THE UNIVERSITY OF ZAMBIA

SCHOOL OF MEDICINE
DEPARTMENT OF SURGERY

DETERMINATION OF THE FUNCTIONAL OUTCOMES OF TOTAL HIP REPLACEMENT, BY USING THE HARRIS HIP SCORE, IN ADULTS PRESENTING AT HOSPITALS IN LUSAKA, A CROSS SECTIONAL STUDY.

BY

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A Dissertation submitted to the University of Zambia in partial fulfillment of the requirements for the Award of Master of Medicine in Orthopaedics and Trauma

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DECLARATION

I Dr Joseph Wapabeti hereby declare that this dissertation herein presented for the degree of Master of Medicine in Orthopaedic Surgery has not been previously submitted either in whole or in part for any other degree at this or any other University, nor being currently submitted for any other degree.

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DR JOSEPH WAPABETI

APPROVED BY_____

DR JAMES MUNTHALI

STATEMENT

I hereby state that this dissertation is entirely the result of my own personal effort. The various sources to which I am indebted have been clearly indicated in the bibliography and acknowledgment.

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DR JOSEPH WAPABETI

CERTIFICATE OF APPROVAL

This dissertation of **DR. JOSEH WAPABETI** is approved as fulfilling part of the requirement for the **AWARD OF THE DEGREE OF MASTER OF MEDICINE IN ORTHOPEADIC SURGERY** by the University Of Zambia.

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ABSTRACT

BACKGROUND: Total hip replacement (THR) is one of the most successful orthopaedic procedures performed worldwide (Miller 2008). The number of joint replacements performed in Africa is increasing but outcomes reported in sub-Saharan Africa, excluding South Africa, are sparse (Dossche 2014). Coupled with an anticipated rise in the prevalence of total hip replacements resulting from trauma, infection and the aging population (Elders 2000, Keruly 2001), there has been no corresponding increase in the health facilities offering specialised orthopaedic services. Zambia has not been spared as there is an information gap regarding information on patients that have undergone Total Hip Replacement and their functional outcomes. The aim of this study was to determine the functional outcomes of patients based on the Harris hip score after total hip replacement

MATERIALS AND METHODS: 31 patients were enrolled in the study by using convenient sampling from hospital records. Patients that met the criteria were then invited to join the study. A standardised structured questionnaire was used to obtain the biophysical profile, pre and postoperative co-morbidities. Functional outcome of the patient was then determined by using the HHS and the results obtained tabulated thereafter.

RESULTS: Twenty males and females were enrolled. The minimum age was 19 years, maximum 78 and mean age was 48.8years. Ten patients were found to be hypertensive, 8 HIV positive, 1 Diabetics Mellitus, 5 had Sickle cell trait while the remaining 7 had no pre-existing medical conditions. Pain was the major indication of surgery. Postoperative complications were either wound infection (38.7%) or hip dislocation (3.2%). Twenty three rated the operation a success, 8 said it was a failure. The Harris Hip Score ranged from poor to good.

CONCLUSION: Pain was the main indication for surgery. Functional outcomes using HHS ranged from poor to good. Patients were generally satisfied with the outcome after Total Hip Replacement. No association was found between the HHS and the patients' biophysical, pre-existing comorbidities, postoperative complications and duration from time from surgery.

DEDICATION

I dedicate this work to my wife and children. A special feeling of gratitude to my loving wife Chanda, whose words of encouragement and push for tenacity ring in my ears. Thank you for your unconditional love and support with my studies. I am honoured to have you as my best friend and wife. Thank you for giving me a chance to prove and improve myself through all my walks of life. Please do not ever change. I love you.

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ABBREVIATIONS

ADL	-	Activities of daily living
BMI	-	Body mass index
BOA	-	British Orthopaedic Association
CI	-	Confidence Interval
HHS	-	Harris Hip Score
HOOS	-	Hip Disability and Osteoarthritis Outcome Score
OA	-	Osteoarthritis
OHS	-	Oxford Hip Score
SPSS	-	Statistical Package for Social Sciences
THR	-	Total Hip Replacement
UNZABREC	-	University of Zambia Biomedical Research Ethics Committee
UTH	-	University Teaching Hospital
WHO	-	World Health Organization
WOMAC	-	Western Ontario & McMaster Universities Arthritis Index
ZIOH	-	Zambian Italian Orthopaedic Hospital

CHAPTER ONE

1.1 INTRODUCTION

“In the last few year’s, changes,” have occurred in the outcomes used in the analysis of the effectiveness of surgical treatments in orthopedics. Outcomes such as quality of life related to health, functional capacity, pain and satisfaction scales have been emphasized as they enable the analysis of the state of health and manifestations of disease in individuals' lives. Consequently instruments, questionnaires and scales that address this type of variable were developed and published. These can be classified as either generic or specific. The generic ones quantify the patient of his or her general state of health, while the specific ones target specific areas of the body and can measure function with greater responsiveness than a scale that assesses the state of health as a whole.

Clinicians use outcomes in the analysis of effectiveness of any clinical or surgical treatment and also to determine whether a particular intervention will yield the desired results in their patients i.e. if the patient is improving with a specific treatment; if treatment needs to be changed or terminated; and if the patient needs to be referred to another clinician or service (Jette & Delitto 1997).

Total hip replacement (THR) is one of the most successful orthopaedic procedures performed today. For patients with severe hip pain, a total hip replacement may be the only solution that will relieve pain, restore function, and overall improve their quality of life.

Sir John Charnley, a British Orthopaedic Surgeon, in 1962 developed the fundamental principles of the artificial hip and is therefore credited as the father of THR. He designed a hip prosthesis that still sees use today (Harris 2009).

The normal hip functions as a “ball and socket” joint. The femoral head (ball) articulates with the acetabulum (socket), allowing smooth range of motion in multiple planes. THR is a procedure whereby the diseased articular surfaces are replaced with synthetic materials, thus relieving pain and improving joint kinematics and function. However any condition that affects either of these structures can lead to deterioration of the joint. This

in turn, can lead to deformity, pain, and loss of function (Miller 2008).

The British Orthopaedic Association (BOA) states that, the indications for THR as severe pain and disability, with accompanying radiological changes at the hip in patients where non-operative treatment has failed or is futile (BOA 2009).

Many conditions have been known to been known to cause hip pain; notable among them is osteoarthritis, osteonecrosis and trauma to the hip (Miller 2008). Other conditions that may affect the hip adversely include inflammatory arthritides (rheumatoid arthritis, psoriatic arthritis), childhood hip disorders (Legg-Calve-Perthes disease and slipped capital femoral epiphysis), and malignancy (Miller 2008).

Many factors may play a role in determining whether one gets either a good or poor outcome after a THR. Complications of total hip replacement are common and can either occur intra-operatively or post-operatively (Miller 2008).

THR is like any other medical and surgical procedures that are available to patients, “it therefore becomes imperative that there must be ways and means available for patients to access the overall benefits that such a procedure will offer to its intended patient. This will enable the surgeons to provide the most accurate information pertaining to THR and thereby affording the client adequate information for them to make an informed decision. This in turn will have profound lifelong consequences on their mobility and ability to live an independent lifestyle.

Total hip replacement is an elective procedure and should be considered as one option among other alternatives. A thorough understanding of both the procedure and anticipated outcome is an integral part of the decision-making process. When performed on an appropriate candidate, the procedure can be life altering that will relieve pain, improves and or restores function and thereby improving the quality of life. However there must be a simple, reproducible and acceptable method of quantifying clinical outcomes after the procedure. Among the numerous clinical scores developed to evaluate hip ailments, the Harris Hip Score, is one such scale that is recognized and used worldwide.

1.2 LITERATURE REVIEW

The number of joint replacements performed in Africa is increasing but outcomes reported in sub-Saharan Africa, excluding South Africa, are sparse (Dossche 2014). Coupled with the anticipated rise in the prevalence of THR resulting from trauma, infection and the aging population (Elders 2000, Keruly 2001), there has been no corresponding increase in the health facilities offering specialised orthopaedic services.

There has been an increasing need for a sensitive and reproducible measurement of the outcome following hip surgery. Numerous hip scoring systems, varying in their complexity and disease specificity have been designed to achieve a measure of outcome. Some rely ultimately on the judgement of the surgeon, whereas others on the patients' perceptions. Commonly used hip scoring system includes the following

- **Harris Hip Score (HHS)**

  First published in 1969, the Harris hip score (HHS) is a disease specific assessment tool used to provide an evaluation system for various hip disabilities and methods of treatment (Söderman and Malchau, 2001). It is a clinician based outcome measure administered by a qualified health professional (Nilsdotter and Bremander, 2011). The HHS is highly valid, easily reproducible and reliable (Söderman 2001; Nilsdotter 2011). However, Reuling et al (2012) in a study demonstrated that, without the pain domain, the HHS is a more reliable score of estimating the functional outcome, than analysing pain and function in one scoring system. The HHS is widely used for evaluating outcome of THR, because the two dominating domains of pain and impaired physical function are also the primary indications for total hip replacement (Nilsdotter and Bremander, 2011).

- **Hip Disability and Osteoarthritis Outcome Score (HOOS)**

  This is an instrument that assesses the patients' opinion about their hip and associated problems. It is used in an adult population with hip disability with or without osteoarthritis (Nilsdotter and Bremander, 2011).

- **Oxford Hip Score (OHS)**

  Introduced in 1996 and updated in 2007 to include a new scoring system, the Oxford Hip Score (OHS) is used to assess outcome after total hip replacement by measuring patient's perceptions in adjunction to surgery. (Nilsdotter and Bremander, 2011). Though it lacks an objective measure of function, Dawson et al (1996) found it to be consistent, valid, and reproducible.

- **The Medical Outcomes Study 36-Item Short-Form Health Survey**

  This is a generic, self-administered questionnaire. It has been used for measuring effects that could be a direct function of disease and treatment that is health related quality of life (Söderman and Malchau, 2001). Though not specific to any hip pathology it has been found to be valid (Feeny 2004) and reliable (Mahomed 2001) in patients undergoing total hip replacement.

- **American Academy of Orthopaedic Surgeons (AAOS) Hip and Knee Questionnaire**

  This tool assesses hip and knee conditions and treatment improvements. The hip and knee questionnaire belongs to a series of lower extremity questionnaires initiated and developed by the AAOS intended for use in patient's age 18 years (Nilsdotter and Bremander, 2011).

In a study conducted by Williams's el at (1994) in the United Kingdom, the prevalence of THR was found to be 5.3%. The rate is higher than previously recorded, however it could be argued that earlier estimates were made at a time when surgical and anaesthetic techniques were less developed and also indications for surgery were more conservative than they are today (Williams 1994). There is a female to male predominance of 4.1% to 2.7% in adults aged 65-74 years, and 8.8% to 5.2 % in adults aged 75 years and over (Williams 1994). The rate is higher in whites than blacks (Williams 1994). The rates of primary and revision total hip replacement increase with age until the age of seventy-five to seventy-nine years and then decrease (Mahomed 2003).

Complications occurring after THR will play a role in the eventual outcome of the patient. For example a hypertensive patient who undergoes a total hip replacement but later develops a cerebrovascular accident with resultant hemiparesis will have a poor

functional status. Mahomed et al (2003) in a study found that the rates of complications occurring within ninety days after THR to be 1.0% for mortality, 0.9% pulmonary embolus, 0.2% wound infections, 4.6% hospital readmission, and 3.1% for hip dislocation. Age, gender (men more than women), race (blacks more than whites), pre-existing medical comorbidity, and a low income were factors associated with an increased risk of developing complications (Mahomed 2003; Heiberg 2013).

Age is reliable predictor of functional result after a hip fracture (Cornwall 2004). Michel et al (2000) showed that patients with a mean age of less than 80 years yielded a better functional status one year after surgical intervention than older patients. However, these younger patients showed a better pre-operative functional status and had less co-morbidity than patients older than 80 years; this invariably explained their good functional results. Nilsdotter and Lohmander (2002) concluded that younger patients (≤72 years) gained more function one year after a THR than older patients, with the exception for pain.

Anne Lubbeke et al (2006) reported that obesity was strongly associated with unfavorable outcomes only in revision THR than primary THR. However the finding in that study was in contrast with an earlier study by Katz et al (2003), who reported unfavorable outcomes in both primary and revision THR.

Lavernia et al (2013) showed that moderate alcohol consumption was associated with better WOMAC and Harris hip scores while after surgery, abstainers achieved greater improvements in the WOMAC function, pain, and total scores.

Preexisting medical conditions has been noted to have an effect on functional outcomes. Studies by Koval and Zuckerman et al (1998) and Magaziner et al (1990) showed that the presence of one or more co-morbidities was a predictor of failure to recover pre-fracture basic activity level. Davis et al (2006) also showed that the fewer the co-morbidities the better the outcomes following a revision THR.

The introduction of highly effective antiretroviral therapy has altered the course and nature of patients infected with HIV/AIDS (Chen 2007). This has resulted in significant reduction in the rates of HIV related infection, mortality and morbidities and has

coincided in an increase in the number of joint replacements operations (Lubenga 2009). Graham et al (2014) in a study in Malawi demonstrated that it was safe to perform THR in HIV positive patients with good short-term functional outcomes with no apparent increase in the risk or rate of early infection.

Ng et al (2007) was able to show that the Harris hip scores improved significantly in the first six-month postoperatively reaching a plateau after 18 months. This was in line with an earlier study by Kocic et al (2006) that at 1 and 5 years after the surgery, patients had very good hip functional status with 77% having a HHS of excellent while 82.4% had a HHS of good. The mean pre-operative HHS was 27 and the mean post-operative HHS was 86, giving a mean improvement of 59 points.

However the HHS will only provide numerical endpoint that defines clinical outcome (Learmonth 2007). It is not patient-specific and therefore will not provide information about what is important to the individual and whether their preoperative expectations have been met (Learmonth 2007). Patient's satisfaction can therefore be poor if expectations are not met.

From the literature a number of factors (age, sex, and comorbidities) have been shown to or may play a role in determining the overall functional outcome. However additional contributors to patient outcome may also depend on the hospital orthopaedic facilities available, the surgical technique and competencies of the attending surgeon. Bias arising from these can be ruled out by the fact that UTH, ZIOH and Beit-Cure hospital are registered as specialist hospitals and consultants perform all THR, and therefore are generally beyond the control of this research.

1.3 STATEMENT OF THE PROBLEM

Total hip replacement is an effective treatment that relieves pain and restores function in the hip joint that has been afflicted by either pathology or trauma. From literature we can anticipate a rise in the prevalence of patients seeking the procedure as a result of osteoarthritis, osteonecrosis and trauma (Elders 2000; Keruly 2001; Millers 2008). However the lack of information in Zambia on the extent of the problem, coupled with the lack of information on the outcomes after total hip replacement have necessitated the need to carry out this research. Furthermore there is a lack of information on the possible benefits and complications after the procedure.

1.4 STUDY JUSTIFICATION

- There is a paucity of information on the prevalence of total hip replacement in Zambia.
- It is postulated that there will be an increase in patients seeking THR as a result of the
    1. Aging population,
    2. HIV/AID infection, 35.9 million people were living with HIV at the end of 2011 (UNAIDS) and coupled with the introduction of highly effective antiretroviral therapy which has altered the course and nature of patients infected with HIV/AIDS (Chen 2007). This has resulted in significant reduction in the rates of HIV related infection, mortality and morbidities and has coincided in an increase in the number of joint replacements operations (Lubenga 2009).
    3. Trauma (Keruly 2001; Millers 2008).
- There is no quantifiable information on the benefits that THR provides to its patients, as their expectation of a good quality life defines their aspirations.

1.5 REASRCH QUESTION

What is the functional outcome of THR done on adults at the University Teaching, Zambian Italian Orthopaedic and Beit-Cure hospitals in Lusaka based on the Harris hip score?

CHAPTER TWO

2.0 OBJECTIVES

2.1 GENERAL OBJECTIVES

- To determine the physical functional outcome of patients after a total hip replacement by using the Harris Hip score.

2.3 SPECFIC OBJECTIVES

1. To establish the common indications for THR in patients presenting to hospitals in Lusaka.
2. To determine the functional outcome of THR based on the Harris hip score.
3. To establish the effects of preexisting co-morbidities on the functional outcome after THR.
4. To establish the effects of postoperative complications of the functional outcome after THR.

CHAPTER THREE

3.0 METHODOLOGY

3.1 STUDY DESIGN

The study was a cross sectional study conducted at hospitals in Lusaka offering orthopaedic services namely, University Teaching, Zambian Italian Orthopaedic and Beit-Cure Hospitals. The study period was for 4 months from October 2014 to February 2015 and a total of 31 patients were enrolled in the study by using convenient sampling. Patients were identified from the hospital records, and those that met the inclusion criteria were contacted and invited to join the study.

The patient's detailed history that included the biophysical profile, pre and postoperative co-morbidities was obtained by the administration of a standardised structured questionnaire. The functional outcome of the patient was then determined by using the HHS and the results obtained tabulated thereafter.

3.2.0 RECRUITMENT OF PATIENTS

3.2.1 INCLUSION CRITERIA

The following were the inclusion criteria:

1. Anyone who had undergone a THR at any of the three hospitals.
2. Signed informed consent.

3.2.2 EXCLUSION CRITERIA

The following types of patients were excluded from the study;

1. Hip replacement not done at the three selected hospitals.
2. Bed ridden patient due to other co-morbidities.
3. Refusal to sign consent.

3.3 CASE DEFINITIONS

A case was any patient who had undergone a total hip replacement at the UTH, ZIOH and Beit-Cure Hospital.

3.4.0 VARIABLE DESCRIPTION

3.4.1 DEPENDENT VARIABLE

The dependent variable is the Harris hip score.

3.4.2 INDEPENDENT VARIABLES

Independent variables included:

- Age, sex, race, weight, height, Body Mass Index (BMI), preexisting co-morbidities, and post-operative complications.

3.5 HARRIS HIP SCORE (HHS)

The domains covered in the Harris Hip score include pain, function, absence of deformity, and range of motion. The pain domain measures pain severity and its effect on daily activities and need for pain medication. The function domain assesses daily activities that each participant is able to do and the gait (refer to appendix IV). Deformity takes into account hip flexion, adduction, internal rotation, and extremity length discrepancy. Range of motion measures hip flexion, abduction, external and internal rotation, and adduction.

In total the score has 10 items with a maximum of 100 points (best possible outcome) covering pain (1 item, 0–44 points), function (7 items, 0–47 points), absence of deformity (1 item, 4 points), and range of motion (2 items, 5 points). The grading of the Harris score is as follows

< 70 points Poor, 70-79 Points fair, 80-89 Points good, 90-100 points Excellent.

3.6 SAMPLE SIZE CALCULATION

Convenient sampling method was used for purposes of data collection. All patients who had undergone THR and were eligible for enrolment during the study period were captured.

Based on an expected prevalence rate of 5.3%, with 5% confidence limits and a 95% confidence interval, using the prevalence formula, the sample size for the study was calculated to be 77 patients.

$$N = \frac{Z^2 \times P(1-P)}{d^2}$$

Where: **N = Sample required**

Z = Z statistic (1.96)

P = the expected prevalence (5.3% from literature)

d = acceptable accuracy range (+/- 0.05)

Giving:

$$N = \frac{1.96^2 \times 0.053(1 - 0.053)}{0.05^2}$$

= 77 participants

3.7 DATA MANAGEMENT

A structured questionnaire as well as the standardised Harris hip score was used as data collecting tools (see **APPENDIX A and B)**. Patients' information such as biophysical profile, pre-existing, postoperative complications, time from surgery and patient subjective rating of the operation were obtained using these tools. This was followed by assessment using the Harris hip score to determine the functional outcome.

No personal details that would identify the patient appeared on the data collection form as only serial numbers were used for data collection and entry purposes.

3.8 STATISTICAL ANALYSIS

All the information collected was encoded and stored in SSPI version 20. Data entry was checked for consistency using double entry checks to identify discordant data and was corrected accordingly.

Information obtained was analysed and tabulated into tables and relevant descriptive statistics of mean, median and mode calculated. For continuous variables (age, sex, weight, height and body mass index) the correlation coefficients was calculated to test for any association with the dependent variable.

The relationship between the Harris hip score and non-continuous variables (comorbidities and postoperative complications) was determined by formulation of cross-tabulation and contingency tables for categorical variables while logistic regression was used to test for confounding. Fishers' Exact tests were carried out to establish any associations and the associations were considered significant at 95% confidence interval if $p<0.05$.

3.9 ETHICAL ISSUES

Ethical clearance was obtained from the University of Zambia Biomedical Research Ethics Committee **(UNZABREC)**. Participation in this study was only by informed consent and no patient identifiers were used. Only serially coded numbers were used to identify all data entry on data collecting forms.

Prior to conducting the research, permission was obtained from the managements of University Teaching, Zambian Italian and Beit-Cure hospitals. Patients who were found with poor functional outcomes or other medical conditions, and the possible cause determined were referred to specialist clinics in the hope of remedying the cause and therefore improving their functional and health status.

Appropriate recommendations have been made in accordance with the study's findings on functional outcomes of patients after THR presenting at hospitals in Lusaka.

CHAPTER FOUR

4.0 RESULTS AND DATA ANALYSIS

4.1 PATIENT' CHARACTERISTIC'S

The study recruited 31 patients (n=31), 11 (35.5%) females and 20 (64.5%) males. Twenty-six (83.9%) patients were Africans, 1 (3.2%) was Caucasian, 3 (9.7%) were Asians, and 1 (3.2%) was of a mixed race. The minimum age of the patients was 19 years; the maximum was 78 years, while the mean age was 48.8 years. The weight distribution was; 7 (26.6%) patients had normal weight, 22 (70.9%) were overweight, and 2 (6.5%) patients were obese. The minimum body mass index (BMI) was 22, the maximum BMI was 31, and the average BMI was 26.5.

Table 1: Patients characteristics

Variable	Values	Frequency	Percent
Sex	Female	11	35.5
	Male	20	64.5
Age	19-30	6	19.4
	31-42	6	19.4
	43-55	9	29.0
	56-66	3	9.7
	67-78	7	22.6
Race	African	26	83.9
	Caucasian	1	3.2
	Asian	3	9.7
	Mixed race	1	3.2
BMI	Normal weight	7	22.6
	Overweight	22	70.9
	Obese	2	6.5

4.2 SOCIOECONOMIC STATUS AND SOCIAL HABITS OF PATIENTS

Table 2 shows the various occupations of the patients. Twelve (38.7%) patients were employed, 2 (6.5%) unemployed, 4 (12.9%) were school going, while the remaining 12 (38.7%) were retired. Three (9.7%) patients were smokers, 3 (9.7%) stopped smoking after surgery, and 24 (77.4%) were non-smokers. Four (12.9%) patients continued consuming alcohol after surgery, 4 (12.9%) stopped drinking alcohol after surgery, and 23 (74.2%) had never consumed alcohol.

Table 2: Social Economic status and social habits of the participants

Variable	Values	Frequency	Percent
Employment status	Employed	12	38.7
	Unemployed	2	6.5
	Still in school	4	12.9
	Retired	12	38.7
	Missing (not stated)	1	3.2
Smoking	Yes	3	9.7
	No	24	77.4
	Stopped after surgery	3	9.7
Drinking alcohol	Yes	4	12.9
	No	23	74.2
	Stopped after surgery	4	12.9

4.3 TIME FROM SURGERY

One (3.2%) patient had the operation done in less than three months, 4 (12.9%) between 4 and 6 months, 11 (35.5%) between 7 and 12 months, 9 (29.0%) between 13 and 23 months, and 6 (19.4%) in more than 24 months.

Table 3: Time from surgery

Period	Frequency	Percent
Less than 3 months	1	3.2
Between 4 & 6 months	4	12.9
Between 7 & 12 months	11	35.5
Between 13 & 23 months	9	29.0
More than 24 months	6	19.4
Total	**31**	**100.0**

4.4 PREEXISTING CO-MORBIDITIES

Twenty-four (77.4%) patients were found to have preexisting medical conditions while 7 (22.6%) did not have any. Ten (32.3%) patients had cardiovascular disorders in the form of hypertension, 1 (3.2%) patient had an endocrine disorder notably diabetes mellitus. Eight (25.8%) patients were found with HIV/AIDS, while 5 (16.1%) had other medical conditions such as sickle cell trait.

Table 4: Preexisting co-morbidities

Preexisting comorbidities	Frequency	Percent
Cardiovascular disorder	10	32.3
Immunosuppression	8	25.8
Endocrine disorder	1	3.2
None	7	22.6
Others	5	16.1
Total	**31**	**100.0**

4.5 INDICATIONS FOR SURGERY

Pain was the main indication for the surgery. Thirty patients (96.8%) were able to correlate to the cause of the pain, while 1 (3.2%) failed to. Fifteen (48.4%) patients associated the pain to degenerative osteoarthritis, 9(29%) due to trauma involving the hip, 2(6.5%) to infection and 5(16.1%) attributed it to other causes such as avascular necrosis of the femoral head in Sickle cell trait and HIV patients.

Table 5: Indications for Surgery

Variable	Values	Frequency	Percent
Indication for the surgery	Pain	31	100.0
Knowledge of reason for the surgery	Yes	30	96.8
	No	1	3.2
Cause of the pain	Infection	2	6.5
	Trauma	9	29.0
	Degenerative disorder	15	48.4
	Others	5	16.1

4.6 POSTOPERATIVE COMPLICATIONS

Eleven (35.5%) patients suffered complications, while 20 (64.5%) did not after the surgery. Ten (38.7%) patients had wound infections and while 1 patient (3.2%) reported having a hip dislocation.

Table 6: Post-operative co-morbidities

Variable	Values	Frequency	Percentage
Complications after surgery	Yes	11	35.5
	No	20	64.5
Type of complications	Wound infection	10	38.7
	Dislocation of the hip	1	3.2

4.7 PATIENT RATING OF SURGERY

Twenty-three (74.2%) of the participants rated the procedure as a success while 8(25.8%) rated it a failure. Absence of pain (35.5%) and improvement in the ADL (6.5%) were reason attributed to the success while increased pain with occasional use of analgesia which affected the ADL (12.9%) were reasons attributed to the failure of the procedure.

Table 7: Patients' rating of the success of the surgery

Variable	Values	Frequency	Percent
Was the operation a success?	Yes	23	74.2
	No	8	25.8
Reasons for the success of the operation	No pain or ignores it	6	19.4
	Some pain, no effect on ADL	11	35.5
	Mild pain, no effect on ADL, may take analgesia	2	6.5
	Moderate pain but tolerable affects ADL and may take occasional analgesia	4	12.9

4.8 RESULTS OF THE HARRIS HIP SCORE

HHS ranged from 36 to 88 points, with an average of 73.81 points (SD=10.895). Ten (32.3%) patients had a poor outcome, 11 (35.5%) patients had a fair outcome, and 10 (32.3%) had a good outcome (Table 8).

Table 8: Harris Hip Score: Grade

HHS grading	Frequency	Percent
Poor	10	32.3
Fair	11	35.5
Good	10	32.3
Total	31	100.0

Further statistical tests were carried out to establish whether there were any associations between HHS and age, BMI, preexisting medical conditions, time from surgery and patients and satisfaction after surgery.

4.9 ASSOCIATION OF HHS WITH SOME INDEPENDENT VARIABLES

Since the sample size was small and the sampling procedure used was convenient sampling, Fishers' Exact test was carried out to establish associations at a significance level of < 0.05. In this study, the results showed that there was no association between HHS and age ($p>0.05$), postoperative co-morbidity complications ($p>0.05$), BMI ($p>0.05$), pre-operative co-morbidity ($p>0.05$), and duration of surgery ($p>0.05$). The results, however, showed that there was an association between HHS and success of surgery ($p<0.007$); participants who had high HHS scores rated the operation a success.

4.9.1 Table 9: Summary of the Fishers Exact test results between HHS and selected independent variables

Associations	Chi Square Statistic	df	pValue
HHS vs. Age	2.032	2	.439
HHS vs. complications	1.367	2	.639
HHS vs. success of surgery	9.114	2	.007
HHS vs. BMI	5.043	2	.151
HHS vs. pre-operative co-morbidities	4.482	2	.123
HHS vs. duration of surgery	5.427	2	.122

4.9.2 Table 10: Fishers' Exact Tests results regarding association between HHS and Age

			Harris Hip Score			Total
			Poor	Fair	Good	
Age	Below 50 years	Count	4	5	7	16
		Expected Count	5.2	5.7	5.2	16.0
	50 years and above	Count	6	6	3	15
		Expected Count	4.8	5.3	4.8	15.0
Total		Count	10	11	10	31
		Expected Count	10.0	11.0	10.0	31.0
χ^2=2.032; df=2; p=.439, >0.05						

Since the p-value (0.439) is greater than 0.05, the association between HSS and Age is not statistically significant.

4.9.3 Table 11: Fishers Exact test results regarding association between HHS and postoperative complications

			Harris Hip Score			Total
			Poor	Fair	Good	
Any complications after the operation	Yes	Count	5	3	3	11
		Expected Count	3.5	3.9	3.5	11.0
	No	Count	5	8	7	20
		Expected Count	6.5	7.1	6.5	20.0
Total		Count	10	11	10	31
		Expected Count	10.0	11.0	10.0	31.0
χ^2=1.367; df=2; p=.639, >0.05						

Since the p-value (0.639) is greater than 0.05, the association between HSS and postoperative complications is not statistically significant.

4.9.4 Table 12: Fishers' Exact test results regarding association between HHS and rating of surgery

			Harris Hip Score			
			Poor	Fair	Good	
Was the operation a success?	Yes	Count	4	9	10	23
		Expected Count	7.4	8.2	7.4	23.0
	No	Count	6	2	0	8
		Expected Count	2.6	2.8	2.6	8.0
Total		Count	10	11	10	31
		Expected Count	10.0	11.0	10.0	31.0
χ^2=9.114; df=2; p=.007, <0.05						

4.9.5 Table 13: Fishers' Exact test results regarding association between HHS and BMI

			Harris Hip Score			Total
			Poor	Fair	Good	
BMI	Normal	Count	4	3	0	7
		Expected Count	2.3	2.3	2.3	7.0
	Overweight	Count	6	7	10	23
		Expected Count	7.7	7.7	7.7	23.0
Total		Count	10	10	10	30
		Expected Count	10.0	10.0	10.0	30.0
χ^2=5.043; df=2; p=.151, >0.05						

Since the p-value (0.151) is greater than 0.05, the association between HSS and BMI is not statistically significant.

4.9.6 Table 14: Fishers' Exact test results regarding association between HHS and preexisting co-morbidities

			Harris Hip Score			
			Poor	Fair	Good	
Pre-op co-morbidity	No	Count	5	1	6	12
		Expected Count	4.7	3.1	4.2	12.0
	Yes	Count	4	5	2	11
		Expected Count	4.3	2.9	3.8	11.0
Total		Count	9	6	8	23
		Expected Count	9.0	6.0	8.0	23.0
χ^2=4.482; df=2; p=.123, >0.05						

Since the p-value (0.123) is greater than 0.05, the association between HSS and preexisting co-morbidities is not statistically significant.

4.9.7 Table 15: Fishers' Exact test results regarding association between HHS and time from surgery

			Harris Hip Score			Total
			Poor	Fair	Good	
When was the operation done?	12 months and below	Count	8	4	3	15
		Expected Count	5.0	5.0	5.0	15.0
	13 to 24 months	Count	2	6	7	15
		Expected Count	5.0	5.0	5.0	15.0
Total		Count	10	10	10	30
		Expected Count	10.0	10.0	10.0	30.0
χ^2=5.427; df=2; p=.122, >0.05						

Since the p-value (0.122) is greater than 0.05, the association between HSS and the time from surgery is not statistically significant.

DISCUSSION

5.0 DISCUSSION

The study was conducted at hospitals within Lusaka that offer orthopaedic services namely University Teaching, Beit-Cure and Zambian Italian Orthopaedic hospitals. 31 patients were enrolled into the study.

5.1 BIOPHYSICAL PROFILE OF PATIENTS

Thirty-one (n=31) patients were recruited into the study and there were 11 (35.5%) females and 20 (64.5%) males. In this study there was a male to female ratio of 1.82 to 1. This is in contrast to what was reported by Williams et al (1994). In that study, there was found a female predominance in all age groups. The minimum age of the patients was 19 years, the maximum age was 78 years, and the mean age at operation was 48.8 years. The age distribution was in line with a study in Burkina Faso by Dossche et al (2014). This study did not find any correlation between the age of the patient and the HHS (p-value 0.439 > 0.05). However in studies by Michael et al (2000), Nilsodotter and Lohmander (2002) found that age was a reliable predictor with young patients having a better HHS than the elderly patients.

The ethnic composition of the patients was 26 (83.9%) Africans, 1 (3.2%) Caucasian, 3 (9.7%) of Asians origin, and 1 (3.2%) was of a mixed race. A study by Williams et al (1994) found a higher rate of THR in Caucasian than in blacks. The discrepancy in this study can be attributed to the fact that the study was conducted in a country that is predominately populated by blacks with a small Caucasian population.

Seven (26.6%) patients were of normal weight, 22 (70.9%) were overweight, and 2 (6.5%) patients were obese. The minimum body mass index (BMI) was 22, the maximum 31, and the mean was 26.5 (SD=2.193). This study did not show any association between the Body Mass Index of patients with HHS, (since the p-value 0.151 > 0.05). Anne Lubbeke et al (2006) reported that obesity was strongly associated with unfavorable outcomes only in revision THR than primary THR. However the finding in

that study was in contrast with Katz et al (2003), who reported unfavorable outcomes in both primary and revision THR.

5.2 SOCIAL ECONOMIC STATUS AND SOCIAL HABITS OF PATIENTS

In this study the social economic status of the patients was, 12 (38.7%) patients were employed, 2 (6.5%) unemployed, 4 (12.9%) were still in school and 12 (38.7%) were retired. The study however failed to desegregate those that were employed in blue-collar jobs and those in labour intensive work. This information would have been helpful, as it would have identified if any the effects of manual labor in the development of degenerative osteoarthritis and the eventual resultant THR.

Three (9.7%) patients were smokers, 3 (9.7%) stopped smoking after surgery, and 24 (77.4%) patients were non-smokers. Kashif Khan et al (2009) in a study showed that smoking did not influence either the complication rate or medium-term functional outcome at five years after total hip replacement. Further the study found that 4(12.9%) patients consumed alcoholic beverages on a regular basis, 4(12.9%) stopped consuming before or immediate after surgery, and 23 (74.2%) had never consumed any alcoholic beverages before. Lavernia et al (2013) showed that moderate alcohol consumption was associated with better WOMAC and Harris hip scores while after surgery, abstainers achieved greater improvements in the WOMAC function, pain, and total scores. This study however did not quantity the amount of alcohol consumed by the patient and therefore cannot relate nor comment on the effect of alcohol and HHS.

5.3 PERIOD FROM TIME OF OPERATION

The period from the time of the operation was determined with 1 (3.2%) patient having the operation done in less than three months, 4 (12.9%) between 4 and 6 months, 11 (35.5%) between 7 and 12 months, 9 (29.0%) between 13 and 23 months, and 6 (19.4%) with the operation done over 24 months. The study did not find any association between the period from time of the operation and the HHS (p-Value > 0.05). This is however in contrast with a study by Kocic et al (2006), which found that at 1 and 5 years after the

surgery, patients had very good hip functional status with HHS ranging from good to excellent. Ng et al (2007) was able to show that the Harris Hip scores improved significantly in the first six-month post operatively reaching a plateau after 18 months.

5.4 PREEXISTING MEDICAL CONDITIONS.

Ten (32.3%) patients had hypertension; 1 (3.2%) patient had diabetes mellitus, 8 (25.8%) were HIV positive, while 12 (38.7%) patients reported that they had no preexisting health disorders. In this study no association was found between the HHS and the preexisting medical conditions. This is in contrast with Koval and Zuckerman et al (1998) and Magaziner et al (1990) who found that the presence of one or more co-morbidities was a predictor of failure to recover pre- fracture basic activity level. Davis et al (2006) also showed that the fewer co-morbidities the better the outcome following a revision THR. However Graham et al (2014) in a study conducted in Malawi was able to demonstrate good functional outcomes with no apparent to either the risk or rate of early infection in HIV positive patients that had undergone THR. This study however only looked at functional outcome of HIV positive patients after total hip replacement. It did not look at patients with other preexisting comorbidities such as Hypertension, diabetes mellitus and sickle cell disease co-infected with HIV/AIDS.

5.5 INDICATIONS FOR SURGERY AND PATIENTS KNOWLEDGE OF THE INDICATIONS.

In this study all 31(100%), patients said that that the main indication for the surgery was due to severe pain. This is in accordance with what has been reported by the British Orthopaedic Association (BOA, 2009) and also in a study in Burkina Faso by Dossche et al (2014). Further 30 (96.8%) patients were able to correlate the pain to a pathological condition that was responsible for the pain, while 1(3.2%) patient failed to do so. Diagnosis included degenerative osteoarthritis in 15(48.4%) patients, trauma either presenting as avascular necrosis of the femoral head or posttraumatic osteoarthritis in 9 (29%) patients. Two (6.5%) patients had previous hip infections notably Tb of the hip, while there were 5 (16.1%) sickle cell trait patients.

5.6 POSTOPERATIVE COMPLICATIONS

Eleven patients (35.5%) had complications following surgery. Ten (38.7%) patients had wound infections and one (3.2%) patient had a dislocation of the hip. The nature of the infections varied from superficial to deep surgical wound infections. The rate of infection in this study is higher than previous reported in other studies, while the rate for hip dislocation was lower than reported in a study by Mahomed et al (2003). The study however did not find any correlations between the HHS and the postoperative complications (p value 0.639 > 0.05), and therefore no association has been found between HSS and postoperative complications.

5.7 PATIENTS' RATING OF THE SUCCESS OF THE SURGERY.

Twenty-three (74.2%) of the patients rated the operation to have been a success while eight (25.8%) rated the operation not successful.

The reasons the patients attributed to the success of the operations were: six (19.4%) patients experienced no pain or ignored it; eleven (35.5%) experienced some pain but it had no effect on their activities of daily living (ADL); two (6.5%) experienced mild pain and would take some analgesia but had no effect on their ADL; and four (12.9%) patients had moderate pain and might take occasional analgesia but had tolerable effects on their ADL. The results, however, showed that there was an association between HHS and success of surgery ($p<0.007$); patients who had high HHS scores rated the operation a success.

The HHS was used to assess the functional outcome after total hip replacement. In this study HHS ranged from 36 to 88 points, with an average of 73.81 points (SD=10.895). The finding in this study were in variant with a study by Kocic et al (2006), who found that 77% had an excellent HHS (90-100 points) while 82.4% had a good HHS (80-90 points).

CHAPTER SIX

6.0 CONCLUSION

In conclusion the study found that

1. Pain, irrespective of the cause (trauma, infection, degenerative condition and preexisting medical condition) was the major indications that lead patients to undergo hip replacement.
2. Further, there was a general feeling of satisfaction amongst patients regarding the functional outcomes of total hip replacements regardless of the Harris hip score.
3. There was no association between the Harris hip score and age, BMI, preexisting medical conditions, time from surgery and postoperative complications.

6.1 STUDY LIMITATIONS

1. The absence of a National Joint Arthroplasty Register made it difficult to identify and recruit potential patients thereby resulting in the sample size being small.
2. Since the sample size was small and the sampling procedure used was convenient sampling, no generalisation can be made of the results as pertaining to the population.
3. Poor record keeping by the hospital, patients' information such as contact details, patients' characteristics such as weight, social economic status and detailed physical examination both preoperatively and postoperatively excluded some patients from being part of this study. Some patients though having being identified from hospital records as having undergone THR could not be enrolled, as they were lost to follow-up.
4. The financial burden that the procedure exerts on the patients and their families meant that few patients had access to the service thereby limiting the sample size.

6.2 RECOMMENDATONS

1. There is an urgent need to setup a joint replacement register that will make it easy to identify and locate the patients that have undergone any joint replacement. This register ill also incorporate information regarding the types of implants used and their success or failure rates.
2. There need for research to be conducted that will measure the pre operative HHS and the postoperative HHS to measure any improvement in the score.

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APPENDICES

Appendix A: Harris Hip Score

Harris Hip Score	Hip ID:
	Study Hip: ☐ Left ☐ Right
	Examination Date (MM/DD/YY): / /
	Subject Initials: |____|____|____|
	Medical Record Number:

Interval: _____

Harris Hip Score	
Pain *(check one)*	**Stairs**
☐ None or ignores it (44)	☐ Normally without using a railing (4)
☐ Slight, occasional, no compromise in activities (40)	☐ Normally using a railing (2)
☐ Mild pain, no effect on average activities, rarely moderate pain with unusual activity; may take aspirin (30)	
☐ Moderate Pain, tolerable but makes concession to pain. Some limitation of ordinary activity or work. May require Occasional pain medication stronger than aspirin (20)	
☐ Marked pain, serious limitation of activities (10)	
☐ Totally disabled, crippled, pain in bed, bedridden (0)	
Limp	
☐ None (11)	
☐ Slight (8)	
☐ Moderate (5)	
☐ Severe (0)	
Support	
☐ None (11)	
☐ Cane for long walks (7)	
☐ Cane most of time (5)	
☐ One crutch (3)	
☐ Two canes (2)	
☐ Two crutches or not able to walk (0)	
Distance Walked	
☐ Unlimited (11)	
☐ Six blocks (8)	
☐ Two or three blocks (5)	
☐ Indoors only (2)	
☐ Bed and chair only (0)	
Sitting	
☐ Comfortably in ordinary chair for one hour (5)	
☐ On a high chair for 30 minutes (3)	
☐ Unable to sit comfortably in any chair (0)	
Enter public transportation	
☐ Yes (1)	
☐ No (0)	

Appendix B: Patient information sheet

Serial ID Number……

Determination of the functional outcomes of total hip replacement, by using the Harris Hip Score, in adults presenting at hospitals in Lusaka, a cross sectional study.

DATA COLLECTION SHEET

Serial Number

BIOPHYSICAL PROFILE

1. Sex M/F [ ]
2. Age in years at last birthday: [ ]
3. Race
    a. African [ ]
    b. Caucasian [ ]
    c. Asian [ ]
    d. Mixed race [ ]
4. Height in cm: [ ]

5. Weight in Kg: [ ]

6. BMI: [ ]

SOCIOECONOMIC STATUS AND SOCIAL HABITS

7. Occupation

a. Employed [ ]
b. Unemployed [ ]
c. Still in school [ ]
d. Retired [ ]

8. Do you smoke?

a. Yes [ ]
b. No [ ]
c. Stopped after the surgery [ ]
d. Never [ ]

9. Do you drink any alcoholic beverages;

a. Yes
b. No
c. Stopped after the surgery
d. Never

10. When was the operation done

a. Less than 3 months
b. Between 4- 6 Months
c. Between 7-12 Months
d. Betwween13- 23 months
e. More than 24 months

PREEXISTING CO-MORBIDITIES

11. Did you have any of the following health conditions before the surgery?

a. Cardiovascular disorder [ ]
b. Respiratory disorder [ ]
c. Neurological disorder [ ]
d. Musculoskeletal disorder [ ]
e. Malignancy [ ]
f. Endocrine disorder [ ]
g. Immunosuppression [ ]
h. Non [ ]
i. Others [ ]

13. What was the main reason for performing surgery?

a. Pain
b. Joint stiffness
c. Others specify

14. Do you know what brought about the reason for the surgery?

a. Yes [ ]
b. No [ ]

15. If yes to Q 14 what was it?

a. Trauma [ ]
b. Infection [ ]
c. Degenerative disorder [ ]
d. Malignancy [ ]
e. Others [ ]

POSTOPERATIVE COMPLICATIONS

16. Do you have any complication(s) after the operation?
    a. Yes
    b. No
17. If yes to the Q 16, what type of complication(s) did you have?
    a. Wound infection
    b. Dislocation of the hip
    c. Implant broke
    d. Heart Attack
    e. Stroke

18. In your opinion do you think that the operation was a success?

    a. Yes

    b. N o

19. If yes to the Q18 why do you think so?

    a. No pain or ignores it

    b. Some pain, no effect on ADL

    c. Mild pain, no effect on ADL, may take analgesia

    d. Moderate pain but tolerable affects ADL and may take occasional analgesia