

**ORTHOPAEDIC SURGICAL TREATMENT WAITING TIME FOR  
ACUTE MUSCULOSKELETAL TRAUMA PATIENTS ATTENDED  
AT MUHIMBILI ORTHOPAEDIC INSTITUTE**

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**Elias Godfrey, MD**

**MMed (Orthopaedics and Traumatology) Dissertation  
Muhimbili University of Health and Allied Sciences  
October~~June~~, 2019**

**Muhimbili University of Health and Allied Sciences**

**Department of Orthopaedic and Traumatology**

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**ORTHOPAEDIC SURGICAL TREATMENT WAITING TIME FOR  
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AT MUHIMBILI ORTHOPAEDIC INSTITUTE**

**By**

**Elias Godfrey**

**Dissertation Submitted in Partial fulfilment of the Requirement for the Degree  
of Master of Medicine (Orthopaedics and Traumatology) of**

**Muhimbili University of Health and Allied Sciences  
~~oetober~~OctoberJune, 2019**

**CERTIFICATION**

The undersigned certifies that he has read and hereby recommends for the **examination acceptance** by Muhimbili University of Health and Allied Sciences a dissertation entitled: **“Orthopaedic Surgical Treatment Waiting Time for Acute Musculoskeletal Trauma Patients Attended at Muhimbili Orthopaedic Institute”**, in (partial) fulfilment of the requirement for the degree of Masters of Medicine in Orthopaedics and Traumatology of Muhimbili University of Health and Allied Sciences.

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**Dr. Robert I. Mhina**

MD, MMed, MSc, FCS

(Supervisor)

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**Date**

**DECLARATION AND COPYRIGHT**

I, **Dr. Elias Godfrey**, declare that this **dissertation** is my own original work and that it has not been presented and it will not be presented to any other University for a similar or any other degree award.

**Signature**..... **Date**.....

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**ACKNOWLEDGEMENT**

First and foremost, I would like to express my heartfelt gratitude to my supervisor, Dr. Robert I. Mhina - Consultant Orthopaedic Surgeon and Senior Lecturer at Muhimbili University of Health and Allied Sciences first for accepting to be my supervisor but above all, for his tireless guidance in every step of this research. He has not only been my research supervisor but my teacher in Orthopaedics and Traumatology as well as my mentor. I also feel indebted to Dr. Billy Haonga – Senior Lecturer and Head of Department of Orthopaedics and Traumatology Muhimbili University of Health and Allied Sciences for his priceless guidance in the preparation of this work. Secondly, I extend my appreciations to all the Faculty members of the Department of Orthopaedics, Traumatology and Neurosurgery for their constructive inputs which have been a cornerstone in helping this research work achieve its objectives. Lastly, I express my appreciation to MOI administration for granting me permission to conduct my research at MOI.

**DEDICATION**

This work is dedicated to my mother Selina Ishebi, my wife (Hellen) and children (Goodchance, Goodray and Edrick)

## ABSTRACT

Waiting time for acute musculoskeletal trauma surgery has been used as a measure of institutional efficiency. Delay in operating on trauma patients leads to increased morbidity, mortality and reports have shown negative impacts and additional costs for the hospitals besides inconvenience to patients and their families.

**Objectives:** To determine the extent and causes of delay of orthopaedic surgical treatment among acute musculoskeletal Trauma patients attended at MOI from July 2018 to February 2019.

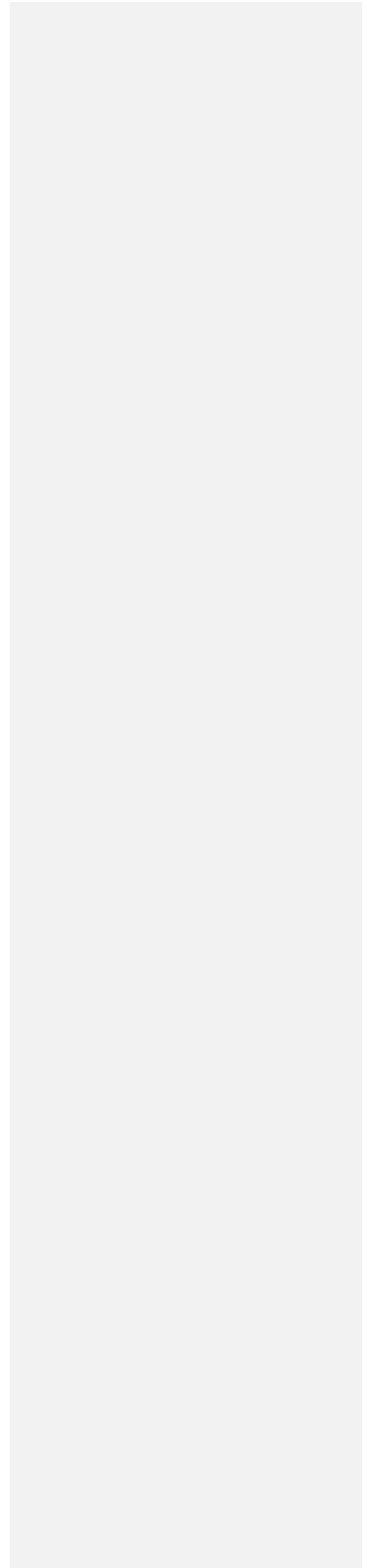
**Methodology:** This was a cross-sectional study, which was conducted at MOI. Two hundred and eighty patients who met the inclusion criteria were enrolled after obtaining written consent, data were collected using a structured questionnaire and Modified Lankester tool was used to recruit patients from the emergency department. Data were analyzed using SPSS version 21 computer software.

**Results:** A total of 280 acute musculoskeletal trauma patients with a mean age of  $28\pm 15$  years were recruited. There were more males 223(79.6%) than Females, Lankester group A accounted for 77.5% of the patients recruited. The mean waiting time for orthopaedic operation for Lankester A and B respectively was  $9\pm 5$  and  $12\pm 6$  hours while 65.4% for Lankester group A and 9.5% for Lankester had missed their target time. The majority of delays were due to lack of available operating time (43.3%) and the presence of comorbidities predicts delay of more than 24hours.

**Conclusion:** The study revealed the mean waiting time for patients who required emergency operation was  $9\pm 5$  hours while for patients who required an urgent operation was  $12\pm 6$  hours. Emergency patients operated less than 6hours after admission was only 34.6%. The commonest cause of the delay of operation was Lack of theatre slots while the presence of comorbidities predicts delay more than 24 hours

**Recommendations:**

To allocate more theatre slots for emergency patients to reduce their waiting time. Orthopaedic and Trauma centers should use orthopaedic surgical treatment waiting time as the indicator for quality delivery services and a Physician should be part of the emergency on-call team to facilitate early management of patient's comorbidities.









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**LIST OF ABBREVIATIONS**

ASA	American Society of Anaesthesiologists
DTS	Delay to Surgery
ICU/HDU	Intensive Care Unit/High Dependency Unit
LOS	Length of Stay
MOI	Muhimbili Orthopaedic Institute
MoHCDGEC	Ministry of Health, Community Development, Gender, Elderly and Children
NCI	National Cancer Institute
IRB	Institutional Review Board
SPSS	Statistical Package for the Social Sciences

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**DEFINITION OF TERMS**

Acute Musculoskeletal trauma patient is the one who sustained injury to the musculoskeletal system within a period of less than 24 hours.

Ring-fencing is defined as separating elective from emergency operations in parallel hospital services and it has been used to enhance efficiency of operating rooms.



## CHAPTER ONE

### 1.0 INTRODUCTION

Waiting time for acute musculoskeletal trauma surgery has been used as a measure of institutional efficiency. High quality Healthcare Services has been a major vision among all healthcare systems worldwide and Tanzania in particular<sup>(1)</sup>.

There is a challenge in delivering high quality Health care equally and efficiently and one of the areas affected by these challenges is surgery.

Emergency surgery is unplanned and often has to be fitted into a surgery schedule already crowded with elective cases, where operating room (OR) space is limited<sup>(2)</sup>.

The urgency of operative intervention depends on the injury sustained. Time to emergence orthopaedic treatment will depend on the patient's physiologic and extremity soft-tissue status<sup>(3)</sup>.

Delay in the surgical treatment of acute musculoskeletal trauma occurs every day in orthopaedics departments despite improvement in technical and hospital resources<sup>(4),(5)</sup>. This delay could be explained partly by the increased number of emergency orthopaedic surgical patients who required emergency surgical treatment<sup>(3)</sup>.

Studies have shown that when the cause of delay to surgery is identified and appropriate intervention applied leads to improved effectiveness of surgical procedure<sup>(6),(7)</sup>.

Delay in operating trauma patient's leads to increased morbidity, mortality, length of hospital stay and overall cost.

Acute musculoskeletal Trauma patients have been classified by using the three groups of Modified Lankester according to their urgency of need of surgery<sup>(8)(9)(10)</sup>.

**Group A:** Open fractures, dislocations, limb injuries associated with vascular compromise, compartment syndrome, acute osteomyelitis, acute septic arthritis, Mangled hand, Cauda equina compression, Femoral neck fracture(child), Sub capital femoral neck fracture in adults under 60 years, Supracondylar fractures with neurovascular compromise, etc., who should have received treatment within 6 hours of admission.

**Group B:** Hip fractures, closed long bone fractures, ankle fractures, limb gangrene, removal of severe implant infection, Spinal fractures with neurology, other injuries not included in group A or C etc. who should be operated upon on the day they presented.

**Group C:** tendon injuries, simple hand fractures, cold abscesses, limb deformities requiring surgical correction, malunion or non-union of fractures, chronic osteomyelitis, carpal tunnel syndrome, Spinal tumours/fracture without neurology etc. who should have surgery done within 5 days or more of presentation. <sup>(9, 10)</sup>

To assess the prevalence of co-morbidities and other contraindications for surgery, ASA grading will be considered. ASA grading: -

- 1) Patient is a completely healthy fit patient.
- 2) Patient has mild systemic disease.
- 3) Patient has severe systemic disease that is not incapacitating.
- 4) Patient has incapacitating disease that is a constant threat to life.
- 5) A moribund patient.

There are modifications – the addition of “E” for an emergency, the addition of “P” for pregnancy, and ASA 6 for organ retrieval in brain-dead patients <sup>(9, 10)</sup>

### 1.1 Literature Review

Time of orthopaedic surgical treatments for acute musculoskeletal trauma patients was studied by Lankester et al at Royal United Hospital in United Kingdom where they categorized patients in three groups A, B and C according to their urgent of need for orthopaedic surgery.

- i. Group A-require emergency surgery,
- ii. Group B-urgent surgery and
- iii. Group C-elective surgery

It was found that orthopaedic surgeries for Patients in Lankester group A and B were done within their target time by 78% and 58% respectively. In all Lankester groups 34% of patients missed their target time<sup>(9)</sup>.

Delay of surgery of hip fracture for more than 24 hours was a significant predictor of a minor medical complication, while a delay for more than 48 hours was associated with an increased risk of major medical complications as shown by Lefavre et al. Patients with a fracture of the hip should have surgery early to lessen the risk of complications<sup>(11)</sup>.

Rouleau et al conducted cross-sectional survey in level 1 trauma centre in Montreal and found the mean time from injury to orthopaedic consultation to be 89 hours or approximately 3.5 days, and half the patients consulted an orthopaedist within 45hours. However, 36% of those with time-sensitive diagnoses were not seen by orthopaedic surgeons within the acceptable time frame which lead to poor prognosis<sup>(12)</sup>.

A study by Jagiasi et al at an urban tertiary care hospital in India where they categorized patients into three groups A ,B and C according to their urgency of need for orthopaedics surgery showed an average time period between the day of admission and date of orthopaedics surgical treatment of 15.73 days. The Average time period taken in Lankester groups A and B were 13.61 and 16.68 days respectively<sup>(10)</sup>

This suggested that except for a few cases which were operated immediately the rest took a long time and most of the time were treating the complication of the fracture rather than the fracture itself<sup>(10)</sup>.

Long et al in North West Cameroon showed that 60.3% of patients had delayed hospital presentation of more than 7 days<sup>(13)</sup>.

A study done by Ifesanya et al at a Ibadan Nigeria showed median orthopaedic surgical treatment delay of 4 days (mean = 17.6 days) and an average delay of 8.9 days and 51.1 days for emergency and other case respectively. Patients admitted on weekends are more likely to encounter delay beyond 3 days before their surgical operations are carried out<sup>(8)</sup>.

The study by Chalya et al in a University Teaching Hospital in the Lake Zone Tanzania showed an overall duration of hospital stay before surgical treatment ranging from 5 to 48 days<sup>(14)</sup>.

There are multiple reasons for the delay of emergency orthopaedics surgical treatments as observed from different studies.

Lankester et al at Royal United Hospital in the United Kingdom found that the most common cause of delay for acute musculoskeletal trauma treatment was lack of theatre time (90%) and mostly due to waiting for an appropriately experienced surgeon or appropriate implant<sup>(9)</sup>.

Studying factors associated with surgical treatment delay in developing countries Jonnalagadda et al of Barbados, West Indies found; 17% of delay of surgery was due to transporting the patient to the operating theatre, Non availability on time for Anaesthetists(12%), nurses(4%) and the surgeon(8%), unavailability of equipment (7%), miscellaneous reasons(11%) such as waiting for consent forms to be signed, delay in arranging blood, while improper and inadequate pre-operative preparation of the patient (10%) and 24% of patients there was an apparent delay, however, without any recorded specific reason<sup>(15)</sup>.

Ricci et al studying factors associated with delay to surgery for hip fracture showed that Independent factors associated with DTS included a day of the week for the hospital admission where Patients attended on weekend had longer DTS (mean 2.2 to 2.7 days) than did patients admitted other days (mean 1.7 – 1.8) And the need for pre-operative cardiac test increased the number of days to surgery mean 3.2 days than those without 1.7 days <sup>(16)</sup>.

A study done in an Urban tertiary care Hospital in India by Jagiasi et al found that 48% of patients were delayed for orthopaedic surgical intervention due to lack of proper infrastructure, including lack of OT slots, lack of medical attendants and lack of linen and gowns, while 19% and 7.1% were delayed because of unfitnes for surgery and in availability of proper implants respectively <sup>(10)</sup>.

Ifesanya et al showed Lack of theatre slot was the commonest cause of delay to acute musculoskeletal trauma surgery and the 14.3% delayed Surgery due to clinical reasons. While for those whose patients operation delayed more than 7 days comorbidities condition contributes almost twice<sup>(8)</sup>.

Chalya et al showed that surgery was delayed in 21.0% of patients. Lack of theatre space and theatre facilities were the most common causes of delay by 53.0% and 28.4% of patients respectively<sup>(14)</sup>.

Nancy et al showed a 61.7% of patients had a delay in their surgical intervention due to non-clinical reasons while 30.1% of patients were delayed due to clinical reasons. Furthermore showed that 8.2% of the patients were delayed due to patient reasons, Lack of theatre time accounted for 70.9%, 10.8% were delayed due to lack of a consultant and Administrative/logistic errors accounted for a further 7.9% of the delays. The commonest pre-existing medical condition was uncontrolled hypertension<sup>(17)</sup>

### 1.2 Conceptual Framework

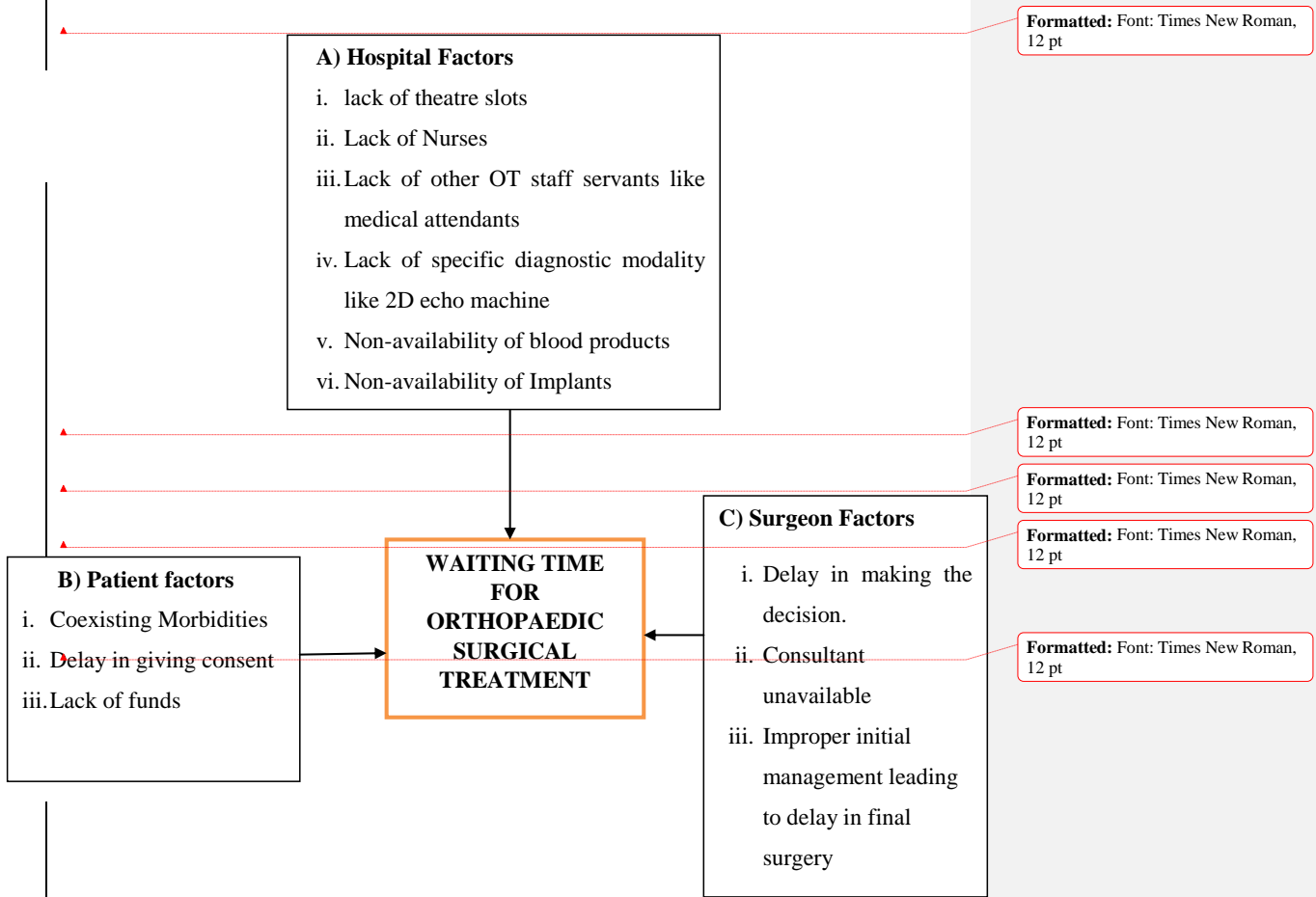


Figure 114: Conceptual Framework

### **1.3 Problem Statement**

Despite an improvement in the hospital infrastructure, resources and medical technology there is still a problem of delays of surgical management among acute musculoskeletal trauma patients<sup>(4)</sup>. Delay in surgical management among acute musculoskeletal trauma has negative impacts on treatment outcome which include impairment of limb functions and loss of part or the whole limb. The overall results of this impairment are increased in costs to the hospitals, patients and families.

### **1.4 Rationale**

Timely management of the patients occurs when the cause of delay to surgery is identified and appropriate intervention applied<sup>(6, 7)</sup>. This study was aimed at identifying time and causes for delay of orthopaedic surgical treatments of acute musculoskeletal trauma patients<sup>1</sup>. When the causes of delay are addressed will reduced costs and inconvenience to the patients eventually leading to patient satisfaction

### **1.5 Research questions**

1. How long do the patients with acute musculoskeletal Trauma injury stay before receiving orthopaedic surgical treatment at MOI?
2. What are the causes for delay in receiving orthopaedic surgical treatment for acute musculoskeletal Trauma attended at MOI?

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## 1.6 Objectives

### 1.6.1 Broad Objective

To determine the extent and causes of delay of orthopaedic surgical treatment among acute musculoskeletal Trauma patients attended at Muhimbili Orthopaedic Institute.

### 1.6.2 Specific Objectives

1. To determine the time lapsed from admission to orthopaedics surgical Treatments among patients with acute musculoskeletal Trauma attended at Muhimbili Orthopaedic Institute from July 2018 to February 2019.
2. To evaluate the extent of orthopaedic surgical treatment delay in patients with acute musculoskeletal Trauma attended at the Muhimbili Orthopaedic Institute from July 2018 to February.
3. To determine the causes of delay for orthopaedics surgical Treatments among acute musculoskeletal Trauma patients attended at Muhimbili Orthopaedic Institute from July 2018 to February 2019.

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## CHAPTER TWO

### 2.0 METHODOLOGY

#### 2.1 Study design

The study was a Cross-sectional study.

#### 2.2 Study population

The study population included acute musculoskeletal trauma injury patients presented at MOI within 24 hours of injury that require emergency orthopaedic surgical treatment during the study period. These patients were categorized by modified Lankester classification as Group A and B who should have surgical treatment within 6 hours and within 24 hrs of admission respectively.

#### 2.3 Study area

The study was conducted at MOI in Dar es Salaam, Tanzania for a period of 14 months(March 2018-May 2019) where a period of 8 months from July 2018 to February 2019 patients were enrolled into the study. MOI is the largest Orthopaedics and trauma referral centre in Tanzania, which offer both Orthopaedics and Neurosurgery services, with a capacity of 270 beds (30 privates and 240 general) with 38 orthopaedic specialists. In the department of Orthopaedics and Traumatology, there are three firms (A and B), and Paediatrics Orthopaedics firm which carry out clinical activities. In Orthopaedics and Traumatology, the admitting firm has a team of one consultant, one specialist, four residents and one registrar who is the medical officer, two intern doctors and a nurse at the emergency department.

#### 2.4 Sampling technique

The Sampling Technique was Convenience Sampling in which only those patients attending at MOI who met the inclusion criteria and possess none of the exclusion criteria were recruited into the study.

### 2.5 Sample size estimation

From a pilot study done at Muhimbili Orthopaedic Institute for 6 months from July 2017 to December 2017 shows a total of 211 patients undergoes external fixation(main emergence orthopaedic surgery) and a total of 877 acute musculoskeletal trauma patients operated so the proportional of acute musculoskeletal trauma require surgery being 24% in considering the study power of 95%, a random likely error is estimated to be 5%, thus the sample size of this study was calculated from the formula

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

Where;

n = Sample size

p = Prevalence

e = Margin of tolerable error 5%

Z = Confidence level

$$n = \frac{1.96^2 \times 0.24 \times (1-0.24)}{0.05^2}$$

$$n = 280$$

Therefore, the minimum sample size of this study was 280 patients.

### 2.6 Inclusion criteria

- All patients with acute musculoskeletal trauma who are admitted at MOI for orthopaedic surgery
- Patient giving consent for inclusion in the study.

### 2.7 Exclusion criteria

- Patients who require non-operative orthopaedic treatments
- Lankester Group C

## 2.8 Data collection process

A Pre-tested structured questionnaire was used as a data collection tool that captured all required information as per the objectives of the study. The waiting time of acute musculoskeletal trauma patient attended MOI for emergency orthopaedic surgery were recorded by the time-lapse in hours from the time of admission to the time taken to the operating theatre. Other information obtained was a type of orthopaedic injury, coexisting morbidities and other causes of delay were noted down after careful review patient's case sheet and detailed interviews of the treating doctor and the patient. Reasons for the delay was recorded as documented in the case notes, described by the surgeon and as corroborated with that given by the nursing staff.

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## 2.9 Data Management

Structured-questionnaire was coded prior to data entry. Then entered into the Microsoft Excel on a daily basis. The approved data file was converted to SPSS format for data analysis.

## 2.10 Data Analysis

Data collected were analysed using SPSS software version 21. Categorical data like the modified Lankester grouping of patients were compared using the T-test, *P*-value of <0.05 was regarded as significant. Continuous variables like ages of patients, and duration of the delay (in hours) were expressed as mean  $\pm$  SD (standard deviation). The Primary outcome measured for this study included the duration of delay between the time when a decision to operate was taken and the time the surgery was eventually carried out and the causes of such delays. Secondly, logistic regression analysis was conducted to identify predictors of surgical delay beyond 24hrs. Results were presented with the aid of tables and diagrams.

**2.11 Ethical consideration and Consent**

Permission to conduct the study was obtained from MOI management and Ethical clearance was sought from IRB of MUHAS prior to enrolment into the study; all patients were instructed about the study and requested for consent. The procedures followed was to observe the principles as described by MUHAS Institutional Review Board. These include telling the patients the right and freedom to participate or not and, the protection of the patient's data and privacy. Patients were instructed about the study and consented privately. They were allowed to have people help them in case they need assistance. A mobile phone number of the MUHAS Research and Publications Committee was provided to each participant to be used in case of any enquiries.

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## CHAPTER THREE

## 3.0 RESULTS

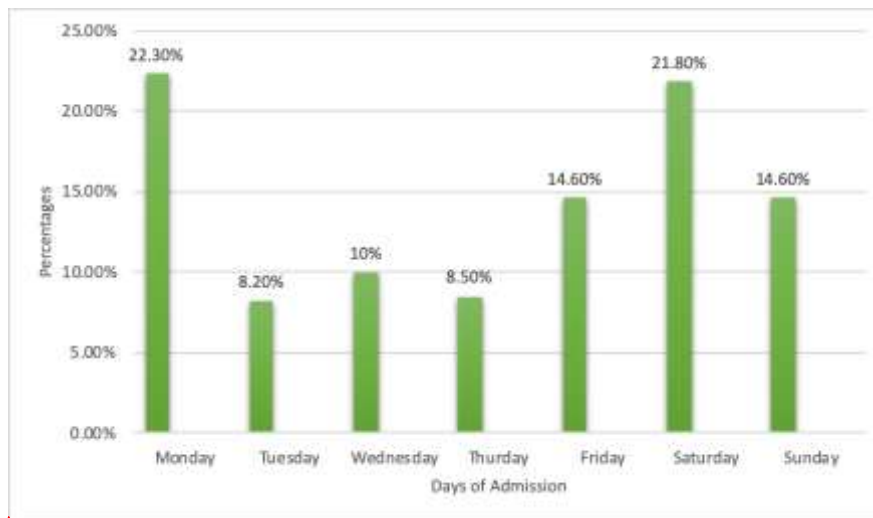
## 3.1 Participants Biodata

**Table 111: Baseline Social Demographic Characteristics of 280 Acute Musculoskeletal Patients Recruited In Study**

Variables	Frequency	Percentage (%)
<b>Age (Years)</b>		
≤15	60	21.4
16-40	172	61.4
41-65	43	15.4
≥65	5	1.8
<b>Sex</b>		
Male	223	79.6
Female	57	20.4
<b>Region of residency</b>		
Dar Es Salaam and Pwani	254	90.7
Others Region	26	9.3
<b>Education Level</b>		
No formal Education	56	20.0
Primary School	112	40.0
Secondary School	96	34.3
Graduated College/University	16	5.7
<b>Occupation</b>		
Employed	23	8.2
Self Employed	163	58.2
Unemployed	94	33.6

### 3.2 Participants' baseline characteristics

Two hundred and eighty (280) patients with Acute Musculoskeletal injury were recruited during the study period. There were 223 (79.6%) males and 57 (20.4%) females with 4:1 ratio. Their mean age of  $28 \pm 15$  Standard Deviation. Most patients i.e., 172(61%) were between 16 and 40 years of age with only 5 (1.8%) patients above 65 years. The majority of study participants were resident of Dar es Salaam City and Pwani Region 254(90.7%). 208(74.5%) of the study participants had primary and secondary school education and only 16(5.7%) had college/university education. The majority of study participants were self-employed 163 (58.2%), while formal employment was least represented (Table: 1).

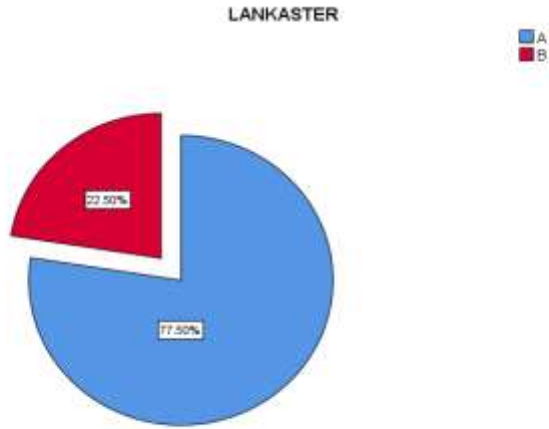


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**Figure 222: Distribution of Study Participants by the day of admission**

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The majority of study participants were admitted during the weekday (64%) with highest proportional on the Monday (22.3%) and Saturday (21.8%) and least being on the Tuesday (8.2%).



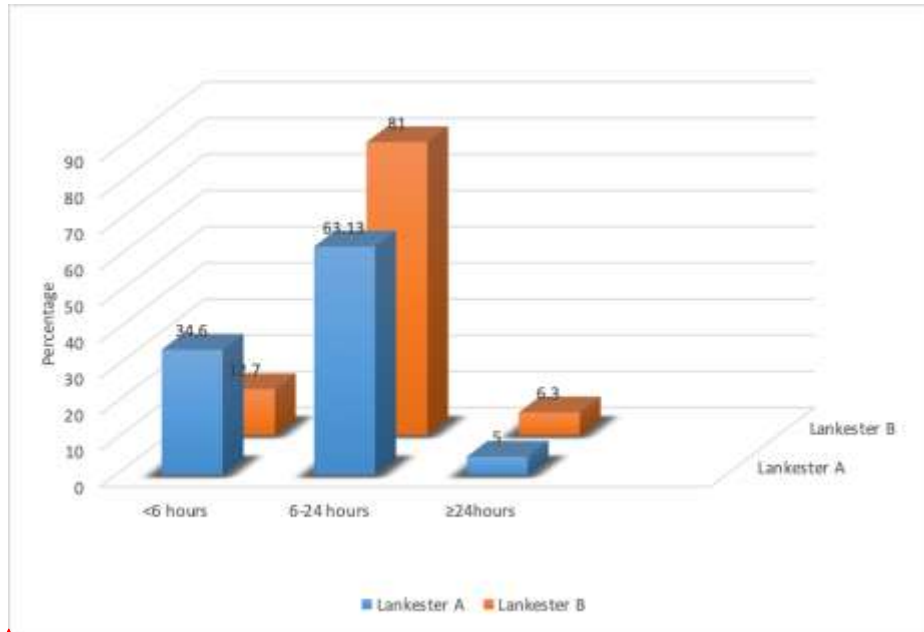
**Figure 333: Distribution of Participants by Lankester Groups**

Among Two hundred and eighty (280) of the recruited Study participants lankester group A (77.5%) the majority and least being Lankester group B(22.5%).

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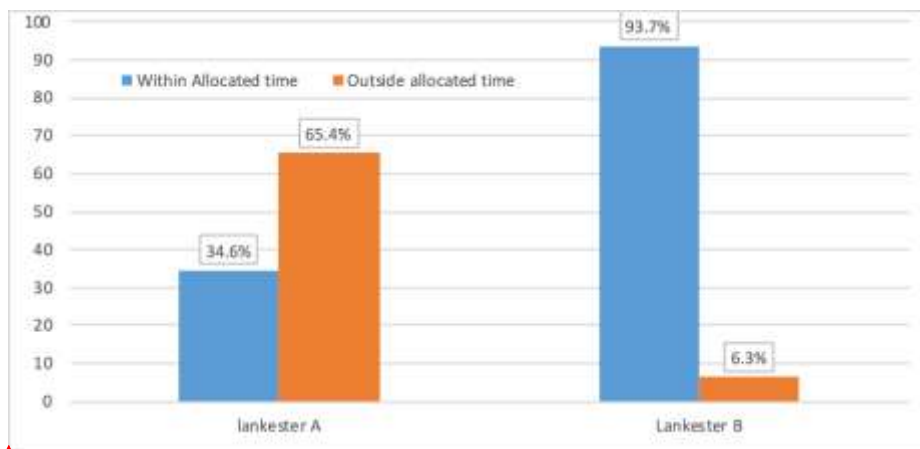




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**Figure 444: Waiting time for Orthopaedic Surgical Treatment in Lankester group A and B patients.**

In Lankester group A only 75 (34.6%) were operated within 6 hours after admission. Most of patients 137(63.13%) were operated between 6-24 hours after admission while few 5 (2.3%) were operated more than 24 hours after admission, with mean waiting time of  $9 \pm 5$  standard deviation Lankester group B the majority of patients 51(81%) were operated within 6-24 hours of admission while 8 (12.7%) and 4(6.3%) were operated within 6 hours and after 24 hours of admission respectively with a mean waiting time was of  $12 \pm 6$  hours.



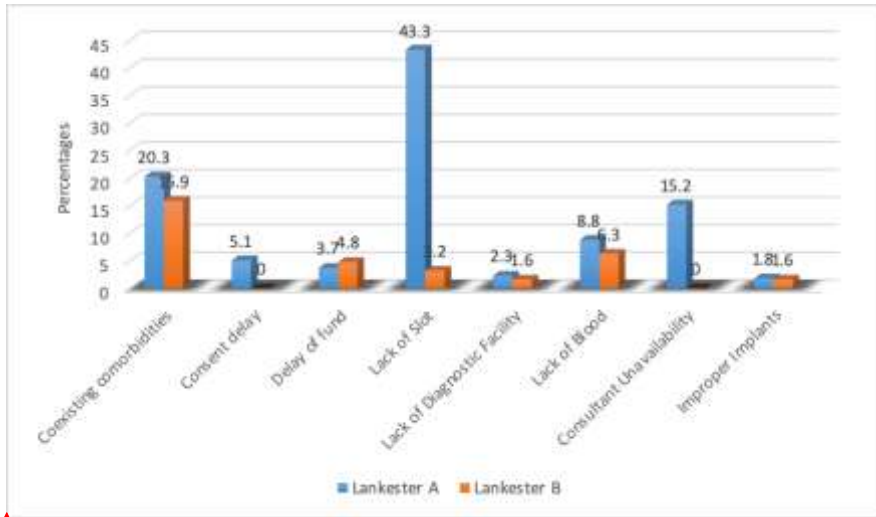
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**Figure 555: Proportion of allocation time in Groups A and B**

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Shows 142(65.4%) and 4(6.3%)of patients in Lankester group A and group B respectively were missed their allocated time (delayed).



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**Figure 666: Reasons for delay of Orthopaedic Surgical Treatment**

Lack of Theatre Slot contribute (43.3%) of the cause of delay among the patients in Lankester group A, followed by Coexisting comorbidities by (20.3%) and Unavailability of Consultants by (15.2%) least by unavailability of proper implants (1.8%) in Lankester group B patients commonest cause was Coexisting Comorbidities (15.9%) and least by Lack of necessary Diagnostic facility and unavailability of proper implants 1.6% each one.

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**Table 2: Reasons for delay of Orthopaedic Surgical Management in Lankester group A**

No	Reasons for delay	Response	Orthopaedic Surgical treatments		p-value
			Not Delayed(<6hrs)	Delayed( $\geq$ 6hours )	
1	Coexisting Morbidities	Yes	8(11.1%)	36(20.3%)	0.018
		No	64(88.9%)	109(75.2%)	
2	Day of Admission	Weekday	51 (70.8%)	85 (58.6%)	4.296
		Saturday	15 (20.8%)	34 (23.4%)	
		Sunday	6 (8.3%)	26 (17.9%)	
3	Delay in giving Consents	Yes	1 (2.8%)	9 (6.2%)	1.176
		No	70 (97.2%)	137 (93.8%)	
4	Inability to pay(lack of fund)	Yes	2(4.2%)	2 (3%)	0.07
		No	69 (95.8%)	142 (97%)	
5	Lack of Blood	Yes	4(5.6%)	18 (12.4%)	2.484
		No	68 (94.4%)	127 (87.6%)	

Delay patients were contributed by Coexisting Morbidities by 36(20.3%) and patients admitted during the weekday a slightly high chance of encounter delay by 58.6% compared during admission on weekend.

A however secondarily, logistic regression analysis was conducted among these factors and significant difference ( $p < 0.05$ ) was only found among patients with coexisting comorbidity with p of 0.018

**Table 3: Reasons for delay of Orthopaedic Surgical Management in Lankester Group B**

No	Reasons for delay	Response	Orthopaedic Surgical treatments		p-value
			(< 24 hrs )	(≥24 hrs )	
1	Coexisting comorbidities	Yes	8(14.0%)	2(33.3%)	1.514
		No	49(86%)	4(66.7%)	
2	Day of Admission	Weekday	40 (70.2%)	2(33.3%)	7.046
		Saturday	11 (19.3%)	1 (16.7%)	
		Sunday	6 (10.5%)	3 (50 %)	
3	Inability to pay(Lack of funds)	Yes	1(1.8%)	2 (33.4%)	11.937
		No	56 (98.2%)	4(66.7%)	
4	Lack of Blood	Yes	3(6.3%)	1 (16.7%)	1.187
		No	54 (94.7%)	5 (83.3%)	

Coexisting comorbidities were 2(33.3%) were encountered more among delayed patients in group B while patients admitted on Sunday were likely to delay more by 3(50%) compared to other days of admission(Saturday and weekday ).

However the secondarily logistic regression analysis was conducted among these factors and no factor where significant with  $p < 0.05$ .

## CHAPTER FOUR

### 4.0 DISCUSSION

In this study, 223 (79.6%) of the patients studied were males and 57 were females with a ratio of 4:1 and the majority of the patients (61.4%) were of the age group 16-40 years with a mean age of  $28 \pm 15$  years. It showed, therefore, a young male predominance. The study by Lankester et al in 2000 and that of Ifesanya et al in 2013 had similar findings<sup>(8,9)</sup>.

Young Male predominance can be explained by the fact that this group is largely involved in high risk and demanding activities such as machine operators, motorcycles riding and car driving, mining, and construction works and therefore putting them at risk of physical injuries.

Among the patients studied, 90.7% were residents of City of Dar es Salaam and Pwani Region which is close to MOI while the remaining 9.3% came from other Regions, this can be explained by the fact that MOI is Tertiary treatments institution while from other Region patients may seek care to nearby centres before reaching MOI, similar results are also seen in another study by Long et al in North West Cameroon<sup>(13)</sup>

Among two hundred and eighty (280) study participants 77.5% were patients who required emergency orthopaedic operation (Lankester group A) while those who required urgent orthopaedic operation were 22.5% (Lankester group B). This Result is different from other studies done by Jagias et al 2017 and Ifesanya et al 2013 which showed Lankester B to be the main group<sup>(8,10)</sup>. These differences can be due to that because they were recruited their patients retrospectively this lead to denied the researchers some detailed of individual cases which might affect the accuracy of Lankester group classification and also this can be explained by the fact that MOI is a main tertiary institution in Tanzania.

The average waiting time of an acute musculoskeletal patient from admission to orthopaedic surgical management for patients who required emergency operation (Lankester A) was  $9 \pm 5$  hours while for patients who required an urgent operation (Lankester B) were  $12 \pm 6$  hours.

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The waiting time is different (lower) compared to the study done by Ifesanya et al 2013 and Jagiasi et al 2017<sup>(8, 10)</sup>.

This difference can be due to that they conducted their studies retrospectively and because hospital records are based on day/month/year dating, delay to surgery could only be measured days as against hours this reduces the precision of their estimate. The efficiency of the on-call emergency trauma team at MOI and increases in the number of the operating room for an emergency case from one to two can also explain the lower waiting time in this study.

Among Two hundred and seventeen (217) patients who required emergency operation (Lankester A) only 34.6% were operated according to their allocated target time (less than 6 hours) while 66.8% of patients were delayed. The majority of patients (63.1%) waited for 6 to 24 hours for their Orthopaedic Surgical operation. In Lankester Group B, among the sixty-three patients, 90.5% were operated within their allocated time (within 24 hours) and only 9.5% were delayed.

Dominique et al (2009) had similar results<sup>(12)</sup>. Lankester et al (2010) however had similar results in group B but different results in emergency patients (group A)<sup>(9)</sup>. This difference in the extents of delay in Lankester group A can be explained by a large proportion (77.5%) emergency patients admitted.

There are multifactorial causes of delay in Orthopaedic Surgery for acute musculoskeletal Trauma patients. In the Lankester group A lack of theatre slots (43.3%) was the most common reason for the delay, followed by unavailability of consultant/experienced Orthopaedic surgeon (15.2%). In Lankester group B patients the lack of theatre slots accounted for 3.2% and lack of diagnostic modality facilities like CT contribute to 1.6%. Several other studies had similar observations<sup>(8, 9, 12, 15, and 17)</sup>.

Among the patients in Lankester Group A delays were due to Coexisting Morbidities in 20.3% (36 patients) followed by lack of blood products in 12.4% (18 patients) and inability to pay for the surgery in 3.7% (5 patients). Patients admitted during weekday had a slightly high chance of encountering delays by 58.6% compared to those admitted during weekends. In Lankester

Group B lack of blood products was the reason for the delay in 6.3% (4 patients), inability to pay for Surgery in 4.8% (3 patients) and unavailability of the proper implant in 1.6%(1 patient). These findings also have shown from different studies (<sup>8,9,10</sup>).

Secondarily logistic regression analysis was conducted to identify predictors of surgical delay for Lankester group A and B and factors analysed include a day of admission, pre-existing comorbidity, lack of blood, delay in giving consent and inability to pay. Among the factors analyzed the only significant difference of ( $p < 0.05$ ) was found for patients with coexisting comorbidity in Lankester group A with a p-value of 0.018. This differs from the study done by Ifesanya et al 2010 which shows patients admitted on weekend are more likely to delay<sup>(8)</sup>. This may be due to the difference in the efficiency of the on-call emergency trauma team on weekdays and weekend and the volume of emergency patients admitted.

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#### 4.1 Study Limitations

The study was confined to MOI thus making generalization of the findings difficult

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## CHAPTER FIVE

### 5.0 CONCLUSION AND RECOMMENDATION

#### 5.1 Conclusion

The study revealed the followings findings

1. The mean waiting time for patients who required emergency operation was  $9\pm 5$  hours while for patients who required an urgent operation was  $12\pm 6$  hours.
2. 34.6% of emergency patients (Lankester A) were operated within 6 hours of admission and 65.4% were delayed while for Urgent patients (Lankester B) only 9.3% were delayed.
3. The commonest cause of surgery was lack of theatre slots.
4. The presence of comorbidity predicted delays of more than 24 hours in emergency patients.

#### 5.2 Recommendations

1. To allocate more theatre slots for emergency patients to reduce their waiting time.
2. Orthopaedic and Trauma centers should use Orthopaedic surgical treatment waiting time as the indicator for quality delivery services
3. A Physician should be part of emergency on call team in order to facilitate early managements of patient's comorbidities.

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## APPENDICES

### Appendix I: Consent Form (English Version)

Study Title: ORTHOPAEDIC SURGICAL TREATMENT WAITING TIME FOR ACUTE MUSCULOSKELETAL TRAUMA PATIENTS ATTENDED AT MUHIMBILI ORTHOPAEDIC INSTITUTE.

#### Part A:

##### Introduction

My name is Dr Elias Godfrey, MMed. Student at MUHAS, Department of Orthopaedic and Traumatology. I am conducting a study on Orthopaedic Surgical Treatment Waiting Time For Acute Musculoskeletal Trauma Patients Attended At Muhimbili Orthopaedic Institute. You are kindly invited to take part in this study, read this form and understand it well before agreeing to the study

##### Purpose of the study

The Proposed study will help in identifying the Time and Causes for delay of Orthopaedic surgical Treatments and therefore assist in making appropriate recommendations on how to address these pitfalls in order to improve surgical care. It is also a partial fulfilment of my MMed degree in Orthopaedic and Traumatology.

##### Study procedures

The main information required from you is your social demographics, Date of admission, date of the decision of surgery, type of orthopaedic injury, type of fixation, coexisting morbidities and time in obtaining surgical fitness will be noted down.

##### Risks and benefits to the participant

No risks are directly expected from the study.

**Confidentiality**

The data collection sheet is strictly confidential. Your name will not appear in it.

**Participant information**

Your participation in this study is voluntary and failure to participate or withdrawal from the study will not affect your management in any way at any stage.

***Contacts and Questions***

Dr Elias Godfrey  
+255 743 166439  
[eliasgodfrey5@gmail.com](mailto:eliasgodfrey5@gmail.com)

If you have any questions or concerns regarding the study and would like to talk to someone other than the researcher, you are encouraged to contact Dr Joyce Masalu, the Chairman of the University Senate research and publications, MUHAS P.O.BOX 65001, Dar es Salaam. Telephone (+255) 222-152-489

**Part B**

Participant consent form

I have understood the above information which has been fully explained to me by the investigator and I voluntarily consent to participate.

Signature.....

Or participants thumbprint.

Date.....

Witness signature.....

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**Appendix II: Consent Form (Swahili Version)**

Study title: ORTHOPAEDIC SURGICAL TREATMENT WAITING TIME FOR ACUTE MUSCULOSKELETAL TRAUMA PATIENTS ATTENDED AT MUHIMBILI ORTHOPAEDIC INSTITUTE.

**Idhini ya Kushiriki:****Sehemu A:****Utambulisho**

Mimi ni Dr.Elias Godfrey, mwanafunzi wa Chuo kikuu cha Afya cha Muhimbili (MUHAS) Idara ya Mifupa na Ajali, Nachukua shahada ya uzamili ya Tiba (MMed) ninafanya utafiti juu ya Muda unaochukua kufanyia Upasuaji Mgonjwa Mwenye shida ya Mifupa baada ya kufikishwa Hospitali. Hivyo unakaribishwa ushiriki kwenye utafiti huu. Tafadhali soma dodoso hili vizuri na kuelewa kabla hujashiriki.

**Shabaha ya Utafiti**

Shabaha ya utafiti huu ni kukusanya taarifa juu ya Muda unaochukua kufanyiwa Upasuaji Mgonjwa Baada ya kufikishwa hospitalini, Sababu zinazopelekea kuchelewa kwa Upasuaji Aidha taarifa hizi zitamsadia mtafiti kuhitimu shahada yake ya uzamivu ya tiba katika upasuaji wa mifupa.

**Taratibu za Utafiti**

Taarifa muhimu zinazohitajika zitaingizwa kwenye dodoso maalum ya kukusanyia taarifa zinajumisha Tarehe uliolazwa, Tarehe ambayo Matibabu yako ya Upasuaji yaliamuliwa, Aina ya upasuaji na Matatizo yeyote ya kiafya ulionayo ambayo yanatatiza Upasuaji wako na Uelewa wako kuhusu sababu zilizopelekea ucheleweshaji wa Upasuaji wako.

**Athari na Faida za Kushiriki kwenye Utafiti**

Hakuna athari zozote zinazotarajiwa kujitokeza kutokana na utafiti huu.

**Siri**

Taarifa zote zitakazo kusanywa zinatajazwa kwenye fomu maalum na zitakua siri, Jina lako au namba yako ya simu zitatumika kwa madhumuni ya matibabu na kufuatilia maendeleo yako.

**Taarifa za Mshiriki**

Ushiriki wako kwenye utafiti huu ni wa hiari, unaweza kushiriki au kutoshiriki, Aidha unaweza kujiondoa kushiriki na hautaathiri matibabu yako

**Kwa maswali**

Jina la mtafiti ni Dr.Elias Godfrey

Barua pepe [eliasgodfrey@gmail.com](mailto:eliasgodfrey@gmail.com)

Namba ya simu +255653-452464

Kama una maswali kuhusu utafiti huu unaweza kuwasiliana na Dr. Joyce Masalu, Mwenyekiti wa baraza la utafiti na machapisho, chuo kikuu cha afya shirikishi MUHAS P.O.BOX 65001, Dar es Salaam. (+255) 222-152-489

**Sehemu B**

Kiapo cha ridhaa ya Kushiriki

Nimesoma na kuelewa taarifa zilizotolewa hapo juu kama zilivyo fafanuliwa na mtafiti na kwa ridhaa yangu mwenyewe nimeamua kushiriki.

Sahihi.....

Au alama ya dole gumba

Tarehe.....

Sahihi ya Shaihidi.....

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**Appendix III: Questionnaire**

Research: ORTHOPAEDIC SURGICAL TREATMENT WAITING TIME FOR ACUTE MUSCULOSKELETAL TRAUMA PATIENTS ATTENDED AT MUHIMBILI ORTHOPAEDIC INSTITUTE.

**PART A: DEMOGRAPHIC CHARACTERISTICS OF PATIENTS**

1. Questionnaire number: .....
2. Registration Number .....
3. Age: .....
4. Sex: Male ..... Female .....
5. Region of residency:
  - a) Dar es Salaam and Pwani
  - b) Others Regions
6. Highest education level obtained
  - a) No formal education
  - b) Primary school
  - c) Secondary school
  - d) Graduated from college/university
7. Current Occupations
  - a) Employed
  - b) Self-employed
  - c) Unemployed



**PART B: TIME INTERVAL TO ORTHOPAEDIC SURGICAL TREATMENT**

- 8. Date of injury: ..... Time of Injury .....
  - 9. Date of admission: .....time of Admission.....
  - 10. Day of Admission
    - a) Weekday.....
    - b) Weekend
    - c) b1) Saturday..... b2 ) Sunday .....
  - 11. Diagnosis at Admission .....
  - 12. Date of Orthopaedic Surgical Management.....Time .....
  - 13. Time Lapse (Hours) from admission to orthopaedic surgical treatment.....
  - 14. Is the patient Operated within Allocated Time According to the Modified Lankester classification Group A and B?
    - a) YES..... b) NO.....
- If NO go Question 17

**PART C: REASONS FOR DELAY FOR EMERGENCE ORTHOPAEDIC SURGERY**

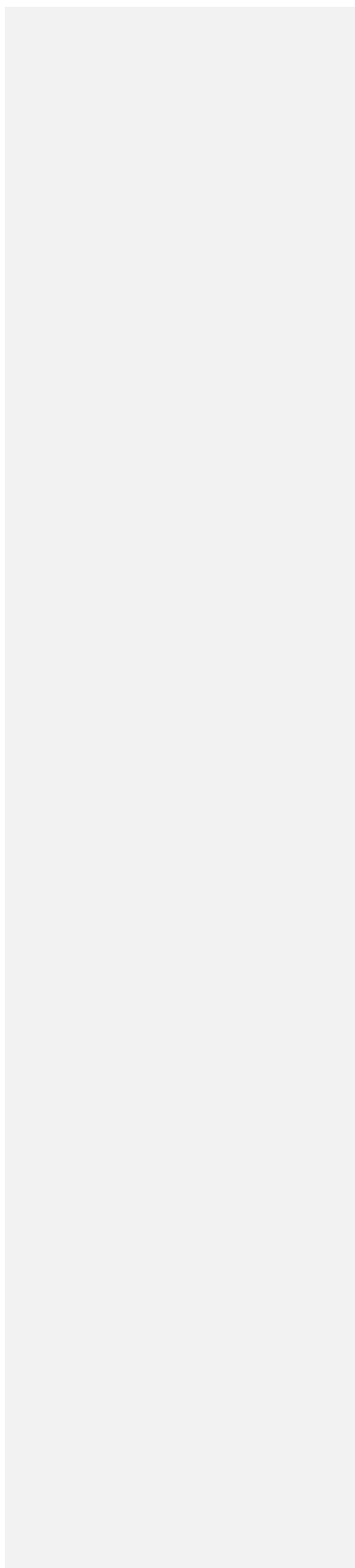
- 17. Reasons for delay of emergency Orthopaedic Surgery
  - A) Patient factors
    - i) Coexisting Morbidities
    - ii) Delay in giving consent
    - iii) Lack of funds
    - iv) Others mention.....

**B) Hospital Factors**

- 1) lack of theatre slot slots
  - ii) Lack of Nurses
  - iii) Lack of other OT staff like servants like medical attendants
  - iii) Lack of specific diagnostic modality like 2D echo machine
  - v) Non-availability of blood products
  - vi) Others mention.....

**C) Surgeon Factors**

- i) Delay in making a decision.
- ii) Consultant unavailable
- iii) Improper initial management leading to delay in final surgery
- iv) Delay in obtaining proper implants for the surgery
- v) Others: mention.....



## Appendix IV: Approval of ethical clearance

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**MUHIMBILI UNIVERSITY OF HEALTH AND ALLIED SCIENCES**  
**OFFICE OF THE DIRECTOR OF POSTGRADUATE STUDIES**

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Ref. No. DA.287/298/01.A/

29th May, 2018

Dr. Elias Godfrey  
 MMed. Orthopaedics and Traumatology  
MUHAS

**RE: APPROVAL OF ETHICAL CLEARANCE FOR A STUDY TITLED:  
 "ORTHOPAEDICS SURGICAL TREATMENT WAITING TIME FOR  
 ACUARE MUSCULOSKELETAL TRAUMA PATIENTS ATTENDED AT  
 MUHIMBILI ORTHOPAEDICS INSTITUTE"**

Reference is made to the above heading.

I am pleased to inform you that, the Chairman has, on behalf of the Senate, approved ethical clearance for the above-mentioned study. Hence you may proceed with the planned study.

The ethical clearance is valid for one year only, from 25th May, 2018 to 24th May, 2019. In case you do not complete data analysis and dissertation report writing by 24th May, 2019, you will have to apply for renewal of ethical clearance prior to the expiry date.

Dr. Emmanuel Balandya  
**ACTING: DIRECTOR OF POSTGRADUATE STUDIES**

cc: Director of Research and Publications  
 cc: Dean, School of Medicine