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Long-Term Pain and Mobility Benefits of Total Hip Replacement

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ABSTRACT

Introduction*: Total hip replacement is an established surgical treatment for patients with terminal hip disorders, such as osteoarthritis, avascular necrosis, and rheumatoid arthritis. It has been known to achieve significant pain relief, recover joint mobility, and improve the quality of life. The purpose of this paper was to assess long-term outcomes following total hip replacement regarding pain, functional status, mobility, quality of life, and complication rates in a series of patients undergoing primary THR.*

Methods*: The following prospective observational study was conducted between January 2024 and December 2024 on 60 patients with hip end-stage disease undergoing primary THR at Rangpur Medical College, Rangpur, Bangladesh. Analysis: SPSS version 26.0 was used for the analysis of data.*

Result*: The mean VAS pain scores decreased from preoperative 8.1 to 1.9 at long-term follow-up, while the overall functional recovery was significant, with 83.3% attaining good-to-excellent Harris Hip Scores, 73.3% ambulating independently, and 76.7% climbing stairs without aid. Quality of life improved in 86.7%, sleep disturbance improved in 80.0%, and 75.0% showed improved social participation. Complications were few, and overall satisfaction was reported by 90.0%.*

Conclusion*: Total hip replacement continues to offer long-lasting effective pain relief with significant improvements in mobility, functional ability, and patient's overall satisfaction. Yet a minority still report ongoing pain or residual limitations in mobility despite predominantly good-to-excellent outcomes.*

Keywords: *Total Hip Replacement, Long-Term Pain, Mobility*

I. INTRODUCTION

Total hip replacement (THR), also referred to as total hip arthroplasty, is one of the biggest successes of the field of orthopaedic surgery for patients who often present with end-stage hip pathologies such as osteoarthritis, rheumatoid arthritis, avascular necrosis, or fractures of certain bone portions. Although the ultimate goals of THR remain pain relief for an extended length of time, restoration of mobility, and subsequently enhanced quality of life, for the past decades, significant advancements in implant design, surgical methodologies, postoperative care practices, and subsequent rehabilitative approaches continue to favourably influence patient outcomes for THR, establishing it as one of the major milestones in the current practice of orthopaedic medicine [1]. Pain relief is consistently reported as the most significant and immediate benefit following THR. Multiple longitudinal studies have demonstrated marked reductions in hip pain within the first year after surgery, with benefits persisting for many years in the majority of patients [2,3]. Systematic reviews indicate that most individuals experience clinically meaningful pain relief, allowing discontinuation of long-term analgesic use and

improved sleep and daily functioning [4]. Nevertheless, despite overall success, a notable minority of patients continue to report chronic or intermittent pain several years after surgery, highlighting the importance of long-term evaluation of pain outcomes [2]. Improvement in mobility and functional capacity is another major goal of THR. Postoperative gains in walking ability, stair climbing, and activities of daily living have been well documented using patient-reported outcome measures such as the Harris Hip Score, Oxford Hip Score, and WOMAC index [3,5]. While subjective functional improvements are substantial, objective assessments have revealed that some patients exhibit persistent deficits in gait speed, muscle strength, and balance when compared with age-matched healthy populations, even 5–10 years after surgery [6]. Long-term mobility outcomes are influenced by several factors, including preoperative functional status, age, comorbidities, body mass index, and adherence to postoperative rehabilitation programs [7]. Psychological factors such as pain catastrophizing and anxiety have also been associated with poorer long-term pain and functional outcomes following THR [8]. Additionally, registry-based studies have shown that implant survivorship now commonly exceeds 90% at 10–15 years, reinforcing the durability of modern prostheses while underscoring the need to focus on patient-centered functional outcomes rather than implant longevity alone [9]. With the worldwide increase in life expectancy and the consequent demand for joint replacement surgery, there has been an increasing need to elucidate the long-term pain and mobility benefits of THR. Despite a well-functioning implant, persistent pain and residual functional limitations may be expected to affect patient satisfaction and healthcare utilization negatively [10]. This study aimed to evaluate the long-term effects of total hip replacement on pain, functional status, mobility, quality of life, complications, and overall patient satisfaction in a cohort of patients undergoing primary THR.

II. METHODS

This is a prospective observational study carried out in Rangpur Medical College, Rangpur, Bangladesh from January 2024 to December 2024 on 60 patients who were undergoing primary total hip replacement for end-stage hip disease. All patients aged 18 years onwards presenting with osteoarthritis, avascular necrosis, rheumatoid arthritis, or other indications for THR were selected. Exclusion criteria were patients with revised THR, inflammatory joint infections, severe comorbid conditions contra-indicating surgery, or those who would not retain for postoperative follow-up. This study had got institutional review board clearance, and consent was taken from all patients. Parameters like demographical information, clinical history, physical examination, and radiological investigations were taken into consideration for preoperative assessment. Pain measurement could be done using Visual Analogue Scale (VAS), and functional assessment could be measured by Harris Hip Score (HHS). Health status for mobility and ambulation or stair climbing could also be taken into consideration. Surgeries were done using standard posterior or lateral approaches by senior orthopaedic surgeons with adequate prophylaxis and pain management strategies. All postoperative patients could also be given adequate care with emphasis on early mobilization, physiotherapy, and long-term patient-centered rehabilitation. For the final assessment, follow-up of patients would be taken into consideration at 1 year as well as for a final long-term analysis of more than 5 years postoperatively for studying pain relief, functional recovery, mobility, health-related quality of life, complications, as well as patient satisfaction. Data analysis was carried out using SPSS software v26. Continuous data were represented in mean with SD, whereas categorical data could be analyzed in frequency with percentage. Paired 't' test could be used for analysis of paired data for pain relief as well as functional recovery with significance at $p = 0.05$.

III. RESULTS

Table 1: Baseline Demographic and Clinical Characteristics of Study Participants (N = 60)

Variable	Frequency (%) / Mean ± SD
Age (years)	58.4 ± 9.6
Age group (years)	
– <50	12 (20.0)
– 50–59	18 (30.0)
– 60–69	20 (33.3)
– ≥70	10 (16.7)
Sex	
– Male	34 (56.7)
– Female	26 (43.3)
Primary diagnosis	
– Osteoarthritis	38 (63.3)
– Avascular necrosis	14 (23.3)

– Rheumatoid arthritis	5 (8.3)
– Others	3 (5.0)

Most patients were aged between 50 and 69 years (63.3%), with males accounting for 56.7% of the study population. Osteoarthritis was the leading indication for surgery, observed in 63.3% of cases, followed by avascular necrosis in 23.3% [Table 1].

Table 2: Comparison of Preoperative and Long-Term Postoperative Pain Scores (N = 60)

Pain assessment (VAS)	Mean ± SD	p-value
Preoperative	8.1 ± 1.0	
1 year postoperative	2.3 ± 1.1	<0.001
Final follow-up (≥5 years)	1.9 ± 1.2	<0.001

Mean VAS pain scores decreased significantly from 8.1 ± 1.0 preoperatively to 2.3 ± 1.1 at one year and further to 1.9 ± 1.2 at final follow-up, indicating sustained long-term pain relief after total hip replacement ($p < 0.001$) [Table 2].

Table 3: Functional Outcome Assessment Using Harris Hip Score (HHS)

HHS category	Preoperative n (%)	Long-term follow-up n (%)
Poor (<70)	42 (70.0)	4 (6.7)
Fair (70–79)	12 (20.0)	6 (10.0)
Good (80–89)	6 (10.0)	20 (33.3)
Excellent (≥90)	0 (0.0)	30 (50.0)

Preoperatively, 70.0% of patients had poor Harris Hip Scores (<70), whereas at long-term follow-up, 50.0% achieved excellent scores (≥90) and 33.3% achieved good scores, reflecting marked functional improvement after surgery [Table 3].

Table 4: Mobility and Activity Status at Long-Term Follow-Up (N = 60)

Mobility parameter	n (%)
Independent ambulation without aid	44 (73.3)
Ambulation with a walking aid	12 (20.0)
Limited household ambulation	4 (6.7)
Ability to climb stairs independently	46 (76.7)

At long-term follow-up, 73.3% of patients were able to ambulate independently without aids, while 20.0% required a walking aid and 6.7% were limited to household ambulation. Independent stair climbing was possible in 76.7% of patients [Table 4].

Table 5: Health-Related Quality of Life Outcomes at Long-Term Follow-Up

Outcome measure	Improved n (%)	Not improved n (%)
Overall quality of life	52 (86.7)	8 (13.3)
Sleep quality	48 (80.0)	12 (20.0)
Participation in social activities	45 (75.0)	15 (25.0)

Improvement in overall quality of life was reported by 86.7% of patients, with better sleep quality in 80.0% and enhanced participation in social activities in 75.0%, demonstrating substantial long-term psychosocial benefits following surgery [Table 5].

Table 6: Long-Term Complications and Patient Satisfaction (N = 60)

Variable	n (%)
Persistent hip pain	7 (11.7)
Limb length discrepancy	5 (8.3)
Dislocation	2 (3.3)

Revision surgery	1 (1.7)
Overall patient satisfaction	
– Satisfied/very satisfied	54 (90.0)
– Neutral	4 (6.7)
– Dissatisfied	2 (3.3)

Persistent hip pain was noted in 11.7% of patients, limb length discrepancy in 8.3%, and dislocation in 3.3%, while revision surgery was required in only one patient (1.7%). Overall, 90.0% of patients reported being satisfied or very satisfied with the surgical outcome [Table 6].

IV. DISCUSSION

The present study evaluated long-term pain relief, mobility, functional recovery, quality of life, complications, and patient satisfaction following total hip replacement (THR) in 60 patients. Overall, the findings demonstrate substantial and sustained benefits of THR, while also highlighting a subset of patients with residual pain and functional limitations. In this study, the majority of patients were aged between 50 and 69 years (63.3%), with a slight male predominance (56.7%), and osteoarthritis as the primary indication for surgery (63.3%). Similar demographic trends have been reported in large cohort studies. Judge et al. observed that most THR recipients were between 55 and 75 years of age, with osteoarthritis accounting for over 70% of cases in the UK population [7]. Likewise, Shan et al. reported osteoarthritis as the leading indication in 68% of patients undergoing THR in their systematic review [3]. The demographic profile of the present study, therefore, reflects the typical patient population undergoing THR globally. A marked and sustained reduction in pain was observed in our cohort, with mean VAS scores decreasing from 8.1 preoperatively to 1.9 at long-term follow-up. Beswick et al. reported that although most patients experienced substantial pain relief after THR, approximately 10–20% continued to report long-term pain [2]. In our study, persistent hip pain was noted in 11.7% of patients, which falls within this reported range. Wylde et al. similarly found persistent pain in 9–14% of patients several years after joint replacement, attributing it to factors such as central sensitization and psychosocial influences rather than implant failure alone [4]. These comparisons suggest that while THR provides durable pain relief for most patients, a small but consistent proportion experience chronic postoperative pain. Functional outcomes improved significantly following surgery. Preoperatively, 70% of patients had poor Harris Hip Scores, whereas at long-term follow-up, 83.3% achieved good-to-excellent scores. Vissers et al. reported comparable improvements, with mean functional scores improving substantially within the first year and remaining stable thereafter [5]. However, despite high patient-reported functional scores, objective mobility limitations persisted in a subset of patients in the present study, as 20% required walking aids and 6.7% were limited to household ambulation. Ninomiya et al. found that even 10 years after THR, patients demonstrated reduced gait speed and muscle strength compared with healthy controls, despite good subjective outcomes [6]. This aligns with our findings and emphasizes the discrepancy between perceived and objectively measured functional recovery. Quality of life outcomes in this study were favourable, with 86.7% of patients reporting overall improvement and 75% reporting improved social participation. Shan et al. demonstrated significant improvements in health-related quality of life scores following THR, which were maintained at mid- to long-term follow-up [3]. Similarly, Skou et al. reported high levels of patient satisfaction and improved daily functioning, although a minority continued to experience limitations affecting social and recreational activities [10]. Complication rates in this cohort were low, with dislocation occurring in 3.3% and revision surgery in 1.7% of patients. Evans et al. reported 10–15-year implant survivorship exceeding 90%, with revision rates comparable to those observed in the present study [11]. Despite minor complications such as limb length discrepancy (8.3%), overall satisfaction was high, with 90% of patients reporting being satisfied or very satisfied. This is consistent with registry-based studies demonstrating high satisfaction rates despite the presence of mild residual symptoms [12,13].

Limitations of The Study

This study has some limitations. The relatively small sample size (n = 60) may limit the generalizability of the findings. The absence of a control or comparison group restricts direct comparison with non-operated patients or alternative treatment modalities. Functional outcomes were largely based on patient-reported measures, which may not fully reflect objective physical performance.

V. CONCLUSION

Total hip replacement provides durable long-term pain relief, significant improvement in mobility and function, and high patient satisfaction. Most patients achieve good-to-excellent results, but a minority of patients continue to experience persistent pain or residual mobility limitations.

VI. RECOMMENDATION

Total hip replacement should be advised for patients with end-stage hip pathology for sustained relief of pain as well as improvement in functioning. It is important to work towards the least risk of pain by using risk assessment before surgery, standardized surgical methods, and long-term postoperative care plans.

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