Asian Journal of Orthopaedic Research

7(2): 28-34, 2022; Article no.AJORR.81809

Rate and Causes of Total Hip Arthroplasty Revision at a Reference Hospital in Tanzania 2008-2018

Amani Saguda Nilla [a,b], Mkala, Reuben Sunzu [b*], Emanuel B. Mtui [a,b,c], N. Jorgen Rutegard [d] and Billy T. Haonga [a]

[a] Muhimbili University of Health and Allied Sciences, Box 65001, Dar es Salaam, Tanzania.
[b] The Benjamin Mkapa Hospital, Box 11088, Dodoma, Tanzania.
[c] Nkinga Referral Hospital Tabora, Tanzania.
[d] Department of Surgical and Perioperative Sciences, Umea University, Sweden.

Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

Article Information

Open Peer Review History:
This journal follows the Advanced Open Peer Review policy. Identity of the Reviewers, Editor(s) and additional Reviewers, peer review comments, different versions of the manuscript, comments of the editors, etc are available here: https://www.sdiarticle5.com/review-history/81809

Original Research Article

Received 25 December 2021
Accepted 28 February 2022
Published 28 February 2022

ABSTRACT

Background: Total hip arthroplasty (THA) is one of the most successful orthopaedic procedures performed in both developed and developing countries with reported excellent long-term outcomes [1]. Despite good results, failures and need for revision continue to be a substantial problem after primary THA. The worldwide revision burden following primary total hip replacement is about 12.9% [2]. In Tanzania total hip arthroplasty procedures have been performed since 2004 at Muhimbili Orthopaedic Institute (MOI). However, neither the rate of revision nor its causes have been studied and published.
Methodology: This was a hospital based retrospective descriptive study which was conducted at MOI for a period of six months from August 2019-February 2020. The total study population was 950, operated on with total hip arthroplasty (THA) from 2008 to 2018. A systematic random sampling technique was used to obtain a sample size of 206 patients who were enrolled in this study. Demographic data, as well as other pertinent information were extracted from arthroplasty record books and patient's case notes by using the data extraction forms.
Results: The mean age of the 206 enrolled patients at the time of the study was 58.91±17.64 years (range 18-97 years). More than half (53.4%) were males. Fifteen (7.3%) of the patients had revision THA. Recurrent dislocation (N=7, 46.7%), periprosthetic fracture (N=4, 26.7%), aseptic

**Corresponding author: Email: rs.mkala13@gmail.com;*

loosening (N=3, 20%) and infection (N=1, 3.1%) were the indications for revision. On average the time interval between primary and revision total hip arthroplasty was found to be 4.47±2.80 years, with median 4.5 years (range <1-9 years).
Conclusion and Recommendations: The rate of THA revision at MOI from 2008 to 2018 was 7.3%. The main cause of THA revision at MOI was dislocation. In majority of the patients, the time period between primary and revision THA was 4.5 years or less. Further prospective and large studies should be conducted to establish and address the causes of dislocation and other complications following THA at MOI and other orthopaedic institutes.

Keywords: Rate of total hip arthroplasty revision; cause of total of hip arthroplasty revision.

1. BACKGROUND

Total hip arthroplasty (THA) is one of the most successful orthopaedic procedure performed in both developed and developing countries with excellent reported long term outcomes [1]. However, despite excellent results, failure and a need for revision remain a substantial problem following primary total hip replacement [1]. The worldwide revision burden following primary total hip replacement is about 12.9% (range; 7.3-16.6%) [2]. According to the Centre for Disease Control (CDC) in 2010, an estimated 2.5 million patients in the United States of America alone underwent THR and approximately 332,000 revision THR were being done every year [3]. An upswing in the demand for both primary and revision THR is anticipated over the subsequent several decades [3].

Revision total hip arthroplasty becomes necessary when the functional impairments of the artificial joint is accompanied by pronounced pain which severely restricts patients' activities and after all conservative and joint preserving therapeutic options have been exhausted [4]. In contrast to primary total hip replacement, the costs and complications following total hip arthroplasty revision are significantly increased and the outcomes are less favorable [5].

Despite poverty, some African countries such as Zambia, Malawi, Burkina Faso and Kenya have made significant progress in THR surgeries to the level of being able to perform even the complicated THR procedures [6]. However, the rate and causes of total hip arthroplasty revision has not been published in Africa including Tanzania. Therefore, the aim of the present study was to determine the rate and causes of THA revision at Muhimbili Orthopaedic Institute in Dar es Salaam, Tanzania, from 2008 to 2018.

2. METHODS

2.1 Study Design

This was a retrospective descriptive study that was conducted among patients who had total hip arthroplasty at MOI from 2008 to 2018.

2.2 Study Setting

MOI is the largest Orthopaedic, Trauma and Neurosurgery center in Tanzania with the main objective of providing tertiary health care services, both preventive and curative in the field of Orthopaedics, Traumatology and Neurosurgery. MOI provides both emergency and elective medical services. Total hip arthroplasty in Tanzania began in 2004 at MOI in Dar es Salaam.

2.3 Study Participants

From the total population of patients who had total hip arthroplasty at MOI from 2008-2018 (N=950) who were aged 18 years or above, in whom both primary and revision total hip arthroplasty were done at MOI from 2008-2018, a systematic random sampling technique was used to obtain a sample size of 206 patients who were enrolled in this study.

2.4 Study Protocol

Data extraction forms were used to extract information from total hip arthroplasty record books and from patient's case notes. The data from duly filled extraction forms were coded and checked for accuracy. A Microsoft Excel (Office 2010) database was developed with logic checks to ensure data quality.

2.5 Outcomes

The primary outcome was total hip arthroplasty revision due to any cause within 11 years (2008-2018).

From the enrolled 206 patients who underwent primary THA procedure at MOI from 2008-2018 the number of patients who had revision THA procedure was determined. The proportion (revision rate) was then determined by dividing the total number of patients who had revision THA (numerator) to the total number of patients who had primary THA (denominator). The causes of total hip arthroplasty revision (infection, aseptic loosening, periprosthetic fracture, recurrent dislocation and implant breakage) were presented as numbers and percentages. The time interval in years was obtained by substracting the age in years at primary THA from the age in years at revision THA. After data analysis, results were presented in tables and figures, interpreted and the study report was written.

3. RESULTS

A total of 206 patients who had total hip arthroplasty (THA) from 2008 to 2018 were enrolled in this study. The mean age of the patients at the time of the study was 58.91±17.64 years (range 18-97years). More than half (53.4%) were males (Table 1). Osteoarthritis accounted for 56.3% of the primary THA indications followed by avascular necrosis (23.3%) and fracture of the neck of femur (14.1%) (Table 2). About fifty five percent of primary THA were cement-less arthroplasty and the least were hybrid (Table 2). Fifteen (7.3%) of the patients had revision THA (Fig. 1). Recurrent dislocation (N=7, 46.7%), periprosthetic fracture (N=4, 26.7%) and aseptic loosening (N=3, 20%) were the most common indications for revision THA (Fig. 2). On average the time interval between primary and revision total hip arthroplasty was found to be 4.47±2.80 years (range <1-9 years). In about forty percent of patients, the time between primary and revision THA was 3 years or less (Fig. 3).

Six percent of patients who were 45 years or less had revision THA while 10.5% of those who were 61 years or more had revision THA. Ten percent of males had THA revision compared to 4.2% of females. About ten percent of patients who had cement-less arthroplasty, but only one patient who had hybrid arthroplasty, had THA revision. Nine percent of patients who had their primary THA due to osteoarthritis had THA revision compared to 4.4% of those who were operated on other indications. None of patients who had primary THA due to fracture of head or neck of femur but 8.3% of those who had avascular necrosis had THA revision (Table 3).

Table 1. Social demographic characteristics of the studied population (N=206)

Character	Frequency (n)	Percentage (%)
Age category (years)		
≤ 45	45	21.8
46 – 60	56	27.2
≥ 61	105	51.0
Sex		
Male	110	53.4
Female	96	46.6

Table 2. Indications for primary THA and type of primary THA recorded

Variable	Frequency (n)	Percentage (%)
Indication for Primary THA		
Osteoarthritis	116	56.3
Fracture of neck of femur	29	14.1
Fracture of head of femur	8	3.9
Avascular necrosis	48	23.3
Others	5	2.4
Type of primary THA		
Cemented arthroplasty	67	32.5
Cement-less arthroplasty	114	55.3
Hybrid	25	12.1

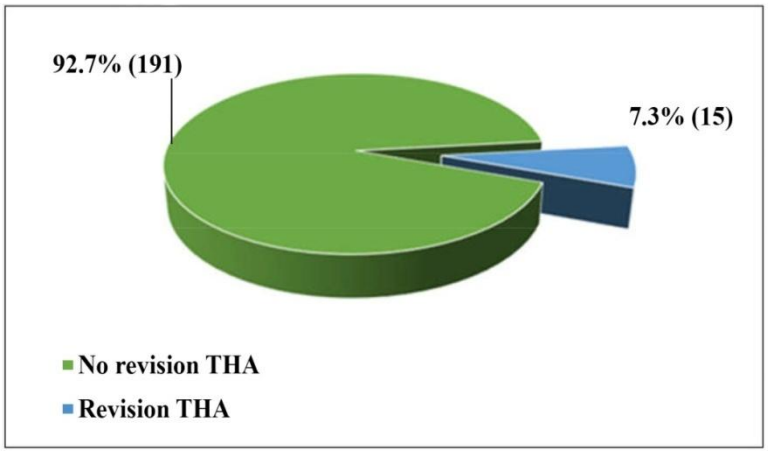

Fig. 1. Total hip arthroplasty revision at MOI from 2008-2018

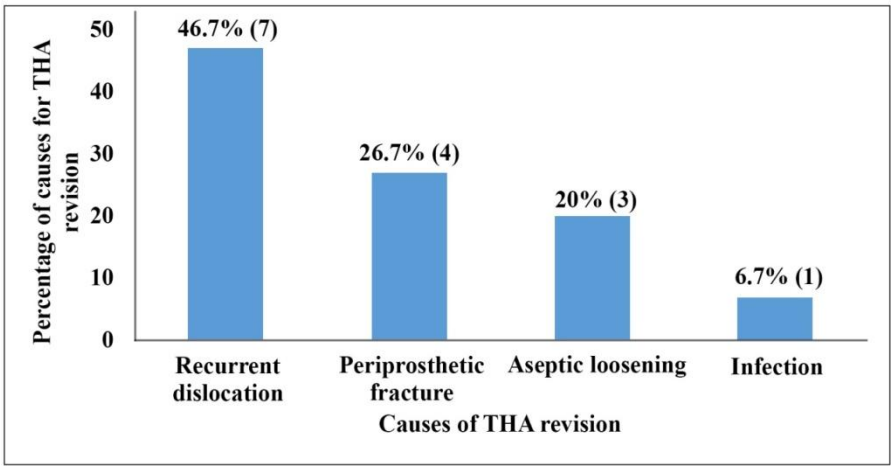

Fig. 2. Causes of total hip arthroplasty revision at MOI from 2008-2018

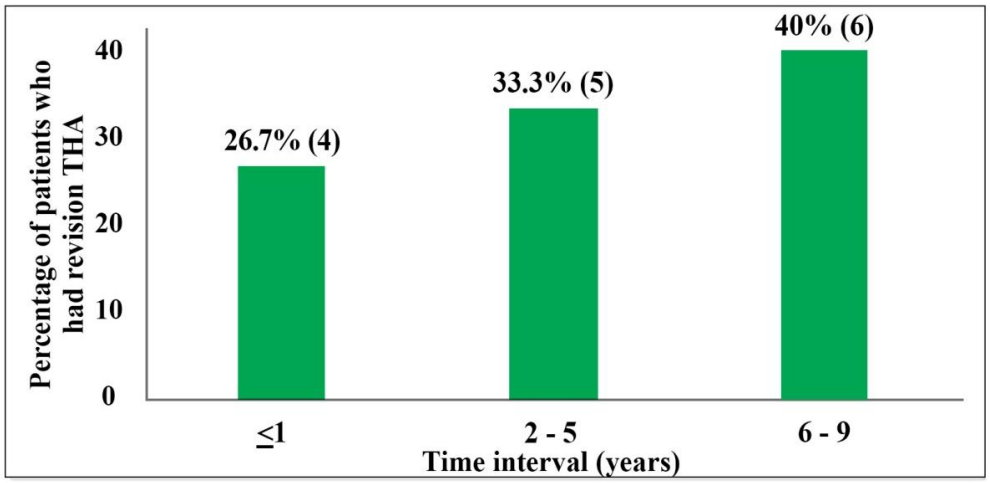

Fig. 3. Time interval between primary and revision THA at MOI from 2008-2018

Table 3. Factors associated with THA revision at MOI

Variable	THA REVISION		Total
	Yes	No	
	15	**191**	
Age category (years)			
≤ 45	3	42	45
46 – 60	1	55	56
≥ 61	11	94	105
Sex			
Male	11	99	110
Female	4	92	96
Type of primary THA			
Cemented arthroplasty	2	65	67
Cement-less arthroplasty	12	102	114
Hybrid	1	24	25
Indication for Primary THA			
Osteoarthritis			
Yes	11	105	116
No	4	86	90
Fracture of neck of femur			
Yes	0	29	29
No	15	162	177
Fracture of head of femur			
Yes	0	8	8
No	15	183	198
Avascular necrosis			
Yes	4	44	48
No	11	147	158

4. DISCUSSION

The rate of total hip arthroplasty (THA) revision observed in this study was 7.3%, similar to the world wide rate. The findings of this study were also comparable to the revision rate of THA which was observed in the United States of America according to the American Joint Registry Report (AJRR) published in 2016 [7]. In addition, these findings are not dissimilar to the values presented from other large national arthroplasty registries although varying from 7.3-16.6% [7,8].

Recurrent dislocation was the most common indication for revision THA observed in this study. In contrast, an investigation done by Jacob et al in 2014, in which the researcher reviewed patients who underwent THA revision surgery over an 8-years period of follow up, it was found that more than half of revisions were due to aseptic loosening, whereby recurrent dislocation and osteolysis around a well-fixed implant were the second and third causes, respectively [9]. In concordance, Ulrich et al in 2008 reported on patients who underwent revision THA over a 6-years follow up period, and found that half of revisions resulted from aseptic loosening followed by instability and few from infections [10].

Similar rate of causes was found in a study from USA [11]. However, our findings were different from the 2013 Swedish national registry study report, which revealed that patients who had THA revision had recurrent dislocation as the second indication, well behind aseptic loosening which accounted for the majority [12]. On the other hand, the rate of THA revision due to dislocation was fifth in the list of causes of revisions as it was highlighted in the study by Girard in France in 2013. This rate is noticeably lower than that in the literature for the incidence and ranking of this cause of revision [13].

In another study which was conducted in Ethiopia in the course of reviewing THA cases done in the country, Lewis et al followed his patients for 5.5 years and found that dislocation and infections were the two leading causes of revision following primary THA [14]. The observation in the present study that recurrent dislocation accounted for the majority of THA revision can be explained by patient factors,

surgeon factors and implant factors which need to be established.

In this study, the time period between primary and revision THA in majority of the patients was 4.50 years or less. Similar findings were obtained in Tunisia, where a study was done to analyze the causes of revision after primary THA as well as the time interval between primary and revision THA. Their study revealed that seventy five percent of revisions occurred within 3.11-4.50 years of index THA [15].

5. STUDY LIMITATION

The low number of patients with revision THA permits only descriptive analysis and limits the generality of the study. Due to the retrospective nature of the study and the lack of electronic records some patients' information was inadequate.

6. CONCLUSION

The rate of THA revision in a random sample of patients, at MOI from 2008 to 2018 was 7.3%. The main cause of THA revision at MOI was dislocation. In majority of the patients, the time period between primary and revision THA was 4.5 years or less.

CONSENT

It is not applicable.

ETHICS APPROVAL

Ethical approval was obtained from MUHAS Institutional Review Board (IRB) and permission to conduct the study at MOI was sought from MOI administration**.**

AVAILABILITY OF DATA AND MATERIAL

The dataset supporting the conclusion of this article is available from the authors on request.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

REFERENCES

1. Sean S. Rajaee,Joshua C. Campbell, James Mirocha, Guy D. Paiement. Increasing burden of total hip arthroplasty revision in patients beteen 45 and 64 years of age. The Journal of Bone and Joint Surgery. 2018;100:449-458.
2. Kurtz S, Ong K, Lau E, Mowat F, Helpernm. Projection of primary and revision hip and knee arthroplasty in the United States of America from 2005 to 2030. The Journal of Bone and Joint Surgery. 2007;89:780-785.
3. Patel AG, Pavlou RE, Mújica-Mota AD. Toms. The epidemiology of revision total knee and hip arthroplasty in England and Wales. A comparative analysis with projections for the United States. A study using the national joint registry data set. Bone Joint J. 2015;97:1076–1081.
4. Cornelia Seidlitz, Miriam Kip. White Paper on Joint Replacement, Introduction to Indications and Procedures 2018;10:7-8.
5. Barnett AJ, Toms AD. Revision total hip and knee replacement. Clin Geriatr Med. 2012;28:431-446.
6. Mulimba JAO. Is hip arthroplasty viable in a developing African country? East Central African Journal of Surgery. 2007;12:30-31.
7. American Joint Replacement Registry. Annual Report. 2016;13-15.
8. Ngianga-Bakwin Kandala, Ruth Pulikottil-Jacob, Paul Sutcliffe, Michael J. Crowther, Amy Grove, Hema Mistry, Aileen Clarke. Setting benchmark revision rates for total hip replacement: Analysis of registry evidence. British Medical Journal. 2015; 350:3-16.
9. Jacob A. Haynes, Jeffrey B. Stambough, Adam A. Sassoon, Staci R. Johnson, John C. Clohisy, Ryan M. Nunley. Contemporary surgical indications and referral trends in revision total hip arthroplasty: A 10-year review. The Journal of Arthroplasty. 2016; 31:622-5.
10. Slif D. Ulrich, Thorsten M. Seylerm, Michael A. Mont. Total hip arthroplasties: What are the reasons for revision? Int. Orthop. 2008;32:597-604.
11. Bozic Kevin J, Kurtz, Steven M, Lau, Edmund, Ong, Kevin, Vail, Thomas P. Berry, Daniel J. The epidemiology of revision total hip arthroplasty in the United States. 2009;91:128-133.
12. Malchau H, Herberts P. Prognosis of total hip replacement. The Swedish National Hip Arthroplasty Register 2013. Proceedings American Academy of Orthopedic Surgeons. Atlanta. 2013;8:27-45.

13. Girard J, Kerna G, Migauda H, Delaunay C, Ramdane N, Hamadouche M. Primary total hip arthroplasty revision due to dislocation: Prospective French multicenter study. Journal of Orthopaedics and Traumatology, Surgery and Research. 2013;99:549-553.
14. Lewis Katz, Eric C. Gokcen, Biruk L. Wamisho. Total hip replacement in Ethiopia, East and Central African Journal of Surgery. 2017;22:35-37.
15. Tebourbl A, Elloumi A, Hadhrl K, Salah M, Nefiss M, Bouzidl R, Kooll M. Total hip arthroplasty loosening due to mycobacterium turberclosis. A case study and Review of Literature. Joint Implant Surgery & Research Foundation, Reconstructive Review. 2017;7:40-43.

Peer-review history:
The peer review history for this paper can be accessed here:
https://www.sdiarticle5.com/review-history/81809