi jinsi umekuwa ukihisi kwa kila swali.*

22. Kwa ujumla, afya yako ikoje leo?
    1. Maskini []
    2. Haki []
    3. Nzuri []
    4. Nzuri sana []
    5. Bora []
23. Je, unaweza kupima afya yako kwa ujumla vipi sasa ikilinganishwa na mwaka mmoja uliopita?
    1. Mbaya zaidi sasa []
    2. Wakati mwingine []
    3. Karibu sawa []
    4. Bora zaidi []
    5. Bora zaidi []
24. Ni kiasi gani maumivu yameingilia kazi yako ya kawaida (nje ya nyumbani na kazi za nyumbani) katika wiki nne zilizopita
    1. Sivyo kabisa []
    2. kidogo []
    3. Wastani []
    4. Kidogo []

Maswali yanayofuata ni kuhusu mambo ambayo ungefanya kwa siku ya kawaida. Je, afya yako inakuzuia kushiriki katika shughuli hizi? Ikiwa ndivyo, itagharimu kiasi gani?		Sio kikomo hata kidogo	Ya Kidogo Kidogo	Kwa wastani mdogo	Kikomo sana	Kikomo kabisa
25.	Kukimbia , kuinua vitu vizito, na kushiriki katika michezo na shughuli kali					
26.	Shughuli za wastani, kama vile kusogeza meza na vitu vingine vya nyumbani, kufagia na kusomba					
27.	Kuinua au kubeba mboga					
28.	Kupanda kadhaa ndege ya ngazi					

29.	Kupanda moja ndege ya ngazi					
30.	Kuinama, kupiga magoti au kuinama					
31.	Kutembea zaidi kuliko a maili					
32.	Kutembea kadhaa vitalu					
33.	Kutembea moja kuzuia					
34.	Kuoga au kuvaa mwenyewe					
Je, ni muda gani umekuwa na mojawapo ya matatizo yafuatayo katika kazi yako au shughuli nyingine za kila siku kama matokeo ya afya yako ya kimwili katika wiki nne zilizopita?		Hakuna wakati	Muda kidogo	Baadhi ya wakati	Mara nyingi	Wakati wote
35.	Punguza muda unaotumia kufanya kazi au kufanya mambo mengine					
36.	Imekamilika chini ya ungependa					
37.	Kulikuwa na kizuizi cha aina ya kazi au shughuli zingine					
38.	Ilikuwa na ugumu wa kufanya kazi au shughuli zingine (km . Ilichukua juhudi za ziada)					
39.	Je, afya yako ya kimwili au matatizo yako ya kiakili yameingilia kiasi gani katika shughuli zako za kijamii (kuona marafiki, familia, n.k.) katika wiki nne zilizopita?					
Maswali haya yanahusu jinsi umekuwa ukihisi na jinsi mambo yalivyokwenda kwako katika wiki nne zilizopita.						

Ulitumia muda gani katika wiki nne zilizopita		Hapana kabisa	Kidogo	Wastani	Kimya kidogo	Wakati wote
40.	Je, ulijisikia kuwa na nguvu					
41.	Umekuwa na wasiwasi					
42.	Umejisikia chini sana kwenye madampo hivi kwamba hakuna kitu kinachoweza kukupa moyo					
43.	Je, umejisikia utulivu na amani					
44.	Je! ulikuwa na nguvu nyingi					
45.	Je, umejisikia kuvunjika moyo na huzuni					
46.	Je, ulijisikia kuchoka					
47.	Umekuwa na furaha					
48.	Je, ulihisi kuishiwa nguvu					
Vipi KWELI au UONGO ni kila mmoja ya ya kufuata kauli kwa wewe?		Hakika	Zaidi ya	Sijui	Kweli zaidi	Hakika ni
49.	Ninaonekana kuugua mara nyingi zaidi kuliko wengine.					
50.	I nina afya sawa kamakila mtu					
51.	Natarajia afya yangu itadhoofika					
52.	Afya yangu ni nzuri					

Appendix III: Consent form (English version)

MUHIMBILI UNIVERSITY OF HEALTH AND ALLIED HEALTH SCIENCES

DIRECTORATE OF RESEARCH AND PUBLICATIONS

ID No. | | | | |

Greetings! My name is **Dr. Deogratias Adolar Hyera** a postgraduate student at MUHAS. I'm conducting a study on Factors Associated with a proportional increase in Psychological Stress among patients with open Tibia fracture treated at Muhimbili Orthopaedic Institute**.**

Purpose of study: To assess the factors associated the proportion of psychological Stress among patients with open Tibia Fracture treated at Muhimbili Orthopaedic Institute**.**

What participation involves: Your participation in the study will be your own choice and you are free to decide without any adverse reactions. Participation will require you to answer questions regarding psychological stress among patients with open Tibia Fracture treated at Muhimbili Orthopaedic Institute. It will take less than 20 minutes to fill out the questionnaire.

Confidentiality: All information collected will be confidential and this will be maintained by use of codes, no names will be asked or required. Information collected from the questionnaire will be entered into computers with only the study identification number and if the results of the current study will be published or presented in a scientific meeting, names and other information that might identify you will not be used.

Benefits: There will be no direct benefit for your participation; however, the study findings will help improve the provision mental health services to orthopaedic patients with open Tibia Fracture. Moreover, the study will be used to addressing Hospital systems or policy maker's regarding associated factors to the psychological stress as per evidence-based recommendations.

Compensation: There will be no compensation of any kind for participation.

Risk: The study will not harm you physically, psychologically, or emotionally.

Rights to withdraw and Alternatives: Participation in this study is voluntary and you have the right to refuse to participate and at any time you may withdraw from the study even if you have already given your consent. Refusal to participate or withdraw from the study will not involve penalty or loss of any benefits to which you are otherwise entitled.

Who to Contact: If you ever have questions about this study, you should contact the principal investigator**, Dr. Deogratias Adolar Hyera, Phone number** +255714272406**, P.O. Box 6000, Dar es Salaam**. If you ever have questions about your rights as a participant, you may contact or call the Director of Research and Publications Committee at MUHAS, P.O. Box 65001, Dar es Salaam.

Signature:

Do you agree to participate?

Participant agrees …… Participant does NOT agree ……..

I, _____ have read the contents in this form. My questions have been answered. I agree to participate in this study.

Signature of participant _____

Signature of the researcher _____Date_____

Appendix IV: Consent form (Swahili version)

CHUO KIKUU CHA AFYA MUHIMBILI NA SAYANSI VINGINE VYA AFYA

KURUGENZI YA UTAFITI NA MACHAPISHO

ID No. | | | | |

Salamu! Naitwa **Dr. Deogratias Adola Hyera** mwanafunzi wa shahada ya uzamili katika MUHAS. Ninafanya utafiti kuhusu Mambo Yanayohusiana na Ongezeko sawia la Msongo wa Kisaikolojia miongoni mwa wagonjwa walio na mpasuko wa wazi wa Tibia wanaotibiwa katika Taasisi ya Mifupa ya Muhimbili **.**

Kusudi la Utafiti : Kutathmini mambo yanayohusiana na kuenea kwa Mkazo wa Kisaikolojia kati ya wagonjwa walio na Tibia Fracture wazi kutibiwa saa Taasisi ya Mifupa Muhimbili **.**

Ushiriki unahusisha nini: Kushiriki kwako katika utafiti kutakuwa chaguo lako mwenyewe na uko huru kuamua bila athari zozote mbaya. Kushiriki kutakuhitaji kujibu maswali kuhusu msongo wa mawazo kati ya wagonjwa walio na Tibia Fracture wazi kutibiwa Taasisi ya Mifupa Muhimbili . Itachukua chini ya dakika 20 kujaza dodoso.

Usiri: Taarifa zote zitakazokusanywa zitakuwa siri na hii itatunzwa kwa kutumia misimbo, hakuna majina yatakayoulizwa au kuhitajika. Taarifa zitakazokusanywa kutoka kwenye dodoso zitaingizwa kwenye kompyuta na nambari ya utambulisho wa utafiti pekee na ikiwa matokeo ya utafiti wa sasa yatachapishwa au kuwasilishwa katika mkutano wa kisayansi, majina na taarifa nyingine ambazo zinaweza kukutambulisha hazitatumika.

Manufaa: Hakutakuwa na manufaa ya moja kwa moja kwa ushiriki wako; hata hivyo, matokeo ya utafiti yatasaidia kuboresha utoaji wa huduma za afya ya akili kwa wagonjwa wa mifupa walio na Tibia Fracture wazi . Zaidi ya hayo, utafiti utatumika kushughulikia mifumo ya Hospitali au watunga sera kuhusu mambo yanayohusiana na mkazo wa kisaikolojia kulingana na mapendekezo ya msingi wa ushahidi.

Fidia: Hakutakuwa na fidia ya aina yoyote kwa ushiriki.

Hatari: Utafiti hautakudhuru kimwili, kisaikolojia, au kihisia.

Haki za kujiondoa na Njia Mbadala: Kushiriki katika utafiti huu ni kwa hiari na una haki ya kukataa kushiriki na wakati wowote unaweza kujiondoa kwenye utafiti hata kama tayari umetoa kibali chako. Kukataa kushiriki au kujiondoa kwenye utafiti hakutahusisha adhabu au hasara ya manufaa yoyote ambayo unastahiki kuyapata.

Nani wa Kuwasiliana naye: Ukiwahi kuwa na maswali kuhusu utafiti huu, unapaswa kuwasiliana na mpelelezi mkuu **, Dk. Deogratias Adola Hyera , Nambari ya simu** +255714272406 **, PO . Box 6000, Dar es Salaam** . Ukiwahi kuwa na maswali kuhusu haki zako kama mshiriki, unaweza kuwasiliana au kumpigia simu Mkurugenzi wa Kamati ya Utafiti na Machapisho kwa MUHAS, SLP 65001, Dar es Salaam.

Sahihi:

Je, unakubali kushiriki?

Mshiriki anakubali …… Mshiriki HAKUBALI ……..

Mimi, _____ nimesoma yaliyomo katika fomu hii. Maswali yangu yamejibiwa. Ninakubali kushiriki katika utafiti huu.

Saini ya mshiriki _____

Sahihi ya mtafiti _____Tarehe_____

Appendix V: Ethical clearance



UNITED REPUBLIC OF TANZANIA

MINISTRY OF EDUCATION, SCIENCE AND TECHNOLOGY

MUHIMBILI UNIVERSITY OF HEALTH AND ALLIED SCIENCES

OFFICE OF THE DIRECTOR – RESEARCH, INNOVATION AND PUBLICATIONS



In reply quote;
Ref. No.DA.282/298/01.C/1496

Date: 17/01/2023

MUHAS-REC-01-2023-1496

Deogratias Adolar Hyera,
Mmed Orthopedics and Traumatology,
School of Medicine,
MUHAS

RE: APPROVAL FOR ETHICAL CLEARANCE FOR A STUDY TITLED: FACTORS ASSOCIATED WITH A PROPORTIONAL INCREASE IN PSYCHOLOGICAL STRESS AMONG PATIENTS WITH OPEN TIBIA FRACTURE TREATED AT MOI.

Reference is made to the above heading.

I am pleased to inform you that the Chairman has on behalf of the University Senate, approved ethical clearance of the above-mentioned study, on recommendations of the Senate Research and Publications Committee meeting accordance with MUHAS research policy and Tanzania regulations governing human and animal subjects research.

APPROVAL DATE: 17/01/2023
EXPIRATION DATE OF APPROVAL: 16/01/2024

STUDY DESCRIPTION:
Purpose:
The purpose of this study is to determine the prevalence and factors associated with psychological stress among patients with open tibia fracture at MOI.

The approved protocol and procedures for this study is attached and stamped with this letter, and can be found in the link provided:
https://irb.muhas.ac.tz/storage/Certificates/Certificate%20-%2014003.pdf and in the MUHAS archives.

9 United Nations Road; Upanga West; P.O. Box 65001, Dar Es Salaam: Tel. G/Line: +255-22-2150302/6; Ext. 1038; Direct Line:+255-22-2152489;Telefax:+255-22-2152489;E-mail:drp@muhas.ac.tz;Web:https://www.muhas.ac.tz

The PI is required to:

1. Submit bi-annual progress reports and final report upon completion of the study.
2. Report to the IRB any unanticipated problem involving risks to subjects or others including adverse events where applicable.
3. Apply for renewal of approval of ethical clearance one (1) month prior its expiration if the study is not completed at the end of this ethical approval. You may not continue with any research activity beyond the expiration date without the approval of the IRB. Failure to receive approval for continuation before the expiration date will result in automatic termination of the approval for this study on the expiration date.
4. Obtain IRB amendment (s) approval for any changes to any aspect of this study before they can be implemented.
5. Data security is ultimately the responsibility of the investigator.
6. Apply for and obtain data transfer agreement (DTA) from NIMR if data will be transferred to a foreign country.
7. Apply for and obtain material transfer agreement (MTA) from NIMR, if research materials (samples) will be shipped to a foreign country,
8. Any researcher, who contravenes or fail to comply with these conditions, shall be guilty of an offence and shall be liable on conviction to a fine as per NIMR Act No. 23 of 1979, PART III section 10 (2)
9. The PI is required to ensure that the findings of the study are disseminated to relevant stake holders.
10. PI is required to be versed with necessary laws and regulatory policies that govern research in Tanzania. Some guidance is available on our website https://drp.muhas.ac.tz/.

Dr. Nahya Salim Masoud
Ag. Chairman, MUHAS Research and Ethics Committee

Muhimbili University of Health and Allied Sciences
DIRECTOR
Research & Publications
Box 65001

9 United Nations Road; Upanga West; P.O. Box 65001, Dar Es Salaam: Tel. G/Line: +255-22-2150302/6; Ext. 1038; Direct Line:+255-22-2152489;Telefax:+255-22-2152489;E-mail:drp@muhas.ac.tz;Web:https://www.muhas.ac.tz

Appendix VI: Introduction letter

UNITED REPUBLIC OF TANZANIA
MINISTRY OF EDUCATION, SCIENCE AND TECHNOLOGY
MUHIMBILI UNIVERSITY OF HEALTH AND ALLIED SCIENCES
OFFICE OF THE DIRECTOR – POSTGRADUATE STUDIES

ı reply quote;
Ref. No. HD/MUH/T.191/2020

24th January, 2023

The Executive Director,
Muhimbili Orthopaedics Institute,
P.O. Box 65474,
DAR ES SALAAM.

Re: INTRODUCTION LETTER

The bearer of this letter is Deogratias Adolar Hyera (HD/MUH/T.191/2020), a student at Muhimbili University of Health and Allied Sciences (MUHAS) pursuing MMed. Orthopaedics and Traumatology.

As part of his studies he intends to do a study titled: **PREVALENCE AND FACTORS ASSOCIATED WITH PSYCHOLOGICAL STRESS AMONG PATIENTS WITH OPEN TIBIA FRACTURE TREATED AT MOI ."**

The research has been approved by the Chairman of University Senate.

Kindly provide him the necessary assistance to facilitate the conduct of his research.

We thank you for your cooperation.

Ms. Victoria Mwanilwa
For: DIRECTOR, POSTGRADUATE STUDIES

c.c. Deogratias Adolar Hyera

9 United Nations Road; Upanga West; P.O. Box 65001, Dar Es Salaam: Tel. G/Line: +255-22-2150302/6; Ext. 1015;
Direct Line:+255-22-2151378;Telefax:+255-22-2150465;E-mail:dpgs@muhas.ac.tz;Web:https://www.muhas.ac.tz

Appendix VII: Permission letter for data collection

UNITED REPUBLIC OF TANZANIA
MINISTRY OF HEALTH

MUHIMBILI ORTHOPAEDIC INSTITUTE (MOI)
Offering Services in Orthopaedics, Neurosurgery and Traumatology

Ref. No. AB.145/146/02A/22

26th January, 2022

Director,
Postgraduate student,
Muhimbili University of Health and Allied Science,
P.O. Box 65001,
Dar Es Salaam.

RE: INTRODUCTION LETTER TO DEOGRATIAS ADOLAR HYERA

Kindly refer to your letter with reference No. HD/MUH/T.191/2020 dated 24th January, 2023 regarding the above subject matter.

On behalf of the Management of Muhimbili Orthopaedic Institute, I would like to officially inform you that, your request to conduct research at Muhimbili Orthopaedic Institute (MOI) has been approved.

Kindly, inform mentioned student to start the study as requested.

Regards,

Naghuhiwa E. Msuya
For: EXECUTIVE DIRECTOR

MUHIMBILI ORTHOPAEDIC INSTITUTE
P. O. Box 65474
DAR-ES-SALAAM

CC: Director Orthopaedic and Trauma

Muhimbili Orthopaedic Institute (MOI), Upanga West Plot No. 1048/2, Kalenga Street, P.O. Box 65474 – Dar es Salaam; Telephone Number: +255-022-2151298/2152937/2152938; Fax: +255-022-2151744
Website: www.moi.ac.tz, info@moi.ac.tz