THE PLANET

Original Article

Functional Outcomes and Complications after Total Hip Arthroplasty in Adult Patients

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ARTICLE INFO

Received: 5 Mar 2026
Accepted: 8 Mar 2026
Published Online: 17 Mar 2026

DOI: 10.5281/zenodo.19317611

Volume: 9, Number: 1, Page: 126-130

e-ISSN: 2789-5912
ISSN: 2617-0817

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ABSTRACT

Background: Total hip arthroplasty is an established surgical intervention for advanced hip disorders, providing substantial pain relief and functional restoration. The global demand for this procedure continues to rise due to ageing populations and expanded surgical indications. Despite extensive international data, prospective outcome reports from resource-limited settings remain limited.**Objective:** This study aimed to evaluate functional outcomes and early postoperative complications following primary total hip arthroplasty in adult patients. **Methods & Materials:** This prospective observational study was conducted in the Department of Orthopedics, 250 Bed General Hospital, Pabna and City Health Aid Hospital, Pabna, Bangladesh, from December 2022 to December 2024. A total of 35 adult patients undergoing primary total hip arthroplasty were included. Functional assessment was performed using the Harris Hip Score, Oxford Hip Score and Visual Analogue Scale preoperatively and at 6 months postoperatively. Postoperative complications were documented during follow-up. **Results:** The mean Harris Hip Score improved from 41.8 ± 7.6 preoperatively to 88.6 ± 5.4 at 6 months ($p < 0.001$). The Oxford Hip Score increased from 19.6 ± 4.3 to 41.2 ± 3.8 ($p < 0.001$). Pain scores decreased significantly from 8.2 ± 0.9 to 1.6 ± 0.8 ($p < 0.001$). Excellent and good outcomes were achieved in 80.0% of patients. Overall, 14.3% experienced at least one complication, with superficial infection being the most common. **Conclusion:** Primary total hip arthroplasty demonstrated significant functional recovery and low early complication rates, supporting its effectiveness and safety in this clinical setting.

Keywords: *Total hip arthroplasty, Functional outcome, Postoperative complications.*

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INTRODUCTION

Total hip arthroplasty (THA) is recognized as a highly effective procedure for alleviating pain and restoring function in patients with advanced hip conditions, with demand rising due to ageing populations, broader indications and enhanced implant durability. Epidemiological data project continued growth in primary THA procedures globally. The main indications include osteoarthritis, avascular necrosis, rheumatoid arthritis and post-traumatic arthritis, with osteoarthritis as the predominant cause of disability among older adults worldwide [1,2].

Functional recovery after THA is often measured using validated tools such as the Harris Hip Score (HHS) and Oxford Hip Score (OHS), which assess pain relief, mobility and daily functioning [3,4]. Studies consistently demonstrate significant improvements in these scores postoperatively, though outcomes may vary depending on patient-specific factors including comorbidities and surgical variables [5,6]. Additionally, enhanced recovery protocols and pain management strategies have been shown to optimize postoperative function and reduce opioid requirements, contributing to improved rehabilitation after THA [7,8].

Comorbid conditions and baseline physical status have been shown to influence postoperative outcomes. Lan et al. reported that medical comorbidities may adversely affect pain relief and functional improvement after THA [9]. Similarly, Park et al. observed differences in functional outcomes and complication rates in patients undergoing THA in relation to underlying medical conditions [10]. Despite these observations, evidence from resource-limited settings remains comparatively scarce.

Although THA is generally associated with high success rates, postoperative complications such as surgical site infection, dislocation and deep vein thrombosis remain clinically relevant [11]. Data from international registries have provided valuable insights into complication profiles; however, local institutional data are essential for contextualizing outcomes and guiding quality improvement initiatives [11,12]. Moreover, the incidence and pattern of complications may differ according to patient demographics and perioperative protocols.

In South Asian settings, limited prospective data are evaluating short-term functional outcomes and complication rates after THA. Most available studies are retrospective or involve heterogeneous populations [13,14]. Furthermore, variations in healthcare infrastructure and postoperative rehabilitation practices may influence recovery trajectories. Generating institution-specific data is therefore important to assess the effectiveness of current clinical practices and to benchmark outcomes against international standards.

Given the increasing utilization of THA and the need for context-specific outcome evaluation, this prospective observational study was undertaken to assess functional outcomes and early postoperative complications in adult patients undergoing primary THA at two tertiary care centers in Pabna, Bangladesh. By systematically evaluating validated functional scores and documenting complication rates at 6 months, this study aims to provide clinically relevant evidence that may inform patient counseling, perioperative

optimization and future research in similar healthcare settings.

OBJECTIVES

The objective of this study was to evaluate functional outcomes and early postoperative complications following primary total hip arthroplasty in adult patients.

METHODS & MATERIALS

This prospective observational study was conducted in the Department of Orthopedics, 250 Bed General Hospital, Pabna and City Health Aid Hospital, Pabna, Bangladesh. The study period extended from December 2022 to December 2024. A total of 35 adult patients undergoing primary total hip arthroplasty were included.

Selection Criteria

Inclusion criteria:

- Adult patients aged ≥30 years.
- Patients undergoing primary total hip arthroplasty.
- Diagnosis of primary osteoarthritis, avascular necrosis, rheumatoid arthritis, or post-traumatic arthritis.
- Patients are willing to participate and provide informed consent.
- Patients available for at least 6 months of follow-up.

Exclusion criteria:

- Revision total hip arthroplasty.
- Active local or systemic infection at the time of surgery.
- Pathological fractures due to malignancy.
- Severe neuromuscular disorders affecting ambulation.
- Patients were lost to follow-up for 6 months.

Data Collection Procedure

Eligible patients were identified in the orthopedic outpatient and inpatient departments. Baseline demographic and clinical data were recorded using a structured data collection form. Preoperative assessment included detailed history, physical examination, radiographic evaluation and routine laboratory investigations. Functional status was assessed using the Harris Hip Score and Oxford Hip Score, while pain severity was measured using the Visual Analogue Scale. All procedures were performed by experienced orthopedic surgeons using standard surgical techniques and perioperative protocols. Postoperative care included antibiotic prophylaxis, thromboprophylaxis, early mobilization and physiotherapy according to institutional guidelines. Functional outcomes were reassessed at 6 months postoperatively during scheduled follow-up visits. Data were collected by trained investigators to ensure uniformity and minimize observer bias. Standardized scoring systems were applied consistently to enhance reliability. All participants provided informed consent before inclusion. Confidentiality was maintained by anonymizing patient identifiers and restricting data access to the research team. Data were securely stored and periodically reviewed to ensure completeness and accuracy.

Statistical Analysis

Data were analyzed using SPSS version 25.0. Descriptive statistics were expressed as mean ± standard deviation for continuous variables and frequencies with percentages for categorical variables. Paired t-tests were used to compare preoperative and postoperative functional scores. A p-value <0.05 was considered statistically significant.

RESULT

Table I shows the baseline demographic and clinical characteristics of the study population. The mean age was 61.2 ± 8.4 years, with the majority of patients aged 60–69 years (37.1%). Males constituted 60.0% of the cohort. Primary osteoarthritis was the most common indication (51.4%), followed by avascular necrosis (25.7%). Most patients were classified as ASA II (57.1%). Regarding BMI, 42.9% had normal weight, 40.0% were overweight and 17.1% were obese.

Table I
Baseline Demographic and Clinical Characteristics (*n* = 35).

Variable		Frequency (n)	Percentage (%)
Age Group (years)	30–49	6	17.1
	50–59	11	31.4
	60–69	13	37.1
	≥70	5	14.3
	Mean ± SD	61.2 ± 8.4	
Sex	Male	21	60.0
	Female	14	40.0
Primary Diagnosis	Primary Osteoarthritis	18	51.4
	Avascular Necrosis	9	25.7
	Rheumatoid Arthritis	4	11.4
	Post-traumatic Arthritis	4	11.4
ASA Physical Status	ASA I	6	17.1
	ASA II	20	57.1
	ASA III	9	25.7
BMI Category	Normal (18.5–24.9)	15	42.9
	Overweight (25–29.9)	14	40.0
	Obese (≥30)	6	17.1

Table II presents the comparison of preoperative and 6-month postoperative functional scores. The mean Harris Hip Score improved from 41.8 ± 7.6 preoperatively to 88.6 ± 5.4 postoperatively, with a mean difference of 46.8 ($p < 0.001$). The Oxford Hip Score increased from 19.6 ± 4.3 to 41.2 ± 3.8, yielding a mean improvement of 21.6 ($p < 0.001$). Pain Visual Analogue Scale scores decreased significantly from 8.2 ± 0.9 to 1.6 ± 0.8, reflecting a mean reduction of 6.6 ($p < 0.001$).

Table II
Comparison of Preoperative and 6-Month Postoperative Functional Scores (n = 35).

Outcome Measure	Preoperative (Mean ± SD)	6-Month Postoperative (Mean ± SD)	Mean Difference	p-value
Harris Hip Score	41.8 ± 7.6	88.6 ± 5.4	46.8	<0.001
Oxford Hip Score	19.6 ± 4.3	41.2 ± 3.8	21.6	<0.001
Pain VAS (0–10)	8.2 ± 0.9	1.6 ± 0.8	−6.6	<0.001

Table III describes functional outcome categories at 6 months according to the Harris Hip Score classification. Excellent outcomes were observed in 51.4% of patients, while 28.6% achieved good results. Fair and poor outcomes were reported in 14.3% and 5.7% of patients, respectively.

Table III
Functional Outcome Categories at 6 Months (HHS Classification).

HHS Category	Frequency (n)	Percentage (%)
Excellent (90–100)	18	51.4
Good (80–89)	10	28.6
Fair (70–79)	5	14.3
Poor (<70)	2	5.7

Table IV outlines postoperative complications during the 6-month follow-up. Superficial surgical site infection occurred in 5.7% of patients. Deep infection, dislocation and deep vein thrombosis each occurred in 2.9% of cases. Overall, 14.3% of patients experienced at least one complication.

Table IV
Postoperative Complications (6-Month Follow-Up).

Complication	Frequency (n)	Percentage (%)
Superficial Surgical Site Infection	2	5.7
Deep Infection	1	2.9
Dislocation	1	2.9
Deep Vein Thrombosis	1	2.9
Total Patients with ≥1 Complication	5	14.3

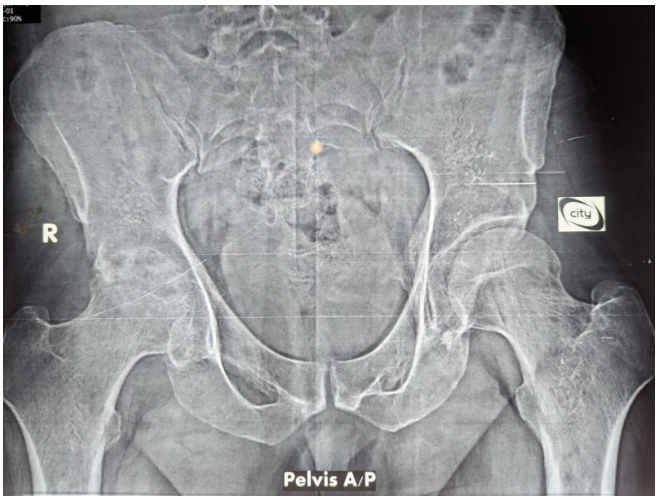

Figure 1 Pre-operative Anteroposterior (AP) radiograph

Figure 2 Post-operative radiograph

Figure 1 shows the Pre-operative Anteroposterior (AP) radiograph of the pelvis in a 32-year-old male showing AVN of the right femoral head. *Figure 2* presents the X-ray showing a right hip (left of the image) that has been replaced, with the ball of this ball-and-socket joint replaced by a metal head that is set in the femur and the socket replaced by a cup.

DISCUSSION

This study demonstrated substantial improvement in functional outcomes and pain relief at 6 months following primary total hip arthroplasty, with a relatively low incidence of early postoperative complications. The mean Harris Hip Score increased from 41.8 preoperatively to 88.6 postoperatively, while the Oxford Hip Score improved markedly and pain scores declined significantly. More than half of the patients achieved an excellent functional outcome at 6 months.

These findings are consistent with the established role of THA in restoring hip function and alleviating pain. Ferguson et al. described THA as a highly effective intervention for end-stage hip disease, reporting predictable improvements in mobility and quality of life [15]. Similarly,

Wang et al. observed significant gains in physical function and reduction in pain among community-dwelling older adults following hip replacement [16]. The magnitude of improvement in our cohort aligns with these observations, indicating that comparable functional recovery can be achieved in a tertiary care setting in Bangladesh.

The marked increase in Harris Hip Score in this study parallels results from Vinjamuri et al., who reported significant postoperative improvements using HHS as a primary outcome measure [13]. Marahatta et al. also demonstrated substantial enhancement in functional scores after primary THA in arthritic hips [17]. The postoperative mean HHS in our study, approaching the excellent range, further supports the reliability of HHS as a sensitive tool for assessing early functional recovery, as emphasized by Kumar et al. in their validation study [18].

Pain reduction was one of the most prominent outcomes in this cohort, with the Visual Analogue Scale decreasing from 8.2 to 1.6 at 6 months. This substantial decline is comparable to the results reported by Lan et al., who found significant pain relief following THA, although outcomes were influenced by comorbid conditions [9]. The high proportion of patients categorized as ASA II in our study may have contributed to favorable early outcomes, as fewer severe systemic comorbidities are generally associated with better postoperative recovery.

Regarding outcome categories, 51.4% of patients achieved excellent results and 28.6% achieved good results. These proportions are comparable to those reported by Wod et al., who observed predominantly good-to-excellent outcomes following THA using modified HHS [14]. Fadlalla et al. similarly reported high rates of excellent functional recovery in younger adults undergoing ceramic-on-ceramic THA [19]. Although implant-specific factors were not the primary focus of the present study, the favorable functional distribution underscores the overall effectiveness of standardized surgical and rehabilitation protocols.

Complication rates in the current series were within acceptable limits compared to published literature. The overall complication rate was 14.3%, with superficial infection being the most frequent event. Healy et al. emphasized that early postoperative complications such as infection and dislocation remain clinically relevant despite advancements in surgical techniques [11]. Dale et al. reported a measurable risk of prosthetic joint infection after THA, highlighting the need for vigilant perioperative measures [12]. The low incidence of deep infection in our cohort may reflect adherence to antibiotic prophylaxis and infection control protocols.

The dislocation rate of 2.9% observed in this study is comparable to previously reported early dislocation rates in primary THA. Matharu et al. noted that the surgical approach can influence dislocation risk following THA [20]. Although approach-specific comparisons were not undertaken in the present study, the low dislocation frequency suggests satisfactory implant positioning and soft tissue handling.

Deep vein thrombosis occurred in one patient, representing 2.9% of the cohort. Belmont et al. documented thromboembolic events as recognized early complications following THA, particularly in patients with additional risk factors [21]. Routine thromboprophylaxis and early mobilization in our study likely contributed to the limited number of such events.

Primary osteoarthritis constituted the majority indication for surgery, consistent with global epidemiological trends described by Ferguson et al. [15]. Singh et al. reported that patients with osteonecrosis may experience comparatively different postoperative trajectories than those with osteoarthritis [22]. Although subgroup analysis was not performed, the overall improvement observed across the cohort suggests that satisfactory short-term outcomes can be achieved across varied diagnostic categories.

The demographic profile, with a mean age of 61.2 years and male predominance, is comparable to other regional studies. Dowsey et al. demonstrated that advancing age does not preclude favorable functional outcomes after THA, although recovery patterns may vary [14]. The predominance of ASA II status in this cohort may partly explain the high rate of excellent and good results, as comorbidity burden has been associated with functional variability in other studies [9].

Overall, the present findings corroborate existing literature demonstrating that primary THA results in significant functional recovery, substantial pain reduction and an acceptable short-term complication profile. The study adds prospective data from a Bangladeshi tertiary care context, reinforcing the global applicability of THA as an effective intervention for advanced hip pathology.

CONCLUSION

Primary total hip arthroplasty resulted in significant functional improvement and marked pain reduction at 6 months in adult patients. The majority achieved excellent or good outcomes and early postoperative complications were infrequent and manageable. These findings support the effectiveness and safety of THA in a tertiary care setting in Bangladesh, with outcomes comparable to published international data.

ACKNOWLEDGMENT

I would like to express my sincere gratitude for the invaluable support and cooperation provided by the staff, participants and my co-authors/colleagues who contributed to this study.

CONFLICTS OF INTEREST

There are no conflicts of interest.

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