

**Evaluation of the impact of primary knee osteoarthritis on patient's quality of life at
Muhimbili Orthopedic Institute 2019/2020, Dar Es Salaam**

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**MMed (Orthopedics and Traumatology) Dissertation
Muhimbili University of Health and Allied Sciences
October, 2020**

Muhimbili University of Health and Allied Sciences

Department of Orthopedics and Traumatology



**EVALUATION OF THE IMPACT OF PRIMARY KNEE OSTEOARTHRITIS ON
PATIENT'S QUALITY OF LIFE AT MUHIMBILI ORTHOPEDIC INSTITUTE
2019/2020, DAR ES SALAAM**

By

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**A Dissertation Submitted in (Partial) Fulfillment of the Requirements for the Degree
of Masters of Medicine in Orthopedics and Traumatology of the**

Muhimbili University of Health and Allied Sciences.

October, 2020

CERTIFICATION

The undersigned certifies that he has read and hereby recommend for acceptance by the Muhimbili University of Health and Allied Sciences this research project “*EVALUATION OF THE IMPACT OF PRIMARY KNEE OSTEOARTHRITIS ON PATIENT’S QUALITY OF LIFE AT MUHIMBILI ORTHOPEDIC INSTITUTE 2019/2020*” in (Partial) fulfillment of the requirements for the degree of Masters of Medicine in Orthopedics and Traumatology of the Muhimbili University of Health and Allied Sciences.

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Date

DECLARATION

I, **Dr. Emanuel, Benedict Mtui**, hereby declare that this dissertation is my original work and that 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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ACKNOWLEDGMENTS

First and foremost, I humbly thank Almighty God for good health throughout my study period.

I wish to extend my sincere gratitude to my supervisor Dr. Anthony Benedict Assey, for his tireless advice and intellectual guidance at all stages of this research. Also thanks to MOI Executive Director for permission to conduct my study.

I would like to convey my thanks to all academic members of staff in the Department of Orthopedics and Traumatology MUHAS and MOI for their input during proposal development, data collection, and report writing.

I am grateful to my wife, Catherine Kalanda for her daily prayers, support, courage, commitment, and taking great care of our family during my study period.

Lastly, I would like to thank my lovely mother, Agustina Mtui, and all family members for their spiritual, social, and economic support during the entire period of my studies.

DEDICATION

This dissertation is dedicated to my lovely wife, Catherine Kalanda, and our beautiful daughters Charitina and Luisa for their real love, courage, and endless prayers for the entire moment of my studies.

ABSTRACT

Background: Primary knee osteoarthritis (OA) is the most common degenerative joint disorder and a major public health problem. ⁽¹⁾⁽²⁾⁽³⁾ It is commonly seen in elderly women over 50 years of age. It is also reported to have a significant impact on physical functionality, role emotion, and social functioning, leading to poor quality of life. ⁽⁴⁾⁽⁵⁾⁽⁶⁾

The main objective: To evaluate the impact of primary knee OA on quality of life among patients attending orthopedic clinics at Muhimbili Orthopedic Institute 2019/2020.

Patients and Methods: This was an observational cross-sectional study, conducted at Muhimbili Orthopedic Institute. A total of 163 patients were recruited into the study. After clinical and radiological evidence of primary knee osteoarthritis; clinical history, physical examination, and radiological findings were recorded according to Kellgren & Lawrence (K-L), pain severity was evaluated by Visual Analogue Scale (VAS). Quality of life (QoL) was assessed using the English/Swahili Short Form (SF)-36 questionnaire. Data analysis was carried out using SPSS Version 24.0. Student *t*-test was used for comparison of means and an alpha of 0.05 adopted for statistical significance.

Results; A total of 163 participants were enrolled. The mean age of the study population was 63.7 ± 9.2 years, and majority were female (74.8%). Fifty percent of patients enrolled had at least primary education, 39.3% were self-employed, and 22.1% were retirees. Based on geographical location of the OA participants, 51.5% were from Coastal Zone (Dar es salaam, Lindi, Morogoro, Mtwara and Pwani), 16.6% from Zanzibar (Unguja and Pemba), 9.8% from lake zone (Geita, Kagera, Mara, Mwanza, Shinyanga and Simiyu), 9.2% from Southern Highland zone (Iringa, Mbeya, Njombe, Rukwa, Ruvuma, and Songwe), 7.4% northern zone (Arusha, Kilimanjaro, Manyara, and Tanga), 1.2% were from central zone (Dodoma, Singida and Tabora), and 4.3% were from the Western Zone, (Kigoma and Katavi). Half of the patients (50%) were hypertensive and 12.9% were diabetic. Clinically, 89.0% presented with bilateral knee OA, 52.8% experienced knee pain for >6 years, and 67.5% reported very severe knee joints pain. However, knee stiffness, mechanical instability, and catching sensation were the common OA features experienced by 95% of the participants, 76.7% had K-L grade 4 and 51.5% had BMI 25-29.9. On assessment of health related quality of life, across all 8 domains of SF-36, vitality, mental health, and role

emotion had higher mean scores above 50%. On the other hand, general health, physical role, bodily pain, social functioning, and physical functioning domain had the lowest mean score <50% with statistical significance $p < 0.05$ at a longer duration of illness >6 years.

Conclusion: Primary knee osteoarthritis was commonly seen among elderly women, with the mean age 63.5 +/- 9.2 years. Severe knee pain, stiffness, mechanical instability, mechanical locking, catching sensation, reduced joint space and joint deformity were the most experienced clinical features. The primary knee OA has a great impact on the quality of life among patients attending orthopedic clinics at MOI. The greatest impact was seen on physical and social functioning, with less effect on mental health. Patients with primary knee osteoarthritis attending to orthopedic clinics, therefore, have a poor health-related quality of life.

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LIST OF ABBREVIATIONS AND ACRONYMS

AP	Anterior Posterior View
BMD	Bone Mineral Density
BMI	Body Mass Index
BP	Bodily Pain
GF	General Health
HRQoL	Health-Related Quality of Life
IPD	Inpatient department
JSN	Joint Space Narrowing
K-L	Kellgren & Lawrence
MAR	Maximum Acceptable Risk
MH	Mental Health
MOI	Muhimbili Orthopedic Institute
MUHAS	Muhimbili University of Health and Allied Sciences
OA	Osteoarthritis
OAKHQoL	Osteo Arthritis Knee, Hip Quality of Life
OPD	Outpatient Department
PF	Physical Functioning
QoL	Quality of Life
RE	Role Emotion
RP	Role Physical
SF-36	Short Form 36
SF	Social Functioning
THA/THR	Total Hip Arthroplasty/Total Hip Replacement
TJA	Total Joint Arthroplasty
TKA/TKR	Total Knee Arthroplasty/Total Knee Replacement
U.S	United State of America
VAS	Visual Analog Scale
X-Rs	X-Rays

DEFINITION OF KEY TERMS

Osteoarthritis (OA) refers to a clinical syndrome of joint pain due to chronic degenerative gradual changes of the articular cartilage accompanied by varying degrees of functional limitation and reduced quality of life.

Primary knee osteoarthritis; Refers to a clinical syndrome of the knee joint pain due to progressive and gradual degenerative changes of the articular cartilage without any known cause other than mere degenerative, accompanied by pain, inflammation, joint destruction, varying degrees of functional limitation and reduced quality of life.

The impact refers to a powerful effect on a situation or person. In this case, the primary knee osteoarthritis has a negative impact as it lowers the patient's quality of life, due to its direct consequence on reduced mobility, increased pain, muscle imbalance, and restriction of overall functionality.

The quality of life; Health-related quality of life refers to the physical, psychological, and social aspects of health that are influenced by a person's experience on beliefs, expectations, and perceptions.

CHAPTER ONE

1.0 INTRODUCTION AND LITERATURE REVIEW

1.1 INTRODUCTION

Osteoarthritis refers to a clinical syndrome of joint pain due to chronic degenerative and gradual changes of the articular cartilage accompanied by varying degrees of functional limitation and reduced quality of life. Mainly, it affects the joints of the knee, hip, hands, and spine.^(1,2) Specifically, in the knee joints, the disease is progressive and produces pain, inflammation, and joint destruction, with consequent limitations in the range of movement and loss of ability to walk. It is commonly seen in the elderly due to the decrease of functionality, loss of the ability to retain water, and to produce proteoglycans.⁽⁷⁾ It is believed to be highly prevalent today because of recent increases in life expectancy and body mass index.⁽⁸⁾

Based on the literature review, primary knee osteoarthritis is found to have a significant negative impact on patients' quality of life with lower physical, emotional, and social function.⁽⁹⁾ Lowering of quality of life have been implicated to its direct impact on impaired mobility, functional induced pain, mechanical instability from muscle weakness, and restriction of overall functionality as a result of a gross deformity of the knee joints. Frequently reported symptoms include, pain, limitations in walking, stairs climbing, and restriction on squatting, causing compromised daily activity, leisure, and socially related practices.⁽¹⁾ However, the physical manifestations of knee osteoarthritis have a direct impact on other aspects of patient's lives such as physical functioning, social interactions, mental functioning, and sleeping quality.⁽²⁾

The diagnosis, treatment, and prognosis of osteoarthritis are at present restricted to clinical evaluations based on signs and symptoms and imaging. Treatment is either medical or surgical. Non-surgical treatment has shown to have few effects with little improvement of patient quality of life due to recurrence of pain, advance in the progression of articular cartilage damage, reduced mobility due to narrowing of the joint space, and gross deformity at large.⁽⁹⁾ Total knee replacement (TKR), effectively relieves pain and improves function and quality of life near to normal individuals.⁽¹⁰⁾ Furthermore, it significantly reduces the clinical, economic, and social burden and restores the necessary walking ability

to patients, maintain their functional independence, and appropriate performance of daily-living activities.⁽¹¹⁾⁽¹²⁾

Currently, TKR procedures are fast-growing with success in developing countries.⁽¹³⁾ It is the most successful surgical intervention in medicine and the demand is growing rapidly as the prevalence of knee osteoarthritis increases worldwide and it has been reported to improve joint functioning and daily quality of life.⁽¹⁴⁾⁽¹⁵⁾

Health-related quality of life refers to the physical, psychological, and social aspects of health that are influenced by a person's experience on beliefs, expectations, and perceptions.⁽¹⁶⁾ Health-related quality of life measures describes the health of populations and represent broader health outcomes for the entire population than mortality rates or life expectancy⁽¹⁷⁾. Health-related quality of life is increasingly acknowledged as a valid health indicator in many diseases. It encompasses emotional, physical, social, and subjective feelings of well-being that reflect an individual's subjective evaluation and reaction to patient illness. Therefore, they are relevant and important adjunct outcomes, helps to quantify the physical, social, and emotional impact of knee osteoarthritis and various osteoarthritic therapies.

Currently, there are several tools available to assess the impact of disease and surgical interventions on the physical, mental, and social health of the patients. They are often termed health-related quality of life measures and can be broken down into several categories and subcategories. They are patient reporting medical outcomes and used to evaluate the quality of life based on the patient's experience, beliefs, expectations, and perceptions⁽¹⁶⁾.

Up to the end of this study, there has been no published investigation on the impact of primary knee osteoarthritis on patient's quality of life among patients attending the orthopedic clinics at Muhimbili Orthopedic Institute, using health status tools.

The aim of the present study was to determine the impact of primary knee osteoarthritis among patients who attended orthopedic clinics at Muhimbili Orthopedic Institute from July 2019 to April 2020 by using the visual analogue score (VAS) pain severity assessment tool, and the SF-36 as the quality of life assessment tool.

1.2 Problem Statement

Primary knee osteoarthritis is a debilitating joint disease among the aged population worldwide. Several studies have shown, that primary knee osteoarthritis is associated with impairment of physical capability, emotional state, and social life, hence the patients' quality of life. This is due to its direct impact on reducing mobility, severe pain, muscle imbalance, and restricted overall joint functionality. Yet, its impact on primary knee OA patients in East Africa, particularly in Tanzania it is not known.

1.3 Rationale / Justification

Quality of life among patients with primary knee osteoarthritis has been rarely studied and reported in Africa. In Tanzania particularly, a literature review could not find any study done on the quality of life in patients with primary knee osteoarthritis. A study to evaluate the quality of life among patients with primary knee osteoarthritis at Muhimbili Orthopedic Institute was therefore deemed necessary. The study findings are supposed to shed light on understanding the impact of primary knee osteoarthritis in our settings, to increase awareness towards making an early diagnosis, treatment plan, and scheduling follow-ups and to improve our patients' quality of life.

1.4 Research Question

How does primary knee osteoarthritis affect the quality of life among patients attending orthopedic clinics at Muhimbili Orthopedic Institute?

1.5 Objectives

1.5.1 Broad Objective

To determine the impact of primary knee osteoarthritis on quality of life among patients attending outpatient clinics at Muhimbili Orthopedic Institute from July 2019 to April 2020.

1.5.2 Specific Objectives

1. To determine socio-demographic characteristics of patients with primary knee osteoarthritis attending outpatient clinics at Muhimbili Orthopedic Institute from July 2019 to April 2020.
2. To identify the clinical presentations of patients with primary knee osteoarthritis at Muhimbili Orthopedic Institute from July 2019 to April 2020.
3. To evaluate the health-related quality of life of patients with primary knee osteoarthritis using medical outcome study SF-36 tool at Muhimbili Orthopedic Institute from July 2019 to April 2020.

1.6 LITERATURE REVIEW

1.6.1 Definition of the main theme

Chronic diseases of the musculoskeletal system are among the most prevalent health hazards in the world's population.⁽⁸⁾ Of these, primary knee osteoarthritis is among them. It is a major public health issue related to age, characterized by progressive loss of articular cartilage resulting in chronic pain, functional impairment, disability/deformity, and low patient's quality of life.⁽²⁾ It affects more than 80% of people above 55 years, due to the decreased functionality, loss of the ability to retain water and to produce proteoglycans, causing degenerative changes of joints.⁽¹⁸⁾⁽⁷⁾ The disease begins as a molecular derangement (abnormal joint tissue metabolism) followed by anatomic, and/or physiologic derangements, including, cartilage degradation, bone remodeling, osteophyte formation, joint inflammation, and loss of normal joint function.⁽¹⁹⁾ It's leading among the causes of elderly visits to the hospital OPD in the developing countries and commonly seen in black African women.⁽²⁰⁾ Risk factors associated with OA have been grouped into modifiable and non – modifiable. Modifiable risk factors include articular trauma, occupation, repetitive knee bending, muscle weakness, large body mass, metabolic syndrome, central (abdominal) obesity, dyslipidemia, high blood pressure, and elevated fasting glucose levels.⁽¹⁸⁾ Non-modifiable include; gender, females > males, advanced age, genetics and race. African American males are the least likely to receive total joint replacement when compared to whites and Hispanics.⁽²¹⁾⁽²²⁾

1.6.2 Prevalence and distribution (socio-demographic characteristics)

Most of the data available on the prevalence of osteoarthritis come from developed western countries.⁽¹⁸⁾ Worldwide, osteoarthritis is estimated to affect 8 to 15% of the total general population.⁽²³⁾ It is a leading cause of joint disability, affecting up to 80% of people aged 60 years and above.⁽²⁴⁾ Other studies have shown that primary knee osteoarthritis is strongly associated with age, with an estimation of more than 80% of cases over 55 years of age and more commonly seen in females than males.⁽¹⁷⁾ In Africa, it is the second reason for consultation in orthopedic clinics in sub-Saharan Africa.⁽²⁵⁾

The prevalence of primary knee osteoarthritis in the United States estimated to be 12% of the adult population.⁽⁹⁾ A recent study has shown it to be seen more commonly among women than men increasing with age.⁽²³⁾ As the prevalence kept as since the life

expectancy of the general population is increasing the demand for total joint replacement is estimated to rise further⁽²⁶⁾. A more recent study done in the U.S showed the prevalence to be twice post-industrial (16%) compared to pre-industrial time (6% to 8%).⁽⁸⁾

India, the prevalence of knee osteoarthritis accounts for 28.7% which is almost two times that reported from the United States in 2016.⁽²⁷⁾ Similarly, it has been reported to associate with female gender, obesity, age, and sedentary life in the U.S, as well as some African countries. In Nigeria, the prevalence of symptomatic primary knee osteoarthrosis was found to be 19.6%.⁽²⁴⁾ It is more prevalent among women than men in India as well as in the United States. The study conducted in North West, Nigeria 2018, by Muhammad O. et al reported that increasing age, female gender and increased body mass index are among the risk factors associated with degenerative knee osteoarthritis.⁽²¹⁾

The global magnitude of primary knee OA based on socio-demographic characteristics has been reported with minor differences as narrated above. Elders above the 60s, black Africa/Americans, and female gender are more prone to this condition. Yet, socio-demographic characteristics for primary knee OA are lacking in most African countries including Tanzania. Our study reports socio-demographic details on primary knee OA in our settings. The study is intended to account for the most affected groups based on age, sex, and geographical locations, but also to help in prioritizing how to address OA from the community level to national wide.

1.6.3 Clinical presentations

The primary symptoms of osteoarthritis are joint pain, stiffness, and locomotor restriction.⁽¹⁸⁾ Other symptoms include crepitus, joint deformity, or joint swelling which is caused by bony remodeling, excessive osteophytes, or joint subluxation.⁽²²⁾ Apart from the physical impacts of knee osteoarthritis, it has also been shown to affect most of the patients psychologically, socially, economically, and functionally leading to poor health-related quality of life due to depression.⁽²⁸⁾

Pain - Pain in osteoarthritis worsen with joint use and is relieved by rest and is often the most troublesome symptom. Stiffness is also common in knee osteoarthritis. Stiffness may be thought of as a difficulty or discomfort during movement caused by a perceived

inflexibility of the joint. Stiffness is usually most noticeable early in the morning, but may also occur later in the day, typically after periods of inactivity.

Short-lived stiffness (gelling) may also be brought on by inactivity. In patients with osteoarthritis, both morning and inactivity-related stiffness quickly improve and resolve with joint use, whereas the joint pain subsequently worsens with continued use. Locomotor restriction and the resulting functional impairment depend on the site and severity of osteoarthritis.⁽¹¹⁾ It impairs the ability to get up from a chair and walk. The resulting participation restriction depends on the individual's daily activities and occupational/recreational requirements.⁽²²⁾

Limitation of motion - Limitations in walking, stair climbing, and squatting are common patient complaints that greatly interfere with activities of daily living and recreation. Consequently, most research on knee osteoarthritis has attempted to quantify the magnitude of physical disability associated with this disease and the impact of various treatments on outcomes such as pain severity and physical functioning. However, the physical manifestations of knee osteoarthritis have a direct impact on other aspects of patient's lives such as social interactions, mental functioning, and sleep quality.⁽²⁾

Joint deformity and instability - Gait often change with an increased adductor moment to the limb, limb alignment, effusion skin (e.g. scars), range of motion, lack of full extension (>5 degrees flexion contracture) lack of full flexion (flexion <110 degrees), and ligament integrity. These are among the physical findings during a clinical examination.⁽²⁹⁾ Radiological changes include joint space narrowing, osteophytes, sclerosis, bone deformity, and subchondral cyst formation.⁽³⁰⁾

Globally, the clinical presentations of primary knee OA, include severe pain, joint stiffness, limitations in motion, and joint instability/deformity as it has been shown from many studies done in the developed countries as mentioned above. A literature search could not reveal any study conducted in Africa and in Tanzania particularly looking for clinical manifestations of primary knee OA. Knowing its clinical presentations in our settings, our study may become important as it may guide on early detection, decision making as well as planning for proper management aiming at improving the patients' quality of life.

1.6.4 Impaired Quality of life

The health-related quality of life among patients with primary knee osteoarthritis has been studied and frequently reported from the US and other parts of the world. This has been due to the advancement in treatment of advanced knee and hip osteoarthritis through total hip and total knee replacement with success and much benefits to the patient's functionality and quality of life in general.

Knee osteoarthritis has a significant negative impact on the patient's health-related quality of life, with interference to role performance of up to 90.2% of all osteoarthritic patients.⁽¹⁶⁾ This has been proven by several studies carried on patients with knee osteoarthritis prior and post non-pharmacological or surgical treatment. Poor health-related quality of life among patients with knee osteoarthritis is directly proportional to the severity of the disease, as it impairs the patient functioning capacity and socioeconomic status due to progressive and severe pain and joint instability.⁽³⁾ The health-related quality of life post total knee arthroplasty improves the function near to the normal joint and generally results in good to excellent outcomes.⁽¹¹⁾ A rapid increase in the demand for total knee arthroplasty procedure reported as a result of an increase in general life expectancy and also because of patient satisfaction postoperatively.⁽³¹⁾

Very recent studies tried to look at the impact of knee osteoarthritis on health-related quality of life, taking into consideration the value patients put on the total knee replacement surgeries. According to these studies, patients could accept a loss of 2.6 years of an additional 10-year life expectancy, and pay 32% of their income to perfect them to attain good health. This signifies how large the burden the osteoarthritis is on their daily lives.⁽³²⁾

Primary knee osteoarthritis has also been reported to interfere with the mental health of the patients presenting with depression. In the US, the study report by Ray M. et al, depression is a frequent correlate with osteoarthritis disability, and when present heightens the prevailing disabling painful experience consistently and significantly. Since depression is amenable to treatment, routine screening and treatment of depression is recommended to all patients with primary knee osteoarthritis.⁽²⁸⁾

Osteoarthritic pain has an impact on general patient functionality and quality of life. This was revealed by a recent study from Serbia by Aleksandra J. et al, 2018, on the impact of pain on functionality and health-related quality of life in patients with knee osteoarthritis. Knee pain has a significant impact on functional capacity and life quality related to health in patients with knee osteoarthritis. One of the main goals in the treatment of knee osteoarthritis should be reduction of pain, and subsequently, to improve the functionality and health-related quality of life. Impaired general physical functionality of the osteoarthritic patient will lead to inability to do his/her daily activities due to severe and chronic pain which will eventually decrease socioeconomic expectations.⁽⁹⁾

Clinical evaluation of osteoarthritic patients is of great importance, aiming at ruling out other comorbidities which can also interfere with general health-related quality of life. Comorbidities like hypertension, diabetes mellitus, and overweight among patients with osteoarthritis have shown to contribute much to making their quality of life poorer than those with no comorbidities. Zaina F et al from Malaysia, did a study on patients with primary knee osteoarthritis attending two primary care clinics. Half of the patients were overweight and the majority had at least one co-morbidity, the commonest being hypertension. They found that patients with knee osteoarthritis attending primary care have a relatively poor quality of life on the physical health components.⁽⁵⁾

The impact of primary knee osteoarthritis in Africa has been evaluated and published in a few countries. Recently in Egypt, Geilan. A. et al, 2018, carried out a study on patients with primary knee osteoarthritis, taking into consideration the clinical and radiographic parameters to evaluate their quality of life. They found that patients with primary knee osteoarthritis have a relatively poor health-related quality of life, reflected mainly by pain components. Disease duration and bilaterally OA were found to be among the predictors for lower scores in all questionnaire domains, and knee stiffness for four subscales. The pain and disability of osteoarthritis can limit the ability to perform daily activities and to work. Furthermore, frequent medical consultations and hospitalizations along with high costs related to treatment also harm the patient's health-related quality of life.⁽³⁾ Another study from Niger on the risk factors for the primary knee osteoarthritis, demonstrated that the burden of primary knee osteoarthritis in Nigerian rural community was higher and interfered with role performance in 90.2% of participants. They suggested that future

studies are of great importance.⁽²¹⁾ In West Africa, a study done by Dieu-Donné O. et al, assessing the quality of life of patients with knee osteoarthritis, found a significant correlation between the age range of 30 to 40 years and declining mental health. Patients with over 60 years of age had a decrease in pain tolerance and reduced social activities. This showed that knee osteoarthritis has a significant impact on the quality of life among OA patients⁽²⁵⁾.

Accordingly, several studies worldwide have shown beyond doubt that primary knee OA has negative impacts on the patient's quality of life. Yet, little is known about African countries as it has been rarely reported in this area. The need to know the impact of primary knee OA in our settings is obvious, since there are no studies available, not only in East Africa but also in Tanzania and specifically at MOI. Knowing its magnitude in our country will act as the key to finding solutions for improving our patients' quality of life.

1.6.5 Diagnosis

The diagnosis is made based on the history taking asking for all risk factors, thorough physical examination, and radiological imaging.

Radiological primary knee osteoarthritis is graded based on Kellgren & Lawrence (K-L) classification as hereunder.

Grade 0 - no joint space narrowing or reactive changes

Grade 1 - possible osteophytic lipping and doubtful joint space narrowing

Grade 2 - definite osteophytes and possible joint space narrowing

Grade 3 - moderate osteophytes, definite joint space narrowing, some sclerosis, and possible bone end deformity.

However, persons with K-L grade ≥ 2 may be asymptomatic and vice versa. Therefore, the symptomatic definition of knee osteoarthritis is considered more relevant. In prevalence studies, symptomatic knee osteoarthritis is usually defined as the concurrent presence of radiographic findings (usually K-L grade ≥ 2) and frequent knee pain in the same knee. Histology will show loss of superficial chondrocytes, replication, and breakdown of the tidemark, fissuring, cartilage destruction with eburnation of subchondral bone.

It should also be emphasized that the diagnosis of osteoarthritis may be reached without any laboratory or radiographic investigations in the at-risk population in the presence of typical signs and symptoms⁽²²⁾.

1.6.6 Treatment modalities and outcomes

Nonpharmacological therapy - Nonpharmacological interventions are the mainstay of osteoarthritis management and should be first initiated before rushing to the pharmacological approach and it may be followed by or in concert with medications to relieve pain when necessary⁽¹⁸⁾. It includes weight management and exercises, physical therapy, braces, and foot orthoses for patients suitable to these interventions, education, and use of assistive devices when required. It is also good in patients with borderline OA. Together with the prevention of modifiable risk factors it will preserve and ease movement in the elderly population. Whenever possible, family physicians should try to improve the physical health of patients with knee osteoarthritis and to help relieve the pain especially to those with high BMI and comorbidities⁽⁵⁾.

Pharmacologic therapy — medications are indicated when pain persists and in patients who have not responded adequately to nonpharmacological measures, or concomitantly with these interventions. Pharmacologic therapy should only be used during periods when symptoms are present since none of the interventions are curative or improving the quality of life⁽¹¹⁾. The main medications used in the pharmacologic management of osteoarthritis include oral and topical NSAIDs, topical capsaicin, duloxetine, and intraarticular glucocorticoids⁽¹⁸⁾. It should be clearly understood that nonsurgical therapies do not reliably modify the health-related quality of life in knee osteoarthritis patients, given their general inability to alleviate the physical manifestations of osteoarthritis⁽¹¹⁾.

Operative - Several surgical options are available for advanced and severe cases. These include osteotomies of various types, and unicompartmental or total joint replacements⁽¹⁸⁾. Surgical treatment is dominated by total joint replacement, aiming to reduce pain, restore function, and improve the quality of life for patients with end-stage knee arthritis.⁽³³⁾ Total joint replacement has been practiced for a quite long time in western countries. Recently it has also been performed in developing countries including East Africa with reported good success rates and outcomes.⁽¹³⁾ Though it is among the most expensive orthopedic

procedure, OA patients have been reported willing to pay up to 32% of their annual income to attain good health through total knee replacement procedures.⁽³⁴⁾

Treatment outcomes – Total knee replacement has been reported to be one of the most successful surgical interventions in orthopedics⁽¹⁵⁾. Quality of life after surgery approximates that of a healthy reference population. The majority of knee replacement patients can walk unassisted for reasonably long distances. Improvements in pain, energy levels, sleep, social, and sexual function are all observed. These gains in quality of life allow a good number of patients to retain their independence and function more actively in society.⁽³³⁾ General outcome post total joint arthroplasty in African countries has shown to be good with low complication rate.⁽³⁵⁾ Total joint replacement surgeries are safe and can be practiced even in the third world with satisfactory results, given appropriate hygienic and surgical prerequisites. However, like in any other surgical procedure difficulties and complications are bound to occur.⁽¹³⁾

CHAPTER TWO

2.0 PATIENTS AND METHODS

2.1 Study design

This was an observational prospective hospital-based cross-sectional study.

2.2 Study area

The study was conducted at Muhimbili Orthopedic Institute (MOI), Dar es Salaam Tanzania. This is a specialized institute for orthopedics, trauma, and neurosurgical care with a bed capacity of 350. It is the main referral center for patients with skeletal trauma, serving both the city of Dar es Salaam and the entire country. The institute is also involved in carrying out researches with a view of improving the management of patients and teaching center for the Orthopedic and Trauma Department of MUHAS.

2.3 Study duration

The study was carried on duration of ten months from July 2019 to April 2020.

2.4 Study population

A total of 163 patients with primary knee osteoarthritis attended orthopedic clinics and those who were admitted at Muhimbil Orthopedic Institute from July 2019 to April 2020 were included in this study.

2.4.1 Sample size

The study involves 163 patients with primary knee osteoarthritis from OPD clinics and inpatient department.

It is was determined using Kish and Leslie formula.

$$N = \frac{Z^2 P (100 - P)}{E^2}$$

Where;

N=sample size.

Z=standard normal deviation set at 1.96 (corresponding to a confidence level of 95%).

P=prevalence which is 12.1% from the study done by Ouédraogo D et al, 2014 in West Africa.⁽²⁵⁾

E= acceptable marginal error which is 5.

2.4.2 Sampling procedures

The convenient sampling method technique was used to obtain and consent patients from outpatient department clinics during their visits and inpatient department upon admission for elective total knee replacement procedure.

2.4.3 Inclusion criteria

Patients from 18 years of age and above with symptomatic primary knee osteoarthritis.

2.4.4 Exclusion criteria

1. Patients with cognitive incapacity.
2. Patients with other associated diseases of the osteoarticular system (rheumatic diseases, osteometabolic diseases, etc.) and chronic degenerative diseases that could interfere with the QOL such as Parkinsonism.
3. Patients with lumbar spondylosis.

2.5 Data collection

A structured Swahili/English questionnaire was used as a research tool to obtain information from eligible candidates. Data collection was done by the researcher and two medical doctors as research assistants. Research assistants were recruited and on the purpose of the study and the application of the research tools for data collection was taught.

Data collection process;

1. All patients with primary knee osteoarthritis were informed about the study during their visits to outpatients' department clinics or upon being admitted for total knee replacement surgery in the ward.
2. Patients who met inclusion criteria were recruited and informed consent was signed after a clear understanding of the research objectives and procedures and the study was explained to them.
3. Socio-demographic data of interest; gender, age, profession, educational level, occupation, and residence were collected and fed on a research questionnaire.

4. History taking and physical examination were done in each patient and the required information was fed in the questionnaires. These included duration of illness, body weight and height, hypertension, diabetes mellitus, OA bilaterality, and Symptoms of presenting illness, mechanical instability, joint deformity, and joint range of motion (measured using a goniometer), radiological findings and classification (K-L) based on AP weight-bearing X-rays. Patients with spine conditions, associated diseases of the articular system, cognitive incapacity, and all other chronic-degenerative diseases that could interfere with the quality of life such as Parkinsonism were excluded.
5. Imaging; radiological images of each patient were reviewed in consultation with the radiologist, the disease was characterized and classified based on the K-L classification of knee osteoarthritis with proper documentation.
6. Visual Analog Scale tool was used to categorize patients' pain severity (See appendix PART III).
7. Quality of Life for each participant was assessed using the SF-36 questionnaire, which includes 36 items, describing the quality of life in eight domains: physical functioning, role physical, bodily pain, general health, vitality, social functioning, and role emotional, and mental health.

2.5.1 Validity and reliability of visual analog score and short-form -36 tools

The visual analog score tool; Reliability - Test-retest reliability has been shown to be good, but higher among literate ($r = 0.94$, $P < 0.001$) than illiterate patients ($r = 0.71$, $P < 0.001$). Validity - In the absence of a gold standard for pain, the pain VAS is highly correlated with a 5-point verbal descriptive scale (“nil,” “mild,” “moderate,” “severe,” and “very severe”) and a numeric rating scale (with response options from “no pain” to “unbearable pain”), with correlations ranging from 0.71– 0.78 and 0.62– 0.91, respectively).

The SF-36 is a 36-item instrument designed to measure generic health concepts relevant across age, disease, and treatment groups. It is a reliable and validated generic instrument that has been used extensively to measure HRQOL in diverse groups worldwide. It has been adopted in more than 15 countries in different continents.⁽⁵⁾

2.5.2 Dependent Variable

Pain severity and health quality of life.

2.5.3 Independent Variables

Age, gender, marital status, educational level, main occupation, profession, and clinical presentations.

2.6 Data analysis

Data were entered into SPSS 25.0 version. Results expressed as proportions in appropriate tables. Mean scores and its SD for all the domains of HRQoL were calculated. Student's independent *t*-test was used to compare the means. $P < 0.05$ was considered statistically significant.

For analysis, the following were considered as independent variables: age, gender, educational level, main occupation, profession, and clinical presentations. The dependent variables were QOL (which was evaluated by using the SF-36 questionnaire) and pain severity (which was measured by using VAS).

2.7 Ethical Consideration

Permission to conduct the study was sought from the Ethical Clearance Committee of the Muhimbili University of Health and Allied Sciences and Muhimbili Orthopedic Institute executive director. The aim of the study was well introduced to the patients and participated voluntarily through informed consent. During and after the study period, the patient's confidentiality was maintained all the time. The collected information is for the research purpose only. Participants were free to withdraw from the study at any time of study period without penalty and their decline didn't affect their treatment rights as patients.

2.8 Dissemination of findings

The research report will be presented in the department of orthopedics and trauma and also, to the Muhimbili University of Health and Allied sciences library in the form of a dissertation. The manuscript will be submitted to the Director of postgraduate studies (DPGS), it shall be presented at the MUHAS conference and finally it will be submitted to a relevant-medical journal.

CHAPTER THREE

3.0 RESULTS

3.1 Social demographic characteristics

The study enrolled 163 participants. The mean age was 63.7 ± 9.2 years, and 74.8% were female. At least fifty percent of them attained primary education, 39.3% were self-employed, 22.1% retired and 18.4% were formally employed. Based on geographical location of the OA participants, 51.5% were from Coastal Zone (Dar es salaam, Lindi, Morogoro, Mtwara and Pwani), 16.6% from Zanzibar (Unguja and Pemba), 9.8% from lake zone (Geita, Kagera, Mara, Mwanza, Shinyanga and Simiyu), 9.2% from Southern Highland zone (Iringa, Mbeya, Njombe, Rukwa, Ruvuma, and Songwe), 7.4% Northern zone (Arusha, Kilimanjaro, Manyara, and Tanga), and 1.2% were from central zone (Dodoma, Singida and Tabora), and 4.3% were from Western Zone, (Kigoma and Katavi).

3.2 Clinical and radiological presentations of patients with primary knee osteoarthritis

Based on the clinical presentation, knee pain and reduced joint space were reported by 100% and two-third of the participants had bilateral osteoarthritis. At least 52.8% of the participants presented with knee pain duration of more than 6 years while the rest, 47.2%, had knee pain for a duration of less than 6 years. Most of the patients (67.5%) had very severe pain according to VAS pain assessment tool. However, knee stiffness, mechanical instability, mechanical locking, and catching sensation were experienced by over 95% of all participants. Furthermore, in terms of radiological findings; majority 125 (76.7%) were K-L classification grade 4 while none had grade 0. Moreover, more than half 84 (51.5%) of the participants had BMI ranging from 25-29.9 uncovering obesity. On clinical evaluation for other comorbidities, the study revealed that, Diabetic patients were 21(12.9%) and Hypertensive patients were 82(50.3%).

3.3 Quality of life of patients with primary knee osteoarthritis

Across all eight domains of quality of life, vitality, mental health, and role emotion had higher mean scores (above 50%) that indicate the high performance of the domain. On the other hand, the social function, role physical, and physical function domain had the lowest

mean score (<50%) signifying poor quality of life. Independent t-student test was run and results found that general health, physical function, role physical, social function, and bodily pain had statistically significant lower values ($p<0.05$) at longer duration of illness >6 years compared to shorter duration of illness (≤ 6 years). That means that primary knee OA is associated with low quality of life in 5 domains of SF-36 questionnaire; general health, physical functioning, social functioning, bodily pain, and role physical.

Table 1: Social demographic characteristics of patients with knee osteoarthritis at Muhimbili Orthopedic Institute from July 2019 to April 2020.

Patient characteristics		N=163	%
Age group	≤ 60	59	36.2
	≥ 61	104	63.8
Sex	Male	41	25.2
	Female	122	74.8
Education	No formal education	6	3.7
	Primary school	88	54.0
	Secondary school	48	29.4
	Graduate	21	12.9
Occupation	Formally employed	30	18.4
	Self-employed	64	39.3
	Not employed	15	9.2
	Retired	37	22.7
	Peasants	17	10.4

The mean age was 63.7 ± 9.2 years with over three-quarters of them were female and half had at least primary education as the highest level of education they attained. The majority of the study participants said they were self-employed while only 9.2% reported having neither formal nor informal occupation.



Figure 1: geographical distribution of the patients with primary knee osteoarthritis at Muhimbili Orthopedic Institute from July 2019 to April 2020.

Key:

Central zone - Dodoma, Singida, Tabora.

Northern zone - Arusha, Kilimanjaro, and Tanga.

Western Zone – Kigoma and Katavi.

Southern highland zone - Songwe, Kigoma, Iringa, Mbeya, Njombe, Rukwa and Ruvuma.

Lake Zone - Geita, Kagera, Mara, Mwanza, Shinyanga and Simiyu.

Zanzibar - Unguja and Pemba.

Coast zone - Dar es Salaam, Lindi, Morogoro, Mtwara, and Pwani.

Table 2: clinical presentations among patients with primary knee osteoarthritis at Muhimbili Orthopedic Institute from July 2019 to April 2020.

Clinical presentations	Yes n (%)	No n (%)
Knee pain	163(100.0)	0(.0)
Pain at Night	127(77.9)	36(22.1)
Swelling	93(57.1)	70(42.9)
Knee stiffness	160(98.2)	3(1.8)
Mechanical instability	159(97.5)	4(2.5)
Mechanical Locking	155(95.1)	8(4.9)
Catching sensation	159(97.5)	4(2.5)
Bilateral genu valgus	8(4.9)	155(95.1)
Bilateral genu varus	81(49.7)	82(50.3)
Right genu varus	28(17.2)	135(82.8)
Left genu varus	22(13.5)	141(86.5)
Reduced Joint space	163(100.0)	0(.0)
Subchondral cysts	107(65.6)	56(34.4)
		N (%)
KL Classification	Grade 0	0(0.0)
	Grade1	4(2.5)
	Grade 2	7(4.3)
	Grade 3	27(16.6)
	Grade 4	125(76.7)
		1(0.6)
BMI	<18.5	
	18.5–24.9	33(20.2)
	25–29.9	84(51.5)
	>=30	45(27.6)

Knee pain and reduced joint space were found in all participants by 100%. However, knee stiffness, mechanical instability, mechanical locking, and catching sensation were experienced by over 95% of all participated study participants. Furthermore, in terms of KL classification, the majority 125(76.7%) were grade 4 while none had grade 0. Moreover, above half 84(51.5%) of the participants had BMI ranging from 25-29.9 uncovering obesity.

6.1%

4.9%

89.0%

Bilateral Right Left

Figure 2: Bilaterality distribution of osteoarthritis among patients with primary knee osteoarthritis at Muhimbili Orthopedic Institute from July 2019 to April 2020.

As could be seen from the figure above, over two-third of the participants had bilateral osteoarthritis.

	Mean	Standard Deviation	Median	Minimum	Maximum	Range
GH	21.7	14.8	20.8	.0	83.3	83.3
PF	9.0	5.7	8.3	1.7	30.0	28.3
RP	8.4	21.6	.0	.0	100.0	100.0
RE	56.4	46.4	66.7	.0	100.0	100.0
SF	12.58	14.21	10.00	.0	60.00	60.00
BP	17.3	13.0	10.0	10.0	80.0	70.0
Vitality	56.4	12.9	60.0	20.0	100.0	80.0
MH	49.7	13.5	48.0	24.0	88.0	64.0

GH=general health, PF=physical function, RP= role physical/physical role, RE=role emotion, SF=social function, BP=bodily pain, MH=mental health.

Table 3: Scores obtained under various aspects of quality of life among patients with primary knee osteoarthritis at Muhimbili Orthopedic Institute from July 2019 to April 2020.

Higher scores indicate better functioning. Across all eight domains of quality of life, vitality, role emotion, and mental health had higher mean scores (above 50%) that indicate the high performance of the domain. On another hand role physical, physical function, and social function domain had the lowest mean score (<50%).

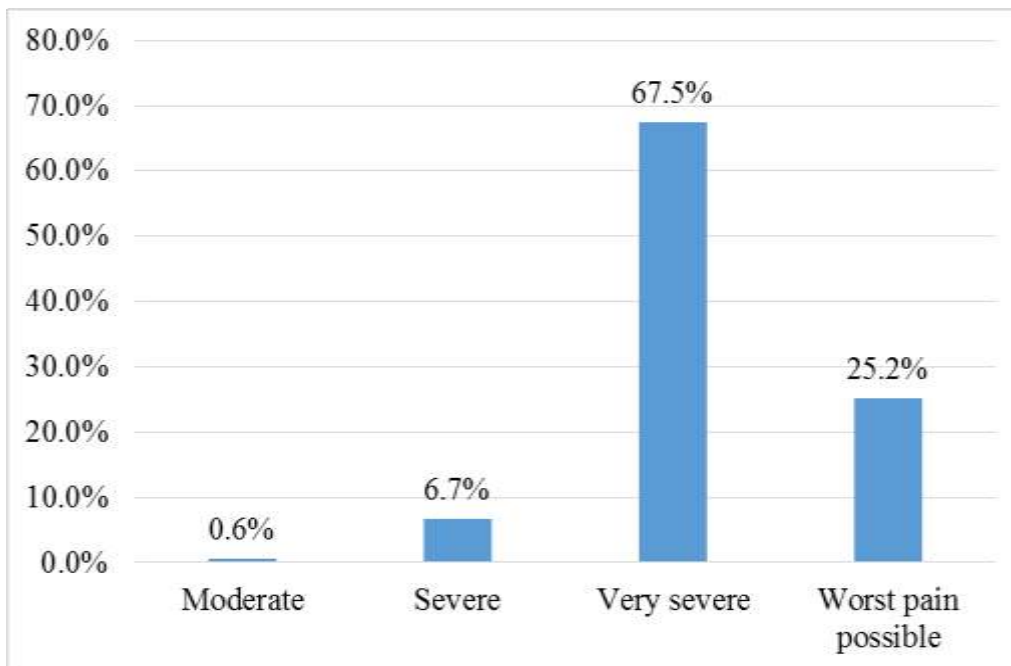


Figure 3: Osteoarthritis Pain experience among patients with primary knee osteoarthritis at Muhimbili Orthopedic Institute from July 2019 to April 2020.

This suggests that the majority of the participants (67.5%) reported experiencing very severe pain, 25.2% reported worst pain, while 6.7% experienced severe pain and the rest 0.6% reported experiencing moderate pain

Health-related quality of life domains.	Duration		t(p value)
	≤6(n=77) Mean	>6(n=86) Mean	
GH	25.2	18.5	2.965(0.003)
PF	11.0	7.3	4.498(<0.0001)
RP	11.4	5.8	1.65(0.1)
RE	62.3	51.2	1.540(0.126)
SF	16.0	9.5	2.956(0.004)
BP	19.6	15.2	2.178(0.031)
Vitality	55.6	57.0	-.685(0.494)
MH	49.2	50.2	-.468(0.640)

GH=general health, PF=physical function, RP= role physical/physical role, RE=role emotion, SF=social function, BP=bodily pain, MH=mental health.

Table 4: Correlation between mean scores of HRQoL and the duration of illness among patients with primary knee osteoarthritis at Muhimbili Orthopedic Institute from July 2019 to April 2020.

Independent t-student test was run and results found that GH, PF, SF, BP had statistically significant ($p < 0.05$) at longer duration of illness (>6 years) compared to shorter duration of illness (≤ 6 years).

CHAPTER FOUR

4.0 DISCUSSION

4.1 Social demographic characteristics of patients with primary knee osteoarthritis at Muhimbili Orthopedic Institute.

From the study, it is evident that among the patients who attended orthopedic clinics at Muhimbili Orthopedic Institute from July 2019 to April 2020, women (74.8%) were more commonly affected with primary knee osteoarthritis than men (25.2%). We also found that the mean age of the study population was 63.7 ± 9.2 years. Similar findings were reported from Egypt, in which 74.1% of patients were women and 25.9% were men, with a slightly lower mean age (51.37 ± 8.85 years) than that we found in our study.⁽¹⁾ From Nigeria, the primary knee OA reported to be more common in women, with the mean age was 51.37 ± 8.85 years which is also lower compared to our study findings.⁽³⁶⁾ Our findings also correlate with similar studies conducted from the developed countries, in which the primary knee OA has been reported to be more commonly seen in elderly women than men.⁽⁴⁾⁽³⁴⁾⁽¹⁸⁾ African countries seem to share similarities in social-demographic backgrounds among patients with primary knee OA, in which elderly women are more affected than men.

Globally, primary knee osteoarthritis affects mostly the elderly group of people above 60 years of age. Black Africa/Americans and women are more prone.⁽⁵⁾⁽³⁷⁾⁽³⁸⁾

At least half of the participants had primary education as their highest level of education attained and the majority reported to have self-employment while only 9.2% have neither formal nor informal occupation. Educational backgrounds play a major role in self-awareness and seeking medical attention. This is a bit different from that reported from North-Eastern Nigeria 2011 in which more than 80% of the studied population was found to have no formal education and only 1% had primary education as the highest level of education.⁽³⁶⁾ Though it was done and reported from rural settings, still there is a significant difference. In this study it was also found that majority of the candidates were from the coast zone (Dar es Salaam, Lindi, Morogoro, Mtwara, and Pwani) followed by Zanzibar (Unguja and Pemba) with less than 40% from the rest of the zones in the mainland. This can be explained by many reasons; Cost Zone and Zanzibar are close to

MOI, but also the availability of diagnostic equipment, expert personnel, and availability of definitive treatment modalities, especially arthroplasty surgeries.

4.2 Clinical and radiological presentations among patients with primary knee osteoarthritis.

The majority of patients in our study presented with signs and symptoms of bilateral primary knee OA. As it is shown in figure 1 above, over two-third (89.0%) of the participants had bilateral osteoarthritis and there was no significant difference of right or left predominance. Similar findings have been reported by some other studies.⁽¹⁸⁾ This incidence is quite high compared to that reported in Nigeria by Muhammad O. et al 2018, where bilateral knee affectation was 50.8% and unilateral affectation in 49.2%.⁽²¹⁾ Knee pain, stiffness, locomotor restriction, crepitus, joint deformity, and joint swelling were the main symptoms encountered in over 95% of participants. This has been reported to contribute to the impairment of both physical, social, and emotional roles in the daily activities among patients with primary knee OA.⁽⁹⁾⁽³⁹⁾

Evaluation of the pain severity among patients with primary knee osteoarthritis using the Visual Analog Score tool, we found that 67.5% were suffering from very severe pain. Pain is the most experienced and the leading symptom which worsens after use, especially moving on or downstairs. After rest, the joint feels stiff and it hurts to get going after sitting for any length of time.⁽¹⁸⁾

Moreover, we found that 51.5% of the participants had body metabolic index ranging from 25-29.9 uncovering obesity. This shows that at least half of the participants were in the range of overweight. Similar findings of the mean body mass index have been reported by several studies in other African countries and developed countries as well.⁽⁵⁾⁽³⁹⁾ Though our study could not find a statistically significant correlation of body metabolic index to the impairment of the participant's quality of life, it has been reported as a risk factor for and associated with the severity of primary knee osteoarthritis.⁽⁸⁾⁽²¹⁾⁽²⁶⁾

Furthermore, common radiological findings were joint space narrowing, osteophytes, sclerosis, joint varus or valgus deformity, and subchondral cysts. 76.7% presented with K-L classification grade 4. This incidence is a bit higher compared to 57% of K-L grade ≥ 2 reported by Soili T. et al.⁽³⁰⁾ This could be explained by the fact that this is a tertiary hospital and majority were referral cases for advanced investigation and definitive

treatment. The definitive treatment here is total knee replacement which is offered to patients with failed responses to conservative management and those with symptoms that significantly interfere with their daily activities as it is also supported by some studies.⁽⁴⁰⁾

4.3 Quality of life of patients with primary knee osteoarthritis at MOI.

Our study results revealed that primary knee osteoarthritis has a significant impact on the quality of life among patients attending Muhimbili Orthopedic Institute for the clinical services. Low quality of life was mainly seen in five domains of the medical outcome study SF-36 questionnaire. These include general health, bodily pain, physical functioning, physical role, and social functioning, as shown in table 3 above. The burden of osteoarthritis limited the patients to participate in most of the social-related activities such as attending the community-based ceremonies, spiritual related matters, and noticeably, some of them reported loss of their job and business. On the physical part, most of them reported difficulties on vigorous activities such as running, lifting heavy objects, participating in strenuous sports, squatting, climbing several flights/stairs, walking a distance without rest, bending, kneeling or stooping, and some reported they could not walk more than a mile. This is due to the direct consequence of the OA in reducing knee joints mobility, severe pain, muscle imbalance, deformity, and restricted overall joint functionality as it has been reported in some studies.⁽¹⁾

Role emotion, mental health, and vitality components were less affected. The majority reported having good energy most of the time and few reported mental/emotional problems to interfere with their daily social and physical roles. The fact is, most of the patients cope with disease progression and adapts to the consequences of the illness as it has been reported by Harsha K. et al.⁽²⁰⁾ Cindy L. et al published slightly different findings, whereby, the highest correlations were observed in pain, functional capacity, and mental health while physical functioning resembles what we found in our study.⁽⁴¹⁾ Another study by Manoj P. et al from Mumbai using a different study tool (WOMAC index) reported similar findings in which primary knee OA reported to have a significant impact on patient's quality of life.⁽⁴⁾ In Malaysia, the study conducted using SF-36 by Zainal F. et al reported slightly different findings. Though their participants had relatively poor quality of life still similar findings of less impact on mental health were reported.⁽⁵⁾

The duration of the illness showed a statistically significant correlation with poor quality of life. The longer the duration of illness the poorer the quality of life (table 4), with statistical significance ($p < 0.05$) at the duration of >6 years of illness. The reason is obvious. As the disease progresses without proper intervention the more the destruction of the articular surfaces also progresses, leading to further deformity and disability, hence the poor physical and social functioning.⁽⁶⁾⁽⁴²⁾ Our findings have similarities to those reported by Harsha K. et al using the same tool (SF-36) from Mangalore city where the duration of the illness was an important determinant of poor quality of life among patients with primary knee osteoarthritis.⁽⁶⁾ Also, findings on the importance of duration of OA on health-related quality of life have been reported by Taher E. et al from Egypt.⁽¹⁾

Diabetes mellitus, and hypertension, however, were not correlated with significant loss of QOL in any domain. Comorbidities like diabetes and hypertension didn't show any statistically significant impact on the patients' quality of life. We believe that the recorded poor QoL is to a large extent depending on the OA related problems.

Studies from the developed countries have shown beyond doubt that primary knee OA has negative impacts on the patient's quality of life.⁽²⁾⁽¹⁶⁾⁽³⁴⁾ Health-related quality of life among the knee OA patients has only been studied and reported in few African countries. Nigeria, Ghana, and Egypt reported evidence that knee OA associates with poor quality of life.⁽³⁾⁽³⁶⁾⁽³⁵⁾ Such studies are lacking in Sub-Saharan Africa particularly in East Africa and in Tanzania. Our findings show that primary knee OA has a great impact on health quality of life among patients attending orthopedic clinics in our settings.

CHAPTER FIVE

5.0 LIMITATION, RECOMMENDATION, AND CONCLUSION

5.1. CONCLUSION

Our study has found that primary knee osteoarthritis was commonly seen among elderly women, with the mean age 63.5 +/- 9.2 years. Severe knee pain, stiffness, mechanical instability, mechanical locking, catching sensation, reduced joint space and joint deformity were the most experienced clinical features. The primary knee OA has a great impact on the quality of life among patients attending orthopedic clinics at MOI. The greatest impact was seen on physical and social functioning, with less effect on mental health. Patients with primary knee osteoarthritis attending to orthopedic clinics, therefore, have a poor health-related quality of life.

5.2. LIMITATIONS

The patient group represents patients with symptoms attending specialized hospital care. The majority of the study participants presented with K-L classification stage four in primary knee OA, which can bias against those with lesser stages of the disease. In addition, this is not a community-based study and most of the participants came from the Cost Zone which cannot be representative for the entire country with regards to those living in rural areas. Thus, the patient series is selected both according to disease severity and geographically. Since the study is based on patients' reports, recall bias cannot be ruled out, particularly among individuals aged >65 years.

5.3. RECOMMENDATION

The burden of pain, progression of deformity, and disability among patients with primary knee osteoarthritis have been found to correlate with poor quality of life. Hence, the need for early detection, evaluation, diagnosis, and intervention is obvious. The emphasis should be on regaining physical and social functioning which will improve the quality of life among these patients.

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APPENDICES

Appendix I: Consent Form

Greetings;

My name is Dr. Mtui Emanuel B, a resident from the department of orthopedic and trauma, Muhimbili University of Health and Allied Sciences. I am working on the research project with the main objective of assessing the quality of life among fellow Tanzanians with primary knee osteoarthritis attending clinics and those scheduled for primary total knee replacement at Muhimbili Orthopedic Institute.

Confidentiality; All information we collect on forms and entered into computers with only the study identification number. Your information will not be available to a third party.

Risks - We do not expect any harm to happen to you because of participating in this study.

Participation; Participating in this study is completely voluntary. You can stop participating in this study at any time, 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.

If you agree to participate in the study, you will be required to respond to the questions in the questionnaire prepared for the study. If you have any questions or concerns about the study, you are free to ask at any time. Contact 0759772014/0716901913 – Dr. Mtui, Emanuel.

Participant agrees.....

Ihave read and understood the contents of this form. My questions have been answered. I agree to participate in this study.

Signature of participants.....

Signature of researcher

Date of signed consent.....

Appendix II (A): English Questionnaire**PART I: DEMOGRAPHIC DATA**

1. Questionnaire NO..... 2. HOSPITAL REG. NO.....
3. Age..... 4. Sex.....
- 4 Physical address.....
- 5 Education level?
 1. No formal education
 2. Primary school
 3. Secondary School
 4. Graduate
7. What is your occupation?
 1. Formally employed
 2. Self-employed
 3. Not employed
 4. Student

PART II: HISTORY AND PHYSICAL EXAMINATION FINDINGS

1. Duration of the illness.....
2. Body height.....
3. Bodyweight.....
4. BMI.....
5. Hypertension
6. Diabetes
7. . OA bilaterality
 - a. Bilateral
 - b. Right
 - c. Left
8. Symptoms of presenting illness.
 - a. Function limiting knee pain
 - b. Pain at night or rest
 - c. Activity-induced swelling
 - d. Knee stiffness
 - e. Mechanical instability

- I. Instability.....
- II. Locking.....
- III. Catching sensation

9. Joint deformity;

- a. Bilateral genu valgus
- b. Bilateral genu Varus
- c. Right genu Varus
- d. Left genu Varus

10. Range of motion (Goniometer).

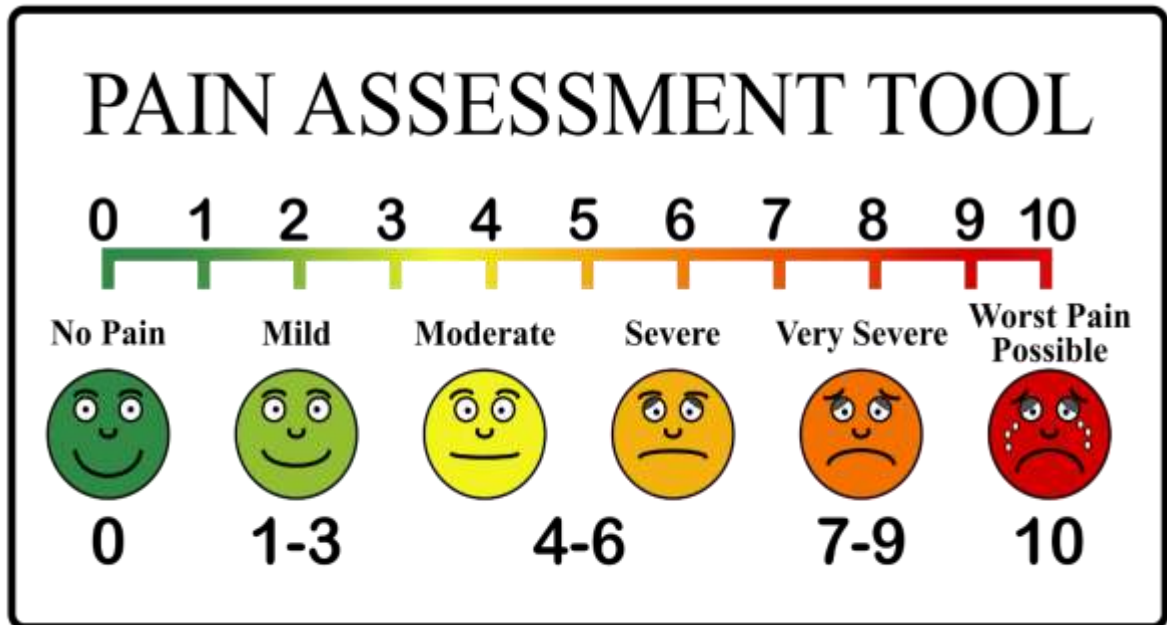
- a. Lack of full Flexion.....
- b. Lack of full Extension....

11. Radiological findings

- a. Reduced joint space
- b. Bone sclerosis
- c. Osteophytes
- d. Subchondral cysts

12. Classification (Kellgren & Lawrence (based on AP weight-bearing XRs)

- a) .Grade 0 (no joint space narrowing (JSN) or reactive changes)....
- b) .Grade 1 (possible osteophytic lipping + doubtful JSN).....
- c) .Grade 2 (definite osteophytes + possible JSN).....
- d) .Grade 3 (moderate osteophytes + definite JSN + some sclerosis + possible bone end deformity).....
- e) . Grade 4 (large osteophytes + marked JSN + severe sclerosis + definite bone end deformity).

PART III: PAIN ASSESSMENT TOOL (VAS)

Brief word instructions: Point to each face using the words to describe the pain intensity. Ask the person to choose the face that best describes their pain and record the appropriate number.

Original Instructions: Explain to the person that each face is for a person who feels happy because he has no pain (hurt) or sad because he has some or a lot of pain.

Face 0 is very happy because he doesn't hurt at all.

Face 2 hurts just a little bit.

Face 4 hurts a little more.

Face 6 hurts even more.

Face 8 hurts a whole lot.

Face 10 hurts as much as you can imagine, although you don't have to be crying to feel this bad.

Ask the person to choose the face that best describes how he is feeling.

PART IV: SHORT FORM 36 (SF-36)

Medical Outcomes Study Questionnaire Short Form 36 Health Survey

This survey asks for your views about your health. This information will help keep track of how you feel and how well you can do your usual activities. Thank you for completing this survey! For each of the following questions, please circle the number that best describes your answer.

1. In general, would you say your health is:	
Excellent	1
Very good	2
Good	3
Fair	4
Poor	5
2. Compared to one year ago,	
Much better now than one year ago	1
Somewhat better now than one year ago	2
About the same	3
Somewhat worse now than one year ago	4
Much worse now than one year ago	5

3. The following items are about activities you might do during a typical day. Does your health now limit you in these activities? If so, how much?

(Circle One Number on Each Line) Yes, Limited a Lot (1)	Yes, Limited a Little (2)	No, Not limited at All (3)	
a. Vigorous activities, such as running, lifting heavy objects, participating in strenuous	1	2	3

sports			
b. Moderate activities, such as moving a table, pushing a vacuum cleaner, bowling, or playing golf	1	2	3
c. Lifting or carrying groceries	1	2	3
d. Climbing several flights of stairs	1	2	3
e. Climbing one flight of stairs	1	2	3
f. Bending, kneeling or stooping	1	2	3
g. Walking more than a mile	1	2	3
h. Walking several blocks	1	2	3
i. Walking one block	1	2	3
j. Bathing or dressing yourself	1	2	3

4. During the past 4 weeks, have you had any of the following problems with your work or other regular daily activities as a result of your physical health?

(Circle One Number on Each Line) Yes (1)	No (2)	
a. Cut down the amount of time you spent on work or other activities	1	2
b. Accomplished less than you would like	1	2
c. Were limited in the kind of work or other activities	1	2
d. Had difficulty performing the work or other activities (for example, it took extra effort)	1	2

5. During the past 4 weeks, have you had any of the following problems with your work or other regular daily activities as a result of any emotional problems (such as feeling depressed or anxious)?

(Circle One Number on Each Line) Yes	No	
a. Cut down the amount of time you spent on work or other activities	1	2
b. Accomplished less than you would like	1	2
c. Didn't do work or other activities as carefully as usual	1	2

6. During the past 4 weeks, to what extent has your physical health or emotional problems interfered with your normal social activities with family, friends, neighbors, or groups?

Not at all	1
Slightly	2
Moderately	3
Quite a bit	4
Extremely	5

7. How much bodily pain have you had during the past 4 weeks?

None	1
Very mild	2
Mild	3
Moderate	4
Severe	5
Very severe	6

8. During the past 4 weeks, how much did pain interfere with your normal work (including both work outside the home and housework)?

Not at all	1
A little bit	2
Moderately	3
Quite a bit	4
Extremely	5

These questions are about how you feel and how things have been with you during the past 4 weeks. For each question, please give the one answer that comes closest to the way you have been feeling. (Circle One Number on Each Line)

9. How much of the time during the past 4 weeks . . . All of the Time	Most of the Time	A Good Bit of the Time	Some of the Time	A Little of the Time	None of the Time	
a. Did you feel full of pep?	1	2	3	4	5	6
b. Have you been a very nervous person?	1	2	3	4	5	6
c. Have you felt so down in the dumps that nothing could cheer you up?	1	2	3	4	5	6
d. Have you felt calm and peaceful?	1	2	3	4	5	6
e. Did you have a lot of energy?	1	2	3	4	5	6
All of the Time	Most of the Time	A Good Bit of the Time	Some of the Time	A Little of the Time	None of the Time	
f. Have you felt downhearted and blue?	1	2	3	4	5	6

g. Did you feel worn out?	1	2	3	4	5	6
h. Have you been a happy person?	1	2	3	4	5	6
i. Did you feel tired?	1	2	3	4	5	6
10. During the past 4 weeks, how much of the time has your physical health or emotional problems interfered with your social activities (like visiting with friends, relatives, etc.)? (Circle One Number)						
All of the time				1		
Most of the time				2		
Some of the time				3		
A little of the time				4		
None of the time				5		

11. How TRUE or FALSE is each of the following statements for you? (Circle One Number on Each Line) Definitely

True

	Mostly True	Don't Know	Mostly False	Definitely False	
a. I seem to get sick a little easier than other people	1	2	3	4	5
b. I am as healthy as anybody I know	1	2	3	4	5
c. I expect my health to get worse	1	2	3	4	5
d. My health is excellent	1	2	3	4	5

APPENDIX II (B) : SHORT FORM 36 (SF-36) SWAHILI –VERSION**Sehemu ya IV: General Well-Being**

MUHIMU: Jaza namba tisa kama mhojiwa ameshindwa kutoa jibu kati ya haya tuliyonayo.

MAELEKEZO: Uchunguzi huu unaomba maoni uliyonayo kuhusu afya yako. Habari hizi zitasaidia katika kufuatilia jinsi unavyojisikia na jinsi gani unaweza kufanya shughuli zako za kawaida. Kama huna uhakika na jibu unalotoa, tafadhali toa jibu unalofikiria kuwa ni zuri zaidi kwako.

1. Kwa ujumla, unaweza kusema afya yako ni?

 1. Nzuri kupita kiasi namba
 2. Nzuri sana
 3. Nzuri
 4. Ya wastani
 5. Mbaya

2. Afya yako ikoje sasa ukilinganisha na mwaka mmoja uliopita?

 1. Nzuri zaidi kuliko mwaka mmoja uliopita namba
 2. Kiasi ni nzuri kuliko mwaka mmoja uliopita
 3. Ni karibu sawa na ya mwaka mmoja uliopita
 4. Kiasi ni mbaya kuliko mwaka mmoja uliopita
 5. Mbaya zaidi kuliko mwaka mmoja uliopita

3. Shughuli zilizoordheshwa hapa chini ni shughuli unazoweza kuzifanya kila siku.
Je afya yako hivi sasa inakuzuia kufanya shughuli hizi? Kama ndivyo, kwa kiasi gani?
 - a. Kazi za nguvu kama kukimbia, kuinua vitu vizito, kushiriki kikamilifu katika michezo na kucheza ngoma:
 - b. Kazi za kawaida kama kuchota maji, kufua nguo, kubeba mtoto:
 1. Inazuia sana namba
 2. Inazuia kiasi
 3. Haizui kabisa

- c. Kufagia, kuinua au kubeba kikapu chenye mahindi, au viazi kiasi cha nusu debe: namba
1. Inazuia sana
 2. Inazuia kiasi
 3. Haizuii kabisa
- d. Kupanda mlima mkali: namba
1. Inazuia sana
 2. Inazuia kiasi
 3. Haizuii kabisa
- e. Kupanda mlima mfupi: namba
1. Inazuia sana
 2. Inazuia kiasi
 3. Haizuii kabisa
- f. Kuinama, kupiga magoti au kuchuchumaa: namba
1. Inazuia sana
 2. Inazuia kiasi
 3. Haizuii kabisa
- g. Kutembea mwendo wa nusu saa bila ya kupumzika: namba
1. Inazuia sana
 2. Inazuia kiasi
 3. Haizuii kabisa
- h. Kutembea mwendo wa robo saa bila ya kupumzika: namba
1. Inazuia sana
 2. Inazuia kiasi
 3. Haizuii kabisa
- i. Kutembea kutoka goli hadi goli la kiwanja cha mpira wa miguu bila kupumzika: namba
1. Inazuia sana
 2. Inazuia kiasi
 3. Haizuii kabisa
- j. Kuoga au kuvaa nguo mwenyewe: namba
1. Inazuia sana
 2. Inazuia kiasi
 3. Haizuii kabisa

4. Katika kipindi cha mwezi mmoja uliopita, je umewahi kupata moja ya matatizo yafuatayo

katika utendaji wako wa kazi, ikiwa ni matokeo ya matatizo ya afya yako?

Umepunguza muda wa kufanya kazi au shughuli zako?

1.Ndiyo

Namba

2.Hapana

a.Umetekeleza machache kuliko ulivyotarajia?

1. Ndiyo

Namba

2. Hapana

b. Umeshindwa kufanya baadhi ya kazi au shughuli?

1. Ndiyo

Namba

2. Hapana

c.Ulipata matatizo katika kutekeleza kazi au shughuli

(kwa mfano, nilijilazimisha kufanya kazi)?

1. Ndiyo

Namba

2. Hapana

5. Katika kipindi cha mwezi mmoja uliopita uliwahi kupata moja ya matatizo yafuatayo

katika utendaji wako wa kazi ikiwa ni matokeo ya mawazo?

a. Umepunguza muda wa kufanya kazi au shughuli zako?

1.Ndiyo

Namba

2. Hapana

b. Umetekeleza machache kuliko ulivyotarajia?

1. Ndiyo

Namba

2. Hapana

c. Hukufanya kazi au shughuli zako kwa uangalifu kama ilivyo kawaida?

1. Ndiyo

Namba

2.Hapana

6. Katika kipindi cha mwezi mmoja uliopita, ni kwa kiasi gani matatizo ya kiafya (au mawazo) yameathiri shughuli zako za kijamii kama za ki-familia, shughuli na marafiki, majirani au makundi ya watu unaoshirikiana nao?
1. Hayakuathiri kabisa namba
 2. Yameathiri kidogo
 3. Yameathiri kwa wastani
 4. Yameathiri kwa kiasi kikubwa
 5. Yameathiri kwa kiasi kikubwa sana
7. Ni kiasi gani cha maumivu ya mwili uliyoyapata katika kipindi cha mwezi mmoja uliopita?
1. Hakuna maumivu namba
 2. Maumivu kidogo sana
 3. Maumivu kidogo
 4. Maumivu ya wastani
 5. Maumivu makali
 6. Maumivu makali sana
8. Katika mwezi mmoja uliopita, maumivu yalikuizia kwa kiasi gani kufanya kazi zako za kila siku (ndani na nje ya nyumbani kwako)?
1. Hayakunizuia kabisa namba
 2. Yalinizuia kiasi kidogo
 3. Yalinizuia kwa wastani
 4. Yalinizuia kwa kiasi
 5. Yalinizuia kwa kiasi kikubwa sana
9. Maswali yafuatayo yanahusu jinsi unavyojisikia kiafya, vile vile jinsi gani shughuli zako zilivyofanikiwa kwa kipindi cha mwezi mmoja uliopita. Kwa kila swali, tafadhali toa jibu lililo karibu na jinsi ulivyokuwa unajisikia. Je ni muda gani kwa kipindi cha mwezi mmoja uliopita umekuwa na yafuatayo:

- a. Je ulijisikia una nguvu zote? namba
1. Muda wote
 2. Muda mwingi
 3. Muda wa kutosha kidogo
 4. Baadhi ya muda
 5. Muda mchache
 6. Hakuna muda wowote
- b. Je umekuwa ni mtu mwenye wasiwasi sana? namba
1. Muda wote
 2. Muda mwingi
 3. Muda wa kutosha kidogo
 4. Baadhi ya muda
 5. Muda mchache
 6. Hakuna muda wowote
- c. Je ulikuwa huna raha kiasi cha kutofurahishwa na kitu chochote? namba
1. Muda wote
 2. Muda mwingi
 3. Muda wa kutosha kidogo
 4. Baadhi ya muda
 5. Muda mchache
 6. Hakuna muda wowote
- d. Je ulijisikia mtulivu na mwenye amani? namba
1. Muda wote
 2. Muda mwingi
 3. Muda wa kutosha kidogo
 4. Baadhi ya muda
 5. Muda mchache
 6. Hakuna muda wowote

e. Je ulikuwa na nguvu nyingi?

1. Muda wote
2. Muda mwingi
3. Muda wa kutosha kidogo
4. Baadhi ya muda
5. Muda mchache
6. Hakuna muda wowote

namba

f. Je ulijisikia kusunoneka?

1. Muda wote
2. Muda mwingi
3. Muda wa kutosha kidogo
4. Baadhi ya muda
5. Muda mchache
6. Hakuna muda wowote

namba

g. Je ulijisikia kuwa na uchovu?

1. Muda wote
2. Muda mwingi
3. Muda wa kutosha kidogo
4. Baadhi ya muda
5. Muda mchache
6. Hakuna muda wowote

namba

h. Je ulikuwa ni mtu mwenye furaha?

1. Muda wote
2. Muda mwingi
3. Muda wa kutosha kidogo
4. Baadhi ya muda
5. Muda mchache
6. Hakuna muda wowote

namba

i. Je ulijisikia kuchoka?

1. Muda wote namba
2. Muda mwingi
3. Muda wa kutosha kidogo
4. Baadhi ya muda
5. Muda mchache
6. Hakuna muda wowote

10. Katika mwezi mmoja uliopita, ni kwa muda gani matatizo ya kiafya au kimawazo yameathiri

shughuli zako za kijamii (kama kutembeleana na marafiki, ndugu na jamaa n.k.)?

1. Muda wote namba
2. Muda mwingi
3. Muda fulani
4. Kiasi kidogo cha muda fulani
5. Sikuwahi kuathirika kabisa

11. Kati ya maelezo yafuatayo, ni yapi yaliyo ya UKWELI au YASIYO YA UKWELI kwako?

a. Ninaonekana kuugua kirahisi zaidi kuliko watu wengine

1. Ni kweli hasa namba
2. Ni kweli kwa kiasi kikubwa
3. Sijui
4. Si kweli kwa kiasi kikubwa
5. Si kweli kabisa

b. Nina afya ya kutosha kama mtu yeyote yule ninayemjua

1. Ni kweli hasa namba
2. Ni kweli kwa kiasi kikubwa
3. Sijui
4. Si kweli kwa kiasi kikubwa
5. Si kweli kabisa

c. Ninategemea afya yangu kuwa mbaya zaidi

|__|

1. Ni kweli hasa
2. Ni kweli kwa kiasi kikubwa
3. Sijui
4. Si kweli kwa kiasi kikubwa
5. Si kweli kabisa

namba

d. Afya yangu ni nzuri kupita kiasi

|__|

1. Ni kweli hasa
2. Ni kweli kwa kiasi kikubwa
3. Sijui
4. Si kweli kwa kiasi kikubwa
5. Si kweli kabisa

namba

APPENDIX III: ETHICAL CLEARANCE

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

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

01 July, 2019

Dr. Emmanuel B. Mtui,
MMed. Orthopaedics and Trauma.
MUHAS.

**RE: APPROVAL OF ETHICAL CLEARANCE FOR A STUDY TITLED:"
EVALUATION OF THE IMPACT OF PRIMARY KNEE OSTEOARTHRITIS ON
PATIENT'S QUALITY OF LIFE AT MUHIMBLI ORTHOPEDIC INSTITUTE
2019/2010/"**

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 **28th June, 2019 to 27th June 2020**. In case you do not complete data analysis and dissertation report writing by **27th June, 2020**, 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
c.c. Dean, School of Medicine, MUHAS