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Original Article

Patient Self-reported Functional Outcomes after Total Hip Arthroplasty: Insights from a Tertiary Hospital in Ethiopia

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Abstract

Background: *Total hip arthroplasty (THA) is one of the most frequently performed procedures in orthopedic surgery where both the acetabular and femoral parts are replaced with a prosthesis. It is most often performed to relieve pain and restore function in patients with severe traumatic or non-traumatic hip pathologies.*

Objectives: *The primary objective was to investigate the functional outcomes of total hip arthroplasty with a minimum follow-up of one year after the procedure.*

Methods: *The modified Harris Hip Score (mHHS), Oxford Hip Score (OHS), EQ-5D and the Standard Version of the Short Form (SF) 36 outcome measures were used. Patients who underwent total hip arthroplasty from September 2017 to July 2023 were included. The functional outcomes of hip arthroplasty were expressed as frequency distribution, mean, and Median (IQR) depending on the nature of the variable. SPSS software version 27 was used for analysis. A p-value less than 0.05 was considered significant.*

Results*: This study included a total of 63 patients with an average follow-up of 45 months (3.75 years). There were more male patients (47, 74.6%). The mean age at the time of surgery was 48.6 years. The most common indication for THA was advanced osteoarthritis (40 patients, 63.5%). There was one case of dislocation and one revision due to infection.Mean scores of mHHS, OHS, and SF- 36 were 89.7, 43, and 88.9, respectively which indicates satisfactory joint functional outcome and a good quality of life.*

Conclusion*: Total hip arthroplasty is an effective treatment option for people with severe hip pain and disability at Tikur Anbessa Specialized Hospital with satisfactory outcomes. Proper documentation of outcome measures including preoperatively and on follow-up at 3 months, 6 months, 1 year, 2 years, 5 years, and 10 years is recommended to scale up and include the service to other hospitals to make it available for timely service.*

Keywords*: Total hip arthroplasty, Functional outcome, Harris hip score, THA, Hip surgery*

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Introduction

Total hip arthroplasty (THA) is one of the most frequently performed procedures in orthopedic surgery. It involves femoral and acetabular components made from various materials, with a multitude of available designs (1). It is most often performed to alleviate pain and restore function for patients with extensive hip joint damage caused by conditions such as osteoarthritis, rheumatoid arthritis, avascular necrosis, traumatic arthritis, certain hip fractures, or benign and malignant bone tumors. This procedure has the potential to substantially improve quality of life (1,2). Advancements in joint replacement surgical techniques and technology have greatly enhanced the effectiveness of total hip replacement (3).

Unlike developed nations where the benefits of THA are enjoyed, developing nations like Ethiopia lag in adequately providing it (4), leading to prolonged waiting times and complications for the patient (5). A literature review conducted in sub–Saharan Africa shows that the outcomes of THA are not well studied (6).

Typically, functional outcomes of THA are assessed using the modified Harris Hip Score (mHHS), short form (SF)-36 (7), Oxford Hip Score (OHS), and EQ-5D, which are influenced by patient characteristics (8). The large majority of patients who undergo the operation experience improved quality of life (9). The improvement in quality of life after orthopedic interventions is as-

sessed using outcome measures (10). The quality of life after total hip arthroplasty reported in a study conducted by Wiklund I and Romanus B showed that it is comparable with that of a healthy reference group of similar age and sex distribution (11).

In a study in the US, 85% of THA patients were well functioning well at 20 years (12). Another study reported an average HHS of 89.4 at follow-up (13). In the Swedish hip arthroplasty registry of 1996, arthritis (OA, post-traumatic, and rheumatoid) and avascular necrosis (AVN) accounted for over 95% of THR indications (14).

Due to improvements in health services, the life expectancy of the Ethiopian population has increased from 39.9 years in 1960 to 64 and 67 years for males and females, respectively in 2016 (15). According to the World Health Organization, the life expectancy at birth in Ethiopia has increased to 67.81 years as of 2023 (15). As most indications for THA are age-related, the demand for THA is expected to increase. Studies have shown that THR is a viable, safe, and effective option in Ethiopia (4).

Tikur Anbessa Specialized Hospital has been providing THA services since 2017 with its own THA surgical set. However, the functional outcomes of these procedures have not been studied yet. Therefore, this study aimed to evaluate the patient self-reported functional outcome of THA at Tikur Anbessa Specialized Hospital.

Patients and Methods

Study Setting and Period

Tikur Anbessa Specialized Hospital (TASH) is a public hospital located in Addis Ababa, Ethiopia. The orthopedic department was established in 1987 and has 75 beds in the adult and pediatric orthopedic wards.

Total hip arthroplasty (THA) surgery was first performed at TASH in 2005 by expatriates using donated implants. In 2017, TASH acquired its own set of THA implants and began performing the surgery independently.

The study was conducted between July 30, 2023, and September 30, 2023. All patients who underwent total hip arthroplasty from 2017 to July 2022 were included in the study.

Study Design

An observational retrospective cohort design was used.

Selection of Study Participants

All patients who underwent total hip arthroplasty at TASH were considered the source population. The study participants were patients who underwent THA at TASH during the period of September 2017 and June 2022 and those who fulfilled the eligibility criteria.

Eligibility criteria

Patients for whom total hip arthroplasty was done and who have a minimum of one-year follow-up were included in the study. Patients who did not give consent, who were seriously ill to give the required information, patients with psychiatric conditions, and those who have physical disability that limits movement were excluded from the study

Data Collection Procedure:

The patient list was compiled from operating theater logbooks. Socio-demographic, disease conditions and treatment-related data were collected from patient charts and directly from patients via phone interviews. A chart abstraction tool that consisted of socio-demographic characteristics, disease conditions, and treatment was used to collect data from patient charts. Data collection from patients was conducted through phone interviews (16) to complete the outcome-measuring tools mentioned above. The questionnaire was developed using KoboToolbox, a free and open-source software platform for data collection and management. It was adapted from the EtJoint registry, an ongoing joint registry process. It consisted of four parts: sociodemographic characteristics, disease condition, treatment condition, and outcome measuring tool questions. The questionnaire was initially prepared in English and then translated into Amharic. Verbal consent was obtained before data collection via phone call and recorded in KoboToolbox.

Data Processing and analysis

The collected data were extracted from KoboToolbox and imported into IBM SPSS Statistics version 27 for analysis. The data were then cleaned, transformed, and made ready for analysis.

The Shapiro-Wilk normality test was used to check for skewness in the descriptive variables since our sample size is small. A p-value less than 0.05 was considered significant.

Skewed variables were described using robust descriptive statistics such as the median with interquartile range (IQR) that accounted for outliers and non-normality. In contrast, normally distributed variables were described using the mean and standard deviation.

Ethical considerations

This retrospective study analyzed existing data collected from surgical logbooks, medical records, and phone interviews. It did not influence patient treatment and any potential risks to patient safety were considered minimal. Due to the anonymous nature of the data and logistical challenges associated with

contacting individuals from a historical record, obtaining written informed consent was deemed impractical. The study received a waiver of written informed consent from the department's ethical review committee. Data privacy and confidentiality were ensured through anonymous data recording, analysis, and manuscript writing. Participants were informed about the study through phone calls.

Results

Background characteristics

This study included a total of 63 patients with an average follow-up of 45 months (3.75 years), ranging from 12.7 months (1 year) to 71.7 months (6 years). There were more male patients (47, 74.6%) than females (16, 25.4%). The mean age at the time of surgery was 48.6 years (ranging from, 24 to 78 years), and the majority (42, 66.7%) were between the ages of 50 and 59. The median BMI was 22.8 with an interquartile range of 4.075 (Table 1).

Comorbidities: The most common medical comorbidities were hypertension (12 patients, 19%) and diabetes mellitus (7 patients, 11.1%). One patient was HIV positive and had started antiretroviral therapy (ART) before the procedure. The indication for implantation in this particular patient was a femoral neck fracture.

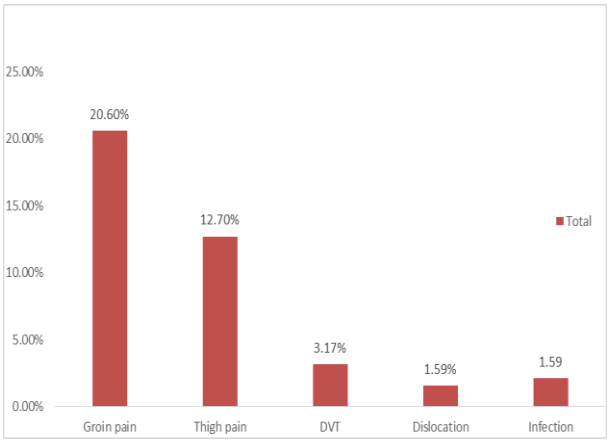
	N	%
Age category		
24-29	3	4.8
30-39	6	9.5
40-49	12	19
50-59	42	66.7
Patient origin (residency)		
Addis Ababa	41	65.1
Oromia Region	13	20.6
Amhara Region	4	6.3
SNNPR	3	4.8
Gambella	2	3.2
Comorbidities		
Hypertension	12	19
Diabetes Mellitus	7	11.1
HIV	1	1.5
Indications for THA		
Osteoarthritis	40	63
Avascular Necrosis	7	11
Previous Tuberculosis	6	10
Femoral Neck Fracture	5	10
Dysplasia	3	5
Ankylosing Spondylitis	1	2

SNNPR: Southern Nations Nationalities Peoples' Region
THA: Total Hip Arthroplasty

Table 1 : Background characteristics of study participants

Forty-one (65.1%) patients were from the capital city, Addis Ababa, while 13 (20.6%) were from the Oromia Region. The remaining patients were from the Amhara Region (4 patients, 6.3%), Southern Nations Nationalities Peoples' Region (3 patients, 4.8%), and Gambella Region (2 patients, 3.2%). The average waiting time for surgery after the decision was made and the patient was booked for THA was 4.54 years, with a range of 0 to 10 years.

Indications: The most common indications for THA are depicted in Table 1. Bilateral total hip arthroplasty (THAs) accounted for 19% (n=12) of all THAs, while



right- and left-sided THAs accounted for 46.0% (n=29) and 34.9% (n=22), respectively.

Figure 5: Complications

Outcome: The modified Harris Hip Score was skewed with a median of 93.4 (IQR= 14), and a mean of 89.7. The Oxford Hip Score had a median of 45 (IQR=7) and a mean of 43.

The average SF-36 score was 88.9, with domain average scores as follows: general health (90.0), physical functioning (88.9), role physical (90.1), bodily pain (88.7), vitality (79.1), social functioning (87.7), role emotional (90.0), and mental health (92.0). The data were skewed, with a median SF-36 score of 93.3 and domain median scores as follows: general health (95), physical functioning (90), role physical (100), bodily pain (90), vitality (80), social functioning (100), role emotional (100), and mental health (100).

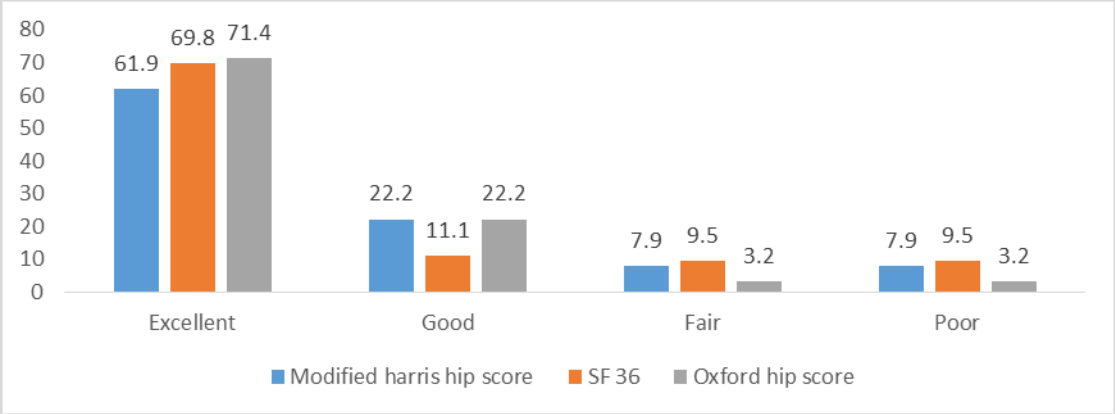


Figure 6: Percentage of cases in each outcome measure by category. The numbers are in percent. Excellent (>90%), good (80-89%), fair (70-79%) poor (<70%).
NB. Oxford Hip Score is converted to 100% for the purpose of comparison with other outcome measures.

EQ-5D result: 27 (42.9%) of patients responded 11111, which is the best possible health state on the EQ-5D. EQ VAS measure of overall self-rated health status was skewed with a median of 85, which is high; interquartile range of 17 indicates a wide range of self-rated health scores (Table 2 and Figure 7).

Table 2: Self-reported functionality

Levels	**Dimensions**				
	Mobility n (%)	Self-care n (%)	Usual activity n (%)	Pain/discomfort n (%)	Anxiety/ depression n (%)
Level 1 (No problems)	50(79.37)	51(80.95)	40(63.49)	34(53.97)	56(88.89)
Level 2 (Slight problems)	7(11.11)	11(17.46)	22(34.92)	20(31.75)	7(11.11)
Level 3 (Moderate problems)	5(7.94)	1(1.59)	0	8(12.7)	2(3.17)
Level 4 (Severe problems)	1(1.5%)	0	1(1.59)	1(1.59)	0
Level 5 (Extreme problems /unable to do)	0	0	0	0	0
Total	63(100)	63(100)	63(100)	63(100)	63(100)

Most patients in the study (53 patients, 84.1%) were able to walk without a walking aid. The remaining patients (9 patients, 14.3%) used a walking aid, but did not need help from others to walk.

The most commonly used implant sizes were 32 mm-3.5 head, 52mm acetabulum shell, and number 9 stem diameter.

Discussion

Research on the outcomes and number of total joint replacements (TJRs) performed in sub-Saharan Africa (SSA) is limited (18). One study (19) reported a 3% dislocation rate in a series of 300 total hip replacements, while another study conducted in Ethiopia by reported 4% total hip replacement (THR) prostheses dislocated due to a fall accident (11). One was reduced closed, without surgery, and the other required surgical reduction due to delayed presentation (4). In our study, there was one case of dislocation was treated with closed reduction as it presented acutely. An article from Kenya reported a superficial infection of 2% and a deep infection rate of 1% (20), which is comparable to a deep infection rate of 1.6% in our study. Another study done in Ethiopia has also found a similar infection rate as our study (11).

In our study, the major indication for total hip arthroplasty was osteoarthritis accounting for 63% (n=40) of cases. Similarly, Gokcen EC and Wamisho BL reported osteoarthritis as the major indication in 44% of cases (4).. Another study by found osteoarthritis to be the primary diagnoses (94.8%) (17). In contrast, the Malawi hip registry report showed the primary diagnosis to be AVN, accounting for 48.6%.

Arthroplasty outcomes in sub-Saharan Africa are underreported, but available literature suggests that arthroplasty can be successful in this region (18,20). Among African reports, one study found the mean and median mHHS of 86.6 and 88 in South Africa (17). Similarly, Gokcen EC and Wamisho BL found an average mHHS at follow-up at Cure Hospital, Ethiopia to be 88.7, which is comparable to our finding of mHHS 89.7 (4). We found a mean OHS of 43, showing a slight improvement from the report by Gokcen EC and Wamisho BL (4).

The EQ-5D results suggest that a significant proportion of patients (42.9%) reported full health after THA, indicating that THA can be a very effective treatment for people with severe hip pain and disability.

The SF-36 results with an average score of 88.9 which is in the upper range of good, suggest that patients who underwent THA experienced significant improvements in their quality of life post-surgery.

Overall, all outcome measures show a significant improvement in health state, demonstrating that total hip arthroplasty is safe and effective.

Limitations

One of the limitations of this study is that it has a small sample size. Study participants may be prone to recall bias.

Conclusion

Total hip replacement (THR) surgery is an effective treatment option for individuals experiencing severe hip pain and disability at Tikur Anbessa Specialized Hospital, yielding satisfactory outcomes. Proper documentation of outcome measures including preoperatively and on follow-up at 3 months, 6 months, 1 year, 2 years, 5 years, and 10 years is recommended to scale up and include the service to other hospitals to make it available for timely service. Initiating a national hip registry for patient complete data follow-up is also recommended.

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