



## Original Article



## Physical Activity among Middle-aged Adults after Total Hip Arthroplasty Following One Year

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## ABSTRACT

Total hip arthroplasty is one of the common surgical procedures that is used to treat the diseases of the hip joint and improve mobility and physical activity. Evaluating the physical after total hip arthroplasty is critical to understanding recovery and outcomes for long-term effectiveness. **Objective:** To evaluate physical Activity after total hip arthroplasty following one Year. **Methods:** The questionnaire-based descriptive case series included 50 subjects (27 Male and 23 Female) after total hip arthroplasty. The sample size was collected using the WHO calculator. Physical Activity and pain were evaluated using the Harris Hip Score. The data were analyzed using SPSS version 20. **Results:** Middle-aged patients aged 55-65 years were evaluated using the Harris Hip Score. Physical Activity was gradually fair to good in patients with total hip arthroplasty following one Year. In 50 patients of THA, the grades of total Harris hip score were with 14 patients (28%) in Poor grade (<70), 17 patients (34%) in Fair grade (70-79), 18 patients (36%) in Good grade (80-89) and one patient (2%) in Excellent grade (90-100). **Conclusions:** It was concluded that the majority of middle-aged adults, after total hip arthroplasty, presented with fair to good (34% & 36%) physical activity following one Year.

## INTRODUCTION

Total hip arthroplasty is one of the most significant and successful surgical procedures. It is considered one of the most successful surgeries to treat degenerative hip conditions in the last thirty years [1]. Total hip arthroplasty is the landmark of modern surgical history and clinical results. It improves Physical Activity, pain, and quality of life [2]. Total hip arthroplasty is a successful and cost-effective procedure in orthopedic surgeries. There is a significant increase in total hip arthroplasty procedures globally among young patients, which is to improve physical activity, physical demands, and quality [3]. Physical Activity, as described by the World Health Organization, is any movement of skeletal muscles that results in the use of

energy [4]. Adequate PA brings along benefits such as enhanced mobility, highlighted resistance to falls, highlighted resistance to death, and enhanced mental health. Individuals suffering from hip and knee OA are generally less likely to engage in activities that promote Physical Activity [5]. Maintaining sufficient PA reduces OA pain and tackles other activity-related comorbidities like obesity, cardiovascular diseases, and diabetes [6]. The general knowledge about the improvement of physical Activity as one of the significant measures to lessen pain and improve the range of movement among patients with OA of the hip or knee is undoubtedly true. According to the International Surgical Outcomes, the patient who



underwent orthopedic surgery had complications [7]. This is particularly taking into consideration the complications that occur in total hip arthroplasty (THA). There is evidence supporting the fact that complications following THA contribute to higher hospital length of stay, reduced mobility, and other adverse effects [7]. The HHS (Harris Hip Score) was designed to make quantitative measurements of hip surgery results, and it is aimed at gauging several kinds of hip disabilities. These include the area of pain, functional status, no deformity present, and flexibility of the affected part [8]. The pain domain describes the degree of pain and how it impacts severity levels, while the function domain embraces daily functioning. Sixteen of the items, in total, each have a maximum of one hundred points [9]. The degree of pain is the primary consideration when considering the recommendation for THA [10]. Self-reported pain is commonly evaluated by disease-specific measures when evaluating the effectiveness of care. The objective of pain relief is also established at 3, 6, 9, and 12 months following THA [11]. The patients may get long-term pain even after being treated with total hip arthroplasty. THA is the ultimate answer to many prolonged-standing hip joint disorders, and based on the above findings, most of the patients achieve notable improvements in functional performance and pain levels [12]. Acute post-surgical pain is a severe reason behind the bothersomeness of particular individuals [13].

This study aims to contribute to the knowledge of post-total hip arthroplasty physical activity by examining it after one year. It may help the physical therapist plan the rehabilitation process and identify vital components, namely stability, mobility, and balance.

## METHODS

The descriptive case series study was conducted after ethical approval. The approval of the study was followed by the IRB letter from the ethical review committee of Lahore College of Physical Therapy with reference number 22199. We used non-probability convenience sampling to collect data from the Ghurki Trust Teaching Hospital. 50 patients were included in the study. The study was conducted in 6 months between 02/05/2022 and 02/11/2022 after IRB approval. The inclusion criteria included patients between 55 and 65 years of age, both male and female, unilateral total hip arthroplasty due to OA, a posterior surgical approach with cemented fixation, and an inserted metal prosthetic implant. Exclusion criteria included the Prior total joint arthroplasty of any joint (hip, ankle, knee), Revision of total hip arthroplasty (THA), Severe musculoskeletal impairments, and Psychiatric illness. Information and data were collected via the Harris Hip Score in domains of pain, physical limitation, fixed deformities, and degree of movement. The data were analyzed via SPSS version 20.0. A non-probability convenience sampling technique was used for the

statistical analysis. Consent was obtained from patients orally and in writing. The sample size was calculated by using World Health Organization (WHO) software under the following formula:  $0.07 \text{ prevalence (P)} [14], 95\% \text{ confidence interval } (1-\alpha), \text{ and } 0.08 \text{ precision (d)}$ . To evaluate the differences in the Harris Hip Score across the age group and gender, the Mann-Whitney U test was followed because of the ordinal and non-parametric nature of the data. Statistical significance was followed by using the two-tailed test, with the  $p\text{-value} < 0.05$ , which was considered statistically significant.

## RESULTS

Out of 50 patients, 70 % (n=35) fall into the Age of 55-60 years, and 15 (30%) fall into the Age of 61-65 years. 27 (54%) were male and 46% (n=23) were female (Table 1).

**Table 1:** Descriptive Statistics of Demographics

Characteristics	Frequency (%)
<b>Age</b>	
55-60 Years	35 (70.0%)
61-65 Years	15 (30.0%)
<b>Gender</b>	
Male	27 (54.0%)
Female	23 (46.0%)
Total	50 (100.0%)

Out of 50 patients, 4 (8%) had no pain, 19 (38%) with slight pain, 24 (48%) with mild pain and 3 (6%) were with moderate pain. Out of 50 patients, 2 (4%) were using no supporting device, 32 (64%) were using a cane for prolonged walking, 15 (30%) were using the cane for most of the time in most activities, and 1 (2%) were using one crutch. Out of 50 patients, 3 (6%) were able to walk unlimited distances, 33 (66%) were able to walk six blocks (30 minutes), 13 (26%) were able to walk three blocks (10-15 minutes) and 1 (2%) able to walk indoors only. Out of 50 patients, 28 (56%) had no limp, 20 (40%) had a slight limp, and 2 (4%) had a moderate limp. Out of 50 patients, 6 (12%) were able to do activities with ease, 32 (64%) had difficulty doing those activity, and 12 (24%) were unable to do those activities. Out of patients, 3 (6%) were climbing stairs without a railing, 45 (90%) were using a railing to climb stairs, 1 (2%) were unable to do stairs, and 1 (2%) were in any manner. Out of 50 patients, 36 (72%) were able to sit in an ordinary chair for one hour, 13 (26%) were able to sit on a high chair for 30 minutes, and 1 (2%) were unable to sit on a chair with comfort. Out of 50 patients, 50 (100%) had less than 3.2 cm LLD. Out of 50 patients, 1 (2%) were in the range of flexion 45>55 degrees, 1 (2%) with 55>65 degrees, 10 (20%) with 65>75 degrees, 13 (26%) with 70>75 degrees, 20 (40%) with 75>80 degrees and 5 (10%) with 80>90 degrees. Out of 50 patients, 2 (4%) were with a range of total external rotation of 0>5 degrees, and 48 (96%) with a range of 5-10 degrees. Out of 50 patients, 4 (8%) fall in the range of 0>5 degrees of total Adduction, and 46 (92%) with a range of 5>10 degrees (Table 2).

**Table 2:** Descriptive Statistics of Domains of Harris Hip Score

Domain	Frequency (%)
<b>Pain</b>	
No pain	4 (8.0%)
Slight	19 (38.0%)
Mild	24 (48.0%)
Moderate	3 (6.0%)
<b>Supportive Device</b>	
None	2 (4.0%)
Cane for Long Walks	32 (64.0%)
Cane Most Times	15 (30.05)
One Crutch	1 (2.0%)
<b>Distance Walked</b>	
Unlimited	3 (6.0%)
Six Blocks	33 (66.0%)
Three Blocks	13 (26.0%)
Indoors Only	1 (2.0%)
<b>Limp</b>	
None	28 (56.0%)
Slight	20 (40.0%)
Moderate	2 (4.0%)
<b>Activities - Shoes, Socks</b>	
With Ease	16 (32.0%)
With Difficulty	22 (44.0%)
Unable	12 (24.0%)
<b>Climbing Stairs</b>	
Without Railing	13 (26.0%)
With Railing	35 (70.0%)
Unable	1 (2.0%)
In Any Manner	1 (2.0%)
<b>Using Public Transport</b>	
Able	23 (46.0%)
Unable	27 (54.0%)
<b>Sitting</b>	
Comfortable	36 (72.0%)
High Chair	13 (26.0%)
Unable	1 (2.0%)
<b>Less Than 30 Degrees Fixed Flexion</b>	
Yes	50 (100%)
<b>Fixed Adduction Less Than 10 Degrees</b>	
Yes	50 (100%)
<b>Total Flexion</b>	
45>55	1 (2.0%)
55>65	1 (2.0%)
65>70	10 (20.0%)
70>75	13 (26.0%)
75>80	20 (40.0%)
80>90	5 (10.0%)
<b>Total Abduction</b>	
0>5	2 (4.0%)
5>10	2 (4.0%)
10>15	46 (92.0%)

<b>Total External Rotation</b>	
0>5	2 (4.0%)
5>10	48 (96.0%)
<b>Total Adduction</b>	
0>5	4 (8.0%)
5>10	46 (92.0%)

The median Score was about 78 (IQR: 72–82) in the male and 74 (IQR: 70–78) in the female. That difference was significant statistically (Mann-Whitney U=220.5, p=0.032), indicating that the male patients showed better post-operative physical functions and outcomes. Patients aged 55–60 years have a median Harris Hip Score of about 76 (IQR: 70–80), those aged 61–65 had a median of 72 (IQR: 68–76). The difference was statistically significant (Mann-Whitney U=210.0, p=0.045), suggesting that the younger patients in the middle-aged cohort achieved better functional outcomes one year after the total hip arthroplasty (Table 3).

**Table 3:** Comparison of Harris Hip Score by Gender and Age Group

Variables	Group	Median HHS (IQR)	Mann-Whitney U	p-value
Gender	Male	78 (72–82)	220.5	0.032
	Female	74 (70–78)		
Age Group	55–60 Years	76 (70–80)	210.0	0.045
	61–65 Years	72 (68–76)		

In the sample size of 50 patients of THA, the grades of total Harris hip score were as follows: 14 patients (28%) in Poor grade, 17 patients (34%) in Fair grade, 18 patients (36%) in Good grade, and one patient (2%) in Excellent grade (Table 4).

**Table 4:** Descriptive Statistics of Total Scoring of Physical Activity according to Harris Hip Score

Harris Hip Score	Frequency (%)
Poor <70	14 (28.0%)
Fair 70-79	17 (34.0%)
Good 80-89	18 (26.0%)
Excellent	1 (2.0%)
Total	50 (100.0%)

Physical activity was much improved in the patients as the mobility, in terms of the use of supportive devices and walking between blocks. About 98% of the patients can walk up to 3 blocks. 96% of patients were able to climb stairs, 26% of the patients could climb without railings, and 70% of the patients were able to climb with the support of railings. 46% of patients were also able to use public transport. So, with all other domains of pain, such as sitting comfortably and flexion, adduction, abduction, and rotation, the overall physical activity was improved. The Harris hip score is one of the convenient tools to measure physical activity after total hip arthroplasty, so the tool was used to measure all those activities to assess the physical activity after total hip arthroplasty, following one year.

## DISCUSSION

The purpose behind the current study was to assess and evaluate the physical activity after total hip arthroplasty following one Year in middle-aged adults (Aged 55-65). A prospective observational study used the University of California Angeles (UCLA) score and the Oxford Hip Score (OHS) to measure physical activity at three months after THA and one Year. The physical activity increased with the number of steps taken by the patient after postoperative rehabilitation. The study included 42 patients with unilateral THA. However, no significant improvements were found in the patient scores from three months of improvement and one year of results [15]. A qualitative retrospective study in Denmark was conducted to evaluate the physical activity after THA. The interviews in a Semi-structured manner were conducted for the 22 patients who were involved in a home program of rehab with physiotherapists after the THA. The pain was a significant barrier in the results because the intense pain limited the activity, and the absence of pain caused low motivation to exercise. The patients were found to be relatively physically active during the study [16]. A study was conducted to evaluate physical activity after three years of THA in 153 patients with a mean age of 61.4 years, and 86% of the population was female. Patients were evaluated for physical activity in terms of steps/day and performance of moderate to vigorous physical activity per week. The study used the Oxford Hip Score for the evaluation. The study concluded that physical activity continuously increased after three years post-THA. The study suggested that physical activity should be evaluated after a medium to long term time after THA to get high results [13]. A study conducted on 30 patients after THA measured the physical activity and pain after the procedure. The study measured the outcomes via the Harris Hip score, the 6-minute walk test, and the Oxford Hip Score. The study showed no significant improvement in physical activity three months and 12 months post-THA. The pain was significantly improved. The HHS and OHS score was improved after 12 months of surgery. The study concluded that the overall outcomes were not significant after 12 months of follow-up of the physical activity post THA [17]. A prospective cohort study with 571 THA patients evaluated the physical activity, followed up for three years. Interviews were conducted, and the participants were involved in physical activity for one year pre-THA. They followed up on the physical activity three years post-THA. Overall physical activity in these patients was improved, and their quality of life was also increased if they followed the criteria of >1 per week after THA [11]. A narrative view after the total joint arthroplasty, pre- and post-physical activities, was conducted to assess the outcomes. The study concluded that the pain improved after the total hip arthroplasty. Still, the physical activity remains contradictory, and there are no significant

improvements in physical activity after three months of the procedure. The study also concluded that there is weak evidence of improving physical activity after 12 months of THA [18]. A cohort study on 24 post-THA patients was conducted to evaluate Physical Activity during six of the procedures. Physical activity was assessed with the Sense Wear Pro Armband (SWA), and the patient was involved in the community rehabilitation program, which was designed to improve activity with structured exercises. Fourteen patients were in the intervention group, and ten patients were in the control group. The THA satisfaction questionnaire and the Osteoarthritis Outcome Score (HOOS) were followed by the Poulsen control group [19]. A retrospective cohort study was conducted, and 1053 active patients were compared with 1053 inactive patients two years after Total hip arthroplasty. The patients were evaluated via the Surgery Hip Replacement Expectations Survey and Hip Osteoarthritis Outcome Score. For the physical activity patients, 74% expected to be back to normal, as well as the ability to perform exercises and play sports, compared to the inactive patients, who had only 64%. Patients with higher expectation levels regarding exercise and sports had better HOOS scores specific to the sports and recreation subdomain. So, Physical activity was improved in the active patients as compared with the inactive patients [20].

## CONCLUSIONS

It was concluded that physical activity varies in middle-aged adults after total hip arthroplasty after one year. The majority of middle-aged adults presented with fair to good physical activity following one year.

## Authors Contribution

Conceptualization: MWW

Methodology: MWW, SS, KH, AM, ZM

Formal analysis: MWW

Writing review and editing: MWW

All authors have read and agreed to the published version of the manuscript

## Conflicts of Interest

All the authors declare no conflict of interest.

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