

**EFFECT OF TRANEXAMIC ACID ON BLOOD LOSS IN TOTAL HIP  
ARTHROPLASTY AT MUHIMBILI ORTHOPAEDIC INSTITUTE:  
A RETROSPECTIVE COMPARATIVE STUDY**

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**MMed (Orthopaedics and Traumatology) Dissertation  
Muhimbili University of Health and Allied Sciences  
October, 2021**

**Muhimbili University of Health and Allied Sciences  
Department of Orthopaedics and Traumatology**



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**By**

**Joram M. Med**

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

**Muhimbili University of Health and Allied Sciences  
October, 2021**

## **CERTIFICATION**

The undersigned certifies that he has read and hereby recommend for acceptance by Muhimbili University of Health and Allied Sciences a dissertation entitled: **“Effect of Tranexamic Acid on blood loss in total hip arthroplasty at Muhimbili orthopaedic institute: a retrospective comparative study”**, in (partial) fulfillment of the requirements for the degree of Master of Medicine (Orthopaedics and Traumatology) of Muhimbili University of Health and Allied Sciences.

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Senior Lecturer MUHAS & Senior Consultant OT

(Supervisor)

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**Date**

**DECLARATION AND COPYRIGHT**

I, **Dr. Joram M. Theobald**, 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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## **DEDICATION**

I dedicate this dissertation to my beloved wife Susan and my sons Martin, Erick and Daniel for their encouragement, prayers, and patience throughout my course and making me firm and proud.

## **ABSTRACT**

**Background:** Total Hip Arthroplasty (THA) is associated with significant intraoperative and postoperative blood loss. At present, six to eight cases of THA are being performed weekly at MOI. Tranexamic acid (TXA) comes as a saver in the sense that when administered preoperatively reduces bleeding and the necessary number of transfusions among patients undergoing THA.

This study is, therefore, aimed at comparing the use of Tranexamic acid in reducing the need for post THA blood transfusion to those who receive it and to those who do not receive it.

Our null hypothesis is that there is no difference in postoperative blood transfusion for post Total Hip Arthroplasty among TXA receiving and non-TXA receiving group.

**Methods:** The study design is a hospital-based retrospective comparative study, 204 patients met our study inclusion criteria. The patients were divided into two groups, the first group were those patients who received TXA preoperatively and the second groups were those patients who didn't receive TXA. The number of patients who got blood transfusions in both groups was determined. Abstraction form was used to collect information from the patient's files.

The results were analyzed by Statistical Package for the Social Sciences (SPSS) computer program version 20.

**Results:** The study showed that among the participants who underwent THA and required postoperative blood transfusion the majority (74.4%) were those who did not receive TXA, as compared to those who received TXA with (60.3%). This was statistically significant with a p-value of 0.033. Also, significant results were observed with Odd ratio of 0.515 in which Tranexamic acid showed to influence the reduction of blood transfusion.

**Conclusion:** Pre-operative Tranexamic Acid administration to patients who underwent Total Arthroplasty showed to be effective in significantly reducing the need for postoperative blood transfusion.

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**ABBREVIATIONS**

TXA	Tranexamic Acid
THR	Total Hip Replacement
THA	Total Hip Arthroplasty
BT	Blood transfusion
SPSS	Statistical Package for Social Studies
MMED	Masters of Medicine
MOI	Muhimbili Orthopaedic Institute
MUHAS	Muhimbili University of Health and Allied Science
NSAIDs	Non-steroidal anti-inflammatory drugs
BMI	Body Mass Index
DVT	Deep vein thrombosis
ASA	Acetylsalicylic acid
SSRIs	Selective Serotonin Reuptake Inhibitors
Hct	Haematocrit
UK	United Kingdom
USA	United State of America

## CHAPTER ONE

### 1.0 INTRODUCTION

#### 1.1 Background

Total Hip Arthroplasty or surgical replacement of the hip joint is an orthopaedic procedure that involves surgical excision of the head and proximal neck of the femur and removal of the Acetabular cartilage replacing them with artificial Implants<sup>(1)</sup>.

Total hip arthroplasty (THA) is associated with significant Intra and postoperative bleeding that can cause acute postoperative anaemia requiring the blood transfusion. Blood transfusion is associated with risks of blood transfusion reactions, infections and fluid overload and these complications can delay a patient's functional recovery and consequent discharge from the hospital.

To avoid these risks Tranexamic acids (TXA) are given preoperatively and it functions by inhibiting the conversion of plasminogen to plasmin, an enzyme that breaks down fibrin-containing blood clots, hence by stabilizing these clots, TXA reduces active bleeding.

Apart from TXA being used in reducing bleeding in other conditions like major trauma, TXA is currently being used in orthopedic surgery through the intravenous (IV) route during hip and knee arthroplasty procedures either as primary or revision procedures. It reduces perioperative blood loss and the need for blood transfusion without increasing the risk of deep vein thrombosis or pulmonary embolism.<sup>(2)</sup>

Metanalysis conducted by Shakya R *et al*<sup>(3)</sup> shows that TXA reduced blood loss by an average of 36.5% in patients undergoing THA. Another study showed that TXA reduced intra-operative blood loss by 104 mL and postoperative blood loss by 172 mL.

## **1.2 Literature Review**

### **Rate of Blood Transfusion before TXA**

Patients undergoing total hip arthroplasty without preoperative Tranexamic acid administration suffer a considerable perioperative blood loss which increases the need for blood transfusion. (Robinson, Obi, Harrison, and Jeffery, 2018; Joy and bennet, 2018; Browne, Adib and Novikoff, 2013; Jans, Kehlet, Johanson, 2011; Menezes, Manso, Seifert, and Gil, 2011; Jans, Kehlet, Hussain and Johansson,2011).

For example Browne, Adib and Novicoff<sup>(4)</sup> at University Hospital Consortium(UHC) in United State of America(USA) found that despite the measure to minimize exposure to allogeneic blood transfusion still there was an increase in the rate of blood transfusion to patients who underwent Total hip arthroplasty which increased from 18.12% in 2005 to 21.21% in 2008 and also it was noted that the length of hospital stay and hospital charges were both significantly higher in those patients who received blood transfusion. This study also provides Information on a socio-demographic distribution where blood transfusion is more in females, age  $\leq 85$  years but it was not stated why blood transfusion is more in this age group

In a study done to assess transfusion Practice among patients undergoing Total Hip Arthroplasty by Robinson, Obi, Harrison and Jeffery<sup>(7)</sup> at Queen Elizabeth Hospital in United Kingdom( UK) noted that the proportion of patients who were transfused blood was decreased from 35% to 17% and this decrease was caused by a strict following transfusion policy which leads to decrease in transfusion requirements, the blood transfusion was given strictly to symptomatic anaemia patients with dizziness , hypotension, postural hypotension.

In both studies, the risk factor factors of patient age, hospital stay, and pre and post-operative haemoglobin concentration level were worked on also no alternative blood conserving measures such as intra and postoperative red blood cell salvage, pharmacological agents, autologous blood transfusion were mentioned if used during the study period. Anaesthetic technique was not mentioned in any study. Also in both studies Hospital stays to patent who

received blood transfusion were longer compared to those who did not receive a blood transfusion.

In the study done by Browne, Adib and Novicoff<sup>(4)</sup> the transfusion rate was increased from 18.12% to 21.21% this occurred despite recent efforts on minimizing exposure to blood transfusion but the underlying reason was not answered in the study in contrast to the study done by Robinson, Obi, Harrison, and Jeffery, 2018 which showed decrease in transfusion rate from 35% to 17% and this was attributed by adopting transfusion policy.

A study done by Robinson, Obi, Harrison, and Jeffery<sup>(7)</sup> did not mention any chemical antithrombolysis which become increasingly common practice also the information regarding compliance with transfusion policy was not collected and no record of the wound drainage. In the study done by Browne, Adib and Novicoff<sup>(4)</sup> showed that geographical area of Northeast America area is associated with increased transfusion rate but there was no reason why happened to this area also increased transfusion rate in those patients who died prior to discharge the reason was not mentioned which could be attributed by degree of commodity, postoperative complication and the amount of blood loss during surgery was not documented. Also, BMI, duration of operation, methods of DVT prevention and anesthetic technique were not examined in this study which contributes to the amount of blood loss during THA.

Also the trend of high rate of blood transfusion was observed in another study done by Jans, Kehlet, Hussain, and Johansson<sup>(5)</sup> in Denmark to determine the prevailing blood transfusion practices in orthopedic surgery, it was found that the rate of blood transfusion was high in which allogeneic red cells (RBC) were administered to 92% of patients who underwent total hip arthroplasty. Also, it showed that despite establishing guideline of red blood cell transfusion in total hip arthroplasty transfusion rate remains high.

A study which was done Joy and Bennet<sup>(6)</sup> at Gloucestershire Hospitals in the UK to determine the appropriateness of blood transfusion following primary total hip replacement showed that the rate of blood transfusion was 27% and also found that there was an inappropriate transfusion of 18% among those who received blood. This data shows that there

was an overuse of blood transfusion despite of using classification adopted from British Orthopaedic Association (BOA) which guide transfusion practice there was still high rate of blood transfusion with inappropriate blood transfusion compared with the study done by Robinson, Obi, Harrison, and Jeffery,<sup>(7)</sup> in which reduced from 35% to 17% after following transfusion policy. The symptom of hypovolaemia which was used as one of the criteria for anemia can also be caused by fatigue due to the ongoing surgery.

Study done by Menezes, Manso, Seifert, Rodrigues and Gil<sup>(8)</sup> in Portugal to identify the factors associated with intraoperative and postoperative blood loss in total hip arthroplasty, it was found that in the group where general anesthesia was administered had a higher total blood loss of  $346\pm 227$ ml compared to the group that used regional anesthesia in which the total blood loss was  $225\pm 54$ ml.

These results showed there was an association between anesthetic technique used during Total hip arthroplasty and the amount of blood loss. In terms of gender and age, there was no statistically significant correlation with blood loss. But in this study the duration of surgery was not mentioned and also the patients who had hypertension if the blood pressure was controlled before surgery was not stated, a study done by Benson M et al<sup>(20)</sup> showed that there is a correlation between duration of surgery and increased postoperative bleeding.

### **Rate of blood transfusion with TXA**

Total hip arthroplasty may produce significant blood loss necessitating allogeneic red blood cell transfusion, Tranexamic acid has been reported in several studies to decrease perioperative blood loss transfusion rate and decrease transfusion when preoperative TXA is administered. (Carling, Jeppson, Errickson and Brisby, 2015, Wind, Barfield and Moskal, 2014).

The study done by Carling, Jeppson, Errickson, and Brisby<sup>(9)</sup> in Sweden to determine the prevalence of red blood cell transfusion to patients who underwent unilateral hip arthroplasty, was found transfusion rate to be 18% when TXA was used as routine prophylaxis before THA. The variables were age, gender, BMI, Medication before surgery such as Acetylsalicylic Acid

and NSAIDS and thromboprophylaxis. The following data have recorded the duration of operation, estimated blood loss and transfusion requirements during intraoperative and 24 to 48 hours postoperative. It was found that female gender, low BMI, long operation time and low preoperative haemoglobin was associated with the risk of excessive blood loss and requiring allogeneic RBC transfusions.

In another study done by Wind, Barfield and Moskal to compare <sup>(10)</sup> the need for blood transfusion in patients receiving TXA via intravenous, topically or neither it was found that transfusion rate without TXA was 19.86%, with TXA infusion was 4.39% and with topical TXA was 12.86%. This data shows that TXA, in general, reduces the need for a blood transfusion but TXA infusion is more potent in reducing blood loss than topical TXA. TXA was administered as one gram within one hour of incision time and then given when wound closure began. Different approaches were used for THA such as anterior, lateral and posterior and haemoglobin below 8g/dl was set as transfusion trigger for all patients.

Both studies they were looking how TXA reduces perioperative bleeding and reducing the need for blood transfusion using intravenous route but Wind, Barfield, and Moskal <sup>(10)</sup> went further to assess the topical route of TXA administration which failed to reach statistical significance. Also in both studies, TXA has shown to be effective to reduce rate blood transfusion. In the study by Carling, Jeppson, Errickson, and Brisby <sup>(9)</sup> the rate was 18% while for, Wind, Barfield and Moskal, 2014 the rate was 4.39%. This shows that there was a decrease in the rate of blood transfusion when TXA was used preoperatively as compared to those who did not use preoperative TXA in the study by Browne, Adib and Novicoff <sup>(4)</sup> found which was 21.21%.

In contrast the study done by Carling, Jeppson, Errickson and Brisby <sup>(9)</sup> they assessed amount of blood loss, perioperative, gender, BMI, operation and haemoglobin level to correlate with red cell transfusion which showed that female gender, low BMI, long operation time were associated with risk of large estimated blood loss while in the study by Wind, Barfield and Moskal <sup>(10)</sup> did not mention whether these variables were studied because as observed they have



effect on increasing perioperative blood loss except for mentioned hemoglobin level which was set to below 8g/dl for red blood cell transfusion.

The study by Wind, Barfield, and Moskal<sup>(10)</sup> did not mention whether the patients who were using ASA, NSAIDS or SSRIs and stopped using before surgery because these drugs have an effect during surgery and can increase the amount of blood loss. In the study by Carling, Jeppson, Errickson, and Brisby they<sup>(9)</sup> showed that low haemoglobin level was a risk factor for receiving red blood cell transfusion but level which trigger blood transfusion was not set in this study and the patients with low haemoglobin may end up with blood transfusion.

Tranexamic Acid (TXA) has shown to be effective in reducing total blood loss and post-operative blood loss by an average of 36.5%, reducing blood transfusion requirements and reducing the risk of transfusion. Furthermore, also it was found that there was no increased risk of complications, including deep vein thrombosis (DVT) and pulmonary embolism (PE), when TXA is utilized.<sup>(3)</sup>

### **Rate of blood transfusion in randomized control trial (RCT)**

Preoperative Tranexamic acid administration has shown to reduce blood loss in THA with the reduction of the need for red cell transfusion and lesser resource utilization.

In a randomized control trial by Hogan et al<sup>(11)</sup> at the University of Colorado Hospital in the USA the treatment group comprised patients who received intravenous tranexamic acid perioperatively and the control group comprised patients who did not receive tranexamic acid. It was found that three patients in the group who received TXA (5%) received BT and 21 patients in the group who received a placebo (21%) received BT. The findings of these show that TXA is effective and safe in reducing blood loss and transfusions THA. TXA in the treatment group were given before skin incision and 184 minutes after skin incision, criteria. Criteria for blood transfusion were set to hemoglobin concentration of < 7g/dl, preoperative, preoperative medication history was taken and antithrombotic was given.

Red blood transfusion was given to 21 patients in the control group which is (21.2%) and blood transfusion in the treatment group was 3 patients equal to 4.7% this shows that there was the reduction of red blood transfusion to the group in which TXA was administered which is low compared to the higher control group. Mean haemoglobin concentration level was declined in both groups, in the treatment group from 14.38g/dl to 10.35g/dl while in the control group was declined from 14.4g/dl to 9.5g/dl, the mean magnitude decline of haemoglobin concentration was higher.

The hidden blood loss was not mentioned in this study whether it was calculated because it has shown to contribute the amount of blood loss during surgery<sup>(15)</sup>.

### **Efficacy of Tranexamic Acid on reducing intraoperative bleeding**

Tranexamic acid is administered to patients undergoing THA given through intravenous route or topical application and it can be given before skin incision or immediately postoperatively with different efficacy on reducing perioperative blood loss and the need of blood transfusion (Panchmatia et al, 2012, Rajesparam et al, 2009, Benon et al, 2000).

A study by Rajesparam et al<sup>(15)</sup> in the UK which included 73 patients who underwent THA with two groups, 36 in the group received TXA and other 37 in the group which TXA was not administered and it was found that TXA reduced early postoperative blood loss and total blood loss, the TXA group required few transfusion compared to non TXA group and the reduction in postoperative blood loss was more marked in women.

During the study patients received 1g of TXA before skin incision in the TXA group while non-TXA group none was given, preoperative haemoglobin and haematocrit level were recorded, intraoperative blood loss was collected from the suction drain, wound swabs and drainage tubes, blood loss was calculated by the gross formula.

The mean percentage early fall in the haematocrit in the TXA group was 21% less than that in the control group. Estimated total blood loss was less 18.5% in the TXA group than in the control group, the mean actual blood loss in the TXA group was 1,372 MLS while in the control group was 1,683mls.

These findings showed that TXA significantly reduces postoperative blood loss in contrary to what was found in the study done by Benon et al<sup>(16)</sup> at Malmo University Hospital in Sweden which showed that administration of TXA at the end of surgery had little effect on reducing postoperative blood loss, the biological explanation of this findings is that TXA act on the early phase of the fibrinolysis process before plasminogen activator is bound to fibrin surface which reduces the activity of plasminogen activator.

Intraoperative blood loss in this study was not influenced by the administration of 1g of TXA which is consistent with other study done by Yamasaki, Masala and Fuji<sup>(21)</sup> Also early blood loss and total blood loss were significantly reduced in the TXA group while late blood loss was not and these findings support the hypothesis that TXA induces the early inhibition before the body the usual responses start to work after 24hours.

Also, a similar finding was found in the study done by Panchmatia et al<sup>(14)</sup> which showed that administration pre-operative bolus of dose 1 g of Tranexamic acid before skin incision was effective in reducing blood loss and transfusion requirement.<sup>(14)</sup>

The strength part of this study is that they measured pre and postoperative blood loss indirectly by using haemoglobin and Hct values which is more accurate than measuring direct drainage fluid since hidden blood loss can occur in a postoperative hematoma.

The weakness of this study is that they calculated intraoperative blood loss within the suction chambers and estimated blood in the swabs which may vary between observers.

In this study, they did not mention the transfusion protocol of hemoglobin level for which blood transfusion can be done.

### **1.3 Problem Statement**

Total Hip Arthroplasty is associated with perioperative blood loss that can lead to acute symptomatic anemia requiring blood transfusion (BT). This leads to an increased demand for blood transfusion while the supply of blood required for transfusion keeps on reducing, blood products are not readily available and there are risks of complications associated with blood transfusion.

Preoperative measures of reducing blood loss should be taken and should aim at preventing perioperative anemia by reducing the amount of blood loss during THA procedure and hence reduce the need for blood transfusion.

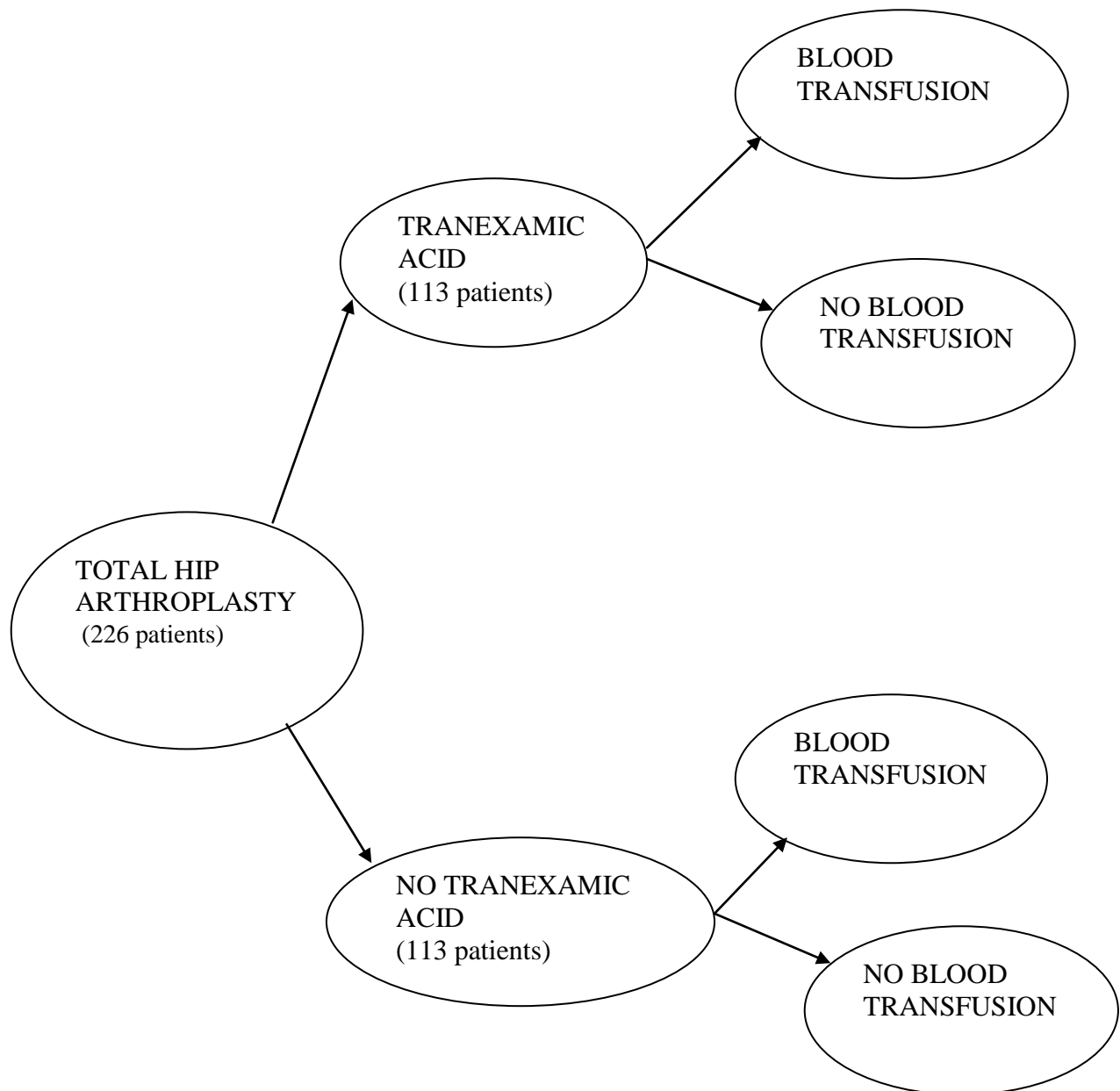
Tranexamic Acid has been in practice at Muhimbili Orthopaedic Institute since 2008 and since then there has been no analysis done from available data in Tanzania to justify the importance of scaling up TXA in major surgeries.

### **1.4 Rationale**

1. The effect of the use of TXA in reducing the need for post THA blood transfusion has not been examined at our Institute.
2. Therefore this study is aimed at determining the effect TXA in reducing BT after THA.
3. The results of this study will help to maximize the regular use of TXA before THA.

### 1.5 Conceptual Framework

Total Hip Arthroplasty with administered Tranexamic Acid and No administered Tranexamic Acid Preoperatively.



## **1.6 Objectives**

### **1.6.1 Broad objective**

To compare the effect of preoperative Tranexamic Acid administration in reducing the need for blood transfusion in patients undergoing Total Hip Arthroplasty between those who receive it and those who did not receive it between January 2007 and December 2017.

### **1.6.2 Specific Objectives**

1. To determine the demographic pattern of patients who underwent THA between January 2007 and December 2017.
2. To determine the proportion of patients who received TXA preoperatively and required blood transfusion post-THA between January 2007 and December 2017.
3. To determine the proportion of patients who did not receive TXA preoperatively and required blood transfusion post-THA between January 2007 and December 2017.
4. To compare the proportion of patients who required blood transfusion postoperatively among those who received TXA to those who did not receive TXA between January 2007 and December 2017.
5. To determine the number of units of blood transfused in patients who did not receive TXA preoperatively compared to those who receive TXA between January 2007 and December 2017.

## **CHAPTER TWO**

### **2.0 METHODOLOGY**

#### **2.1 Study design**

A hospital-based retrospective comparative study design.

#### **2.2 Study area**

The study was conducted at Muhimbili Orthopaedic Institute (MOI)- Dar es Salaam, Tanzania. Muhimbili Orthopedic Institute is an autonomous Institute established under the act. No 7 of 1996 with the main objective of providing primary, secondary and tertiary care of preventive and curative health services in the field of Orthopedics, Traumatology, and Neurosurgery.

MOI provides both emergency and non-emergency medical services in the field of Orthopedics, Traumatology, and Neurosurgery. The institute has a bed capacity of more than 380 beds. In the Department of Orthopedic and Traumatology, there are three firms (A and B), and Pediatric Orthopedics.

Total Hip Arthroplasty is done in firms A and B and about six to eight surgeries are done per week. Tranexamic Acid gradually started to be given to patients who underwent THA at MOI in 2008 and gained momentum.

#### **2.3 Study period**

April 2018- Feb 2019.

#### **2.4 Study population**

Adult patients who underwent THA between January 2007 to December 2017 at MOI.

#### **2.5 Inclusion and Exclusion Criteria**

##### **Inclusion criteria**

- 1.Participants > 18 years of age
- 2.Participants who underwent primary THA

### **Exclusion criteria**

Sickle Cell Anemia patients.

### **2.6 Sample Size**

Prevalence of blood transfusion among patients who underwent THA when tranexamic acid was used as routine prophylaxis, by Carling MSet *al*,2018 was 18%

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

n = Minimum sample size

P = prevalence=18%

e = Margin of tolerable error= 5%

95% confidence interval (Z) =1.96

n =  $3.8416 \times 918(100- 18)/25= 226$  patients

### **2.7 Data Collection Process**

Datasheet with predetermined variables of interest was used and data were extracted from patient's files.

From 226 postoperative patients files who met inclusion criteria which were identified randomly from register books, 22 files dropped from the study due to inadequate information from files and Only 204 patients files went for further assessment which included patients who underwent THA who received preoperative TXA and those who didn't receive preoperative TXA. From patient's files, demographic data were taken, Case notes and anesthetic notes were examined to extract data of amount blood loss, amount of blood transfusion and the number of patients who received preoperative Tranexamic Acid and those who did not receive Tranexamic Acid were taken.

The obtained data were be entered in abstraction form and then transferred to Statistical Package for the Social Sciences (SPSS) computer program version 20 for analysis.



## **2.8 Variables**

1. Patient demographic information on age and sex
2. Number of patients who underwent THA and received TXA prophylaxis
3. Number of patients who underwent THA and didn't receive TXA prophylaxis
4. Number of units of transfused per each group
5. Duration of surgery
6. Preoperative Haemoglobin

## **2.9 Data Processing and Analysis**

1. The obtained data were entered and analyzed by Statistical Package for the Social Sciences (SPSS) computer program version 20.
2. Continuous data were summarized via means and standard deviation.
3. Categorical variables were summarized by frequency distributions and Chi-square was used to test for association and the association for continuous variables was done by using the t-test.
4. Using bivariate analysis, cross-tabulation was used to test the association between categorical variables.
5. The odds ratio was used to find the association of continuous data.
6. Statistical significance was set to a p-value of  $<0.05$

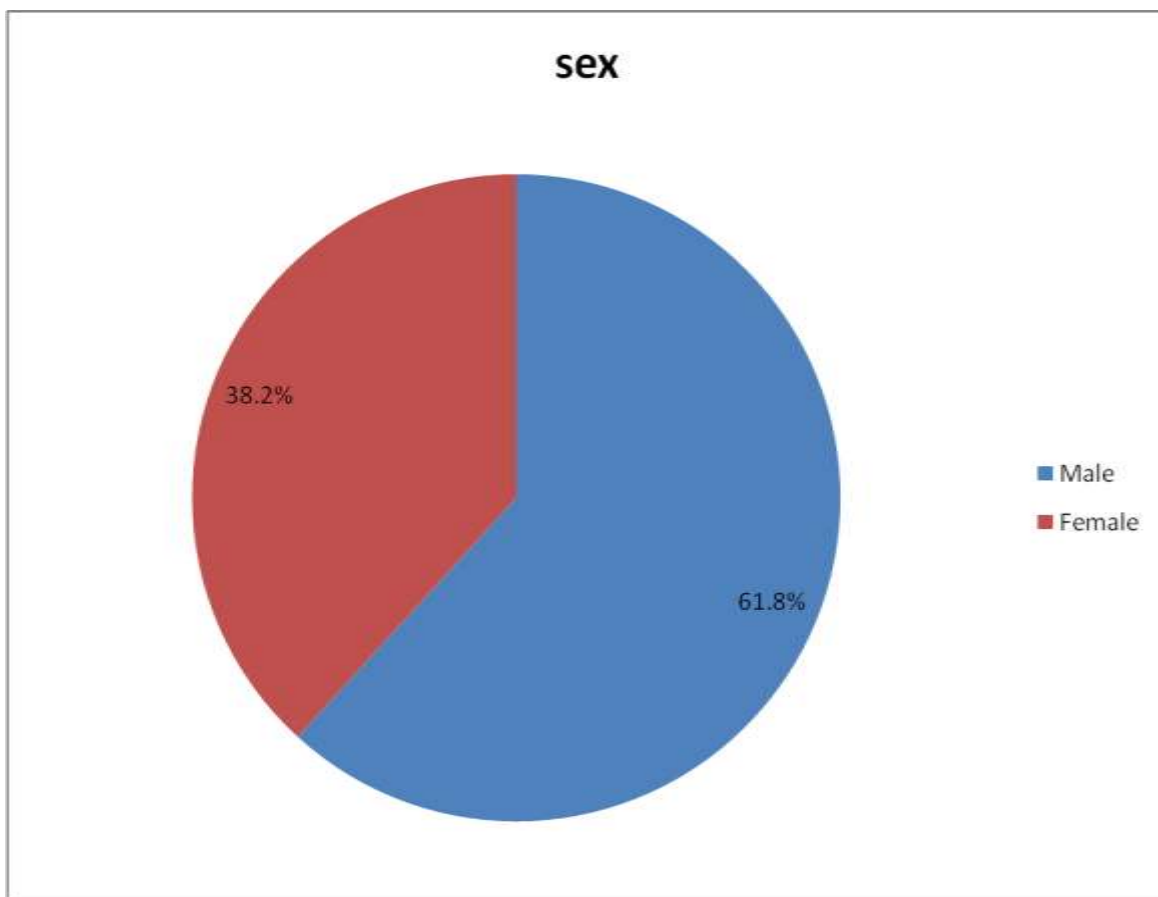
## **2.10 Ethical Issues**

Ethical clearance of extracting patient's information from the files and the electronic database was obtained from the MUHAS Institution board (IRB) and permission from MOI administration was obtained. During and after the study period, the patient's confidentiality was maintained. The obtained information was used for research purposes only.

## CHAPTER THREE

### 3.0 RESULTS

A total of 204 patients who underwent total hip Arthroplasty met the inclusion criteria and were recruited in the study, of those, 126 (61.8%) patients were male and 78 (38.2%) patients were female.



**Figure 1 : Socio-Demographic Characteristics of respondents (n= 204) for Sex**

**Table 1: Socio-Demographic Characteristics of respondents (n= 204) - Age**

<b>Characteristics</b>	<b>Number (%)</b>
<b>Age group</b>	
14-24	16 (7.8)
25-35	10 (4.9)
36-46	21 (10.3)
47-57	44 (21.6)
58-68	55 (27.0)
69-79	52(25.5)
80+	6 (2.9)
<b>Total</b>	<b>204(100%)</b>

The age ranged from 14 to 84 years with a mean age of 57 years and (SD 17). The majority of the patients were between 58 to 68 and 69 to 79years old which comprises 27.0% and 25.5% respectively.

**Table 2: Comparison of the proportion of patients who received blood transfusion postoperatively among those who received preoperative TXA as compared to those who did not receive preoperative TXA**

<b>Tranexamic Acid</b>	<b>BT</b>		
	<b>YES</b>	<b>NO</b>	<b>Chi-square, P-value</b>
<b>YES</b>	73(60.3%)	48(39.7%)	4.541, 0.033
<b>NO</b>	62(74.7%)	21(25.3%)	
<b>Total</b>	<b>135(66.2%)</b>	<b>69(33.8%)</b>	

The results show that those who received TXA the proportion of blood transfusion was 60.3% compared to those who did not receive TXA which was 74.7% with Chi-square 4.541 and P-value =0.033. This shows that there is an association between Tranexamic Acid and Blood transfusion and we reject the null hypothesis.

**Table 3: Correlations between blood transfusion and operation duration, haemoglobin (Hb) level, and age**

Control Variables		Op. duration	Hb. level	Age
BT Op. duration	Correlation	1.000	.028	-.025
	Significance (1-tailed)	.	.348	.360
	df	0	200	200
Hb.level	Correlation	.028	1.000	.136
	Significance (1-tailed)	.348	.	.027
	df	200	0	200
Age	Correlation	-.025	.136	1.000
	Significance (1-tailed)	.360	.027	.
	df	200	200	0

The results show that there is a strength of association between blood transfusion and haemoglobin level with Pearson correlation coefficient of 0.028 also there is a strength of association between blood transfusion and age with Pearson correlation coefficient of -0.025 because both are below 1 but no correlation between duration of operation because of the Pearson correlation is 1.

#### **Number of transfused units of blood among patients who underwent THA**

The results show that those patients who did not receive Tranexamic acid have the possibility of receiving one unit blood transfusion per patient while those who received Tranexamic acid have a range of blood transfusion of 0-1 unit blood per patient. With a p-value of 0.011 which shows that it is statically significant and Tranexamic acid showed to reduce the number of units of blood transfusion to patients who underwent THA.

## CHAPTER FOUR

### 4.0 DISCUSSION

Based on the statistical analysis the results from figure 1, show that the majority of participants who underwent Total Hip Arthroplasty were males with 61.8% as compared to females with 38.2%. Also results from table one in the age distribution, the majority of participants who underwent Total Hip Arthroplasty are between 47 to 79 years old which has big age group difference compared to another study conducted by Pedersen et al <sup>(19)</sup> which found age group difference of 70–79 years old.

Based on table two results, from this study among patients who received Tranexamic Acid preoperatively 60.3% of participants got blood transfusion post-THA. The findings suggest that Tranexamic Acid reduce the rate of blood transfusion to patients undergoing THA, but the finding of the rate of blood transfusion is higher when compared to the study which was conducted by Carling, Jeppsson, Eriksson, and Brisby<sup>(9)</sup> which found that transfusion rate was 18% among participants who receive preoperative Tranexamic Acid and also the prolonged operation time was associated with increased blood loss and transfusion rate but in this study there was no correlation between blood transfusion and time of operation. But other risk factors like preoperative haemoglobin level and age were the same in both studies which were associated with increased transfusion rate which in this study was shown in table three.

Also in this study among participants who underwent Total hip Arthroplasty 74.7% are the patients who received blood transfusion postoperatively but did not receive preoperative Tranexamic Acid. This shows that there is a higher rate of blood transfusion to participants who did not receive preoperative TXA. This was similar to the findings of another study conducted by Jans, Kehlet, Hussain, and Johansson <sup>(5)</sup> which found that allogeneic red cells (RBC) were administered to 92% of patients who underwent total hip arthroplasty without preoperative Tranexamic Acid. The findings have a negative effect on the reduction of blood transfusion due to a higher rate of blood transfusion post Total Hip Arthroplasty.

These results were similar to randomized control trial study which was conducted by Fernández-Cortiñas et al. (2018), which found that more blood transfusions were performed in the cohort that had not received preoperative Tranexamic acid (25.37%) compared with 4.48% in the group with tranexamic acid and the amount of perioperative blood loss was determined to correlate rate of blood transfusions but this study looked only into an effect of Tranexamic use on blood transfusion rate.

These findings suggest that the administration of Tranexamic Acid has shown to be an effective method of reducing postoperative blood transfusion to participants who underwent total Hip Arthroplasty. This result was expected due to Tranexamic Acid capacity in preventing bleeding during the surgery and hence reducing the rate of blood transfusion postoperatively. The finding suggested a P-value of 0.033 which is below the set p-value of 0.05 and this shows that there is a statistically difference in postoperative blood transfusion for post Total Hip Arthroplasty among TXA and non-TXA group. The statistical analysis shows that TXA reduces the need for blood transfusion for the patients undergoing THA.

The results show an Odds ratio of 0.515, meaning Tranexamic has shown to influence the reduction of blood transfusion by 0.515 times (OR=0.515, 95% CI= 0.279-0.952) and it is statistically significant with  $p=0.033$ . Also, the relative risk of blood transfusion when TXA is given is 0.808 times a relative risk of blood Transfusion when TXA not given is 1.568 times. This finding shows that TXA influence the reduction of postoperative risk of blood transfusion for those participants who receive preoperative TXA and is protective compared to those who did not receive preoperative TXA.

The results show that those patients who did not receive Tranexamic acid have the possibility of receiving one unit blood transfusion per patient while those who received Tranexamic acid have a range of blood transfusion of 0-1 unit blood per patient, which means that some patients who got TXA did not receive any unit of blood. With a p-value of 0.011 which shows that it is statistically significant meaning Tranexamic acid administration preoperatively reduces the need of blood transfusion to patients who underwent THA.

#### **4.1 Study Limitations**

1. Some of the chosen files of participants who did not receive Tranexamic Acid were not seen in the medical record.
2. Some files excluded from the study due to inadequate information

## CHAPTER FIVE

### 5.0 CONCLUSION AND RECOMMENDATION

#### 5.1 Conclusion

Perioperative bleeding is the major cause of blood loss in major orthopaedic surgeries that lead to increased blood transfusion demands and Tranexamic acid (TXA) has been introduced to reduce the need of blood transfusion to patients undergoing total hip arthroplasty (THA), this study was looking whether preoperative TXA administration reduces the need of blood transfusion in post THA patients.

The majority of patients who underwent THA were the males and the majority of the ages ranged between 47 to 79 years age

The results showed that patients who underwent THA and received preoperative TXA who have a blood transfusion rate of 60.3% which is lower compared to those patients who underwent THA and did not receive preoperative TXA have blood transfusion rate of 74.7%.

Also, the results showed that patients who did not receive TXA have the possibility of receiving one unit blood transfusion per patient while those who received TXA have a range of blood transfusion of 0-1 unit blood per patient.

The administration of preoperative TXA to patients undergoing THA has proved to be an effective method to reduce the need for postoperative blood transfusion. Therefore, Tranexamic Acid treatment could reduce the burden of active blood product donation to this Institution – MOI and reduce exposure to blood transfusion risks.

#### 5.2 Recommendations

1. Tranexamic Acid appears to be an important variable in major surgeries to reduce the number of transfusions, so should routinely be administered preoperatively in our practice at MOI.
2. Increase awareness for surgeons to improve on TXA practice and reduce the demand for blood products.



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**APPENDICES**

**Appendix I: Abstraction Form**

IDENTIFICATION NUMBER \_ \_ \_

**Put tick that applies**

1. Age----- (years)  
  
Gender            a) Male ( ) b) Female ( )
  
2. Received Tranexamic Acid prophylaxis before the operation? YES ( ) NO ( )
  
3. Did the patient receive a blood transfusion during or after the operation?  
  
YES ( ) NO ( ) If Yes how many units -----
  
4. The amount of blood loss during operation.....MLS
  
5. Preoperative level of Haemoglobin .....
  
6. Type of anesthesia did you receive? Spinal ( ) general ( )
  
7. Duration of operation?.....hours