

Retrospective Assessment of Functional Recovery Following Total Hip Arthroplasty in Elderly PatientsRai Amrit Nath Sahai¹, Anand Kumar Singh², Ajinkya Gautam³, Shwetank Shivam⁴,
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Abstract:**Background:** Total Hip Arthroplasty (THA) is typically performed on older hip joint disease patients to relieve pain and enhance function. To optimise effectiveness in this demographic, ascertain the variables that influence functional recovery subsequent to surgery.**Methods:** From March 2022 to January 2023, 60 senior patients (65 years or older) who had THA at Patna Medical College and Hospital were tested for functional recovery. Demographics, pre-surgery health, surgery details, and Harris Hip Score (HHS) and WOMAC index functional evaluations were collected. The statistical analysis comprised descriptive statistics, paired t-tests for score changes, and multiple regressions for recovery predictors.**Results:** Age significantly impacts functional recovery, with slower trajectories in older individuals ($\beta = -0.45$, $p = 0.002$). Cardiovascular illness negatively impacted recovery ($\beta = -1.30$, $p = 0.027$), while males had better outcomes ($\beta = 1.25$, $p = 0.025$). There was a significant association between preoperative HHS and postoperative functional status ($\beta = 0.58$, $p < 0.001$). Significant functional improvement was seen in the mean HHS from 45.2 before surgery to 78.6 12 months after THA.**Conclusion:** In older THA patients, age, gender, preoperative HHS, and cardiovascular health affect functional recovery. Extensive preoperative assessments and perioperative protocols are necessary for this population in order to achieve optimal outcomes. To confirm these findings and assess additional THA outcome determinants, future trials should be larger, multicenter, and longer.**Keywords:** Cardiovascular disease, Functional recovery, Elderly patients, Total Hip Arthroplasty (THA), Preoperative assessment.This is an Open Access article that uses a funding model which does not charge readers or their institutions for access and distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/4.0>) and the Budapest Open Access Initiative (<http://www.budapestopenaccessinitiative.org/read>), which permit unrestricted use, distribution, and reproduction in any medium, provided original work is properly credited.**Introduction****Background of Total Hip Arthroplasty (THA):** A popular orthopaedic operation, Total Hip Arthroplasty (THA), restores mobility and function to severe hip joint dysfunction [1]. THA replaces the arthritic hip with prosthesis.

THA manages hip fractures, avascular necrosis, rheumatoid arthritis, osteoarthritis, and others [2]. Since the 1960s, surgery, prosthetics, and postoperative care have improved, making patients happier. THA reduces pain, improves joint function, and improves quality of life, especially for hip joint dysfunction patients with limited mobility.

Importance of Functional Recovery in Elderly Patients: Functional rehabilitation following THA is crucial for older people [3]. Understanding

geriatric THA-requiring disorder recovery processes is crucial due to their increased prevalence. Cardiovascular disease, diabetes, and osteoporosis can impede surgery and recovery in the elderly [4]. Age-related muscle atrophy, bone density loss, and longer recovery may influence surgery results. Functional recovery comprises physically recovering, returning to daily activities, maintaining independence, and improving quality of life [5]. Reducing carer dependence, restoring mobility, and maintaining social and psychological well-being are all part of functional rehabilitation for older adults [6]. To maximise THA, monitor this group and ensure functional recovery as soon as possible.

Objectives of the Study

- To assess how well 65-year-olds recover from complete hip arthroplasty.
- Determine factors affecting functional recovery in this population, including pre- and post-op health and rehabilitation regimens.
- To highlight age-related challenges and recovery patterns by comparing functional outcomes of older and younger patients after the same procedure.

THA and Functional Recovery: This orthopaedic surgery sector has been extensively studied for THA outcomes and recovery. THA reduces pain and improves joint function, improving hip joint dysfunction patients' quality of life.

According to [7], most patients report considerable improvements in mobility and daily functioning after THA and high satisfaction with the operation. Surgical procedures, prosthesis design, and postoperative care are among the many recovery variables studied. Compared to standard therapies, less intrusive techniques may reduce postoperative

pain and recovery time [8]. Technological advances in prosthetics improve functional outcomes and implant longevity. Rehabilitation regimens have been focused on because early mobilisation and systematic physiotherapy improve recovery. In their comprehensive review, [9] found that tailored rehabilitation courses can reduce loose prosthesis and dislocation and improve functional outcomes.

Specific Challenges and Outcomes in Elderly Patients: Due to functional difficulties, elderly persons may find THA recovery harder. Age-related physiological changes, comorbidities, and lower physiological reserves may cause surgery and recovery issues. Older patients heal slower than younger patients. [10] Observed that elderly patients had longer post-THA hospital stays and slower mobility gains. Cardiovascular disease, diabetes, and osteoporosis are more common in the elderly, compromising surgical results. [11]

Found that patients with these co-occurring conditions have higher infections and thromboembolic events, which can hinder rehabilitation. Before surgery, the elder patient's cognitive and physical health affects functional recovery.



Figure 1: Total Hip Arthroplasty (THA) (Source: [12])

Gaps in Current Literature: The existing literature on THA and functional recovery is useful, but there are still many questions. First, ageing research must be deeper. Most study includes a wide range of ages, making it difficult to make conclusions regarding the needs and recovery patterns of the elderly. Long-term functional outcomes for older patients are unknown. To completely understand the long-term impacts, longitudinal studies must monitor healing over time. The optimal rehabilitation methods for different age groups must be researched and developed. No evidence-based geriatric rehabilitation initiatives exist, but there are broad rehabilitation suggestions.

Clinicians could benefit from studies comparing geriatric functional recovery with different rehabilitation methods. Psychosocial rehabilitation in elder THA patients needs more study. Unfortunately, research often ignores patient expectations, social support, and mental health in recovery outcomes.

Methods

Study Design: This retrospective study aims to assess the functional recovery following THA in elderly patients. Conducted at Patna Medical College and Hospital, Patna, the study conducted from March 2022 to January 2023. The retrospective

design involves reviewing and analyzing patient records to evaluate postoperative outcomes. This design is advantageous for examining real-world clinical outcomes and identifying patterns over a defined period without the need for patient intervention or follow-up appointments.

Sample Size and Selection Criteria: The research sample included sixty senior Patna Medical College and Hospital THA patients.

Inclusion Criteria

- Patients aged 65 years and above.
- Patients who underwent primary THA between March 2022 and January 2023.
- Availability of complete medical records, including preoperative, intraoperative, and post-operative data.
- Patients who provided consent for their medical records to be used for research purposes.

Exclusion Criteria

- Patients below 65 years of age.
- Patients who underwent revision THA or other hip surgeries.
- Incomplete or missing medical records.
- Patients with significant cognitive impairments that preclude reliable assessment of functional outcomes.

Data Collection Methods

We searched each patient's medical records for this data. Data came from follow-up visits, hospital and outpatient records, and surgery reports. The key variables collected were gender, age, comorbidities, preoperative health, surgical operation details (prosthesis type, surgical method), and

postoperative results. HHS and WOMAC were utilised to assess functional recovery. These ratings were taken from patients' medical records 3-, 6-, and 12-months following surgery. Postoperative complications, hospital stays, and rehabilitation regimens were tracked to track each patient's recovery.

This data collection strategy contained all clinical and functional details needed for a complete investigation.

Statistical Analysis: SPSS 26.0 was used for statistical analysis. All variables were descriptively analysed to summarise sample characteristics. Means, frequencies, and standard deviations are included. Paired t-tests were performed to assess functional recovery by comparing HHS and WOMAC ratings before and after surgery at 3, 6, and 12 months.

Multiple regression analysis examined the relationship between functional recovery and demographic and clinical factors such as gender, age, and comorbidities. This strategy helped us identify the variables that most affected patients' post-surgery recovery. Kaplan-Meier survival study analysed surgical complications' time to occurrence.

All statistical tests were significant if $p < 0.05$. This comprehensive statistical analytic framework allowed a complete evaluation of functional recovery after THA in elderly individuals and revealed important factors impacting results.

Results

Demographic Characteristics of the Sample

Table 1: Demographic Details

Variable	Number (n=60)	Percentage (%)
Age (years)		
65-69	20	33.3
70-74	18	30.0
75-79	12	20.0
80+	10	16.7
Gender		
Male	32	53.3
Female	28	46.7
Comorbidities		
Hypertension	35	58.3
Diabetes Mellitus	28	46.7
Cardiovascular Disease	20	33.3
Osteoporosis	15	25.0
Preoperative Harris Hip Score (mean \pm SD)	45.2 \pm 9.3	

Demographic results show 53.3% male and 46.7% female among 60 elderly patients.

Most of patients (63.3%) were 65-74 years old, whereas just 36.7% were 75+. Cardiovascular disease (33.3%), hypertension (58.3%), diabetes

(46.7%), and osteoporosis (25.0%) were frequent comorbidities. Before surgery, the average Harris Hip Score (HHS) was 45.2 \pm 9.3, indicating significant functional loss. This demographic and

baseline data collection shows THA patients' common co-morbidities, which can impair recovery.

Main Findings on Functional Recovery

Table 2: Main Findings on Functional Recovery

Follow-up Time Post-THA	Harris Hip Score (mean \pm SD)	WOMAC Score (mean \pm SD)
Preoperative	45.2 \pm 9.3	68.5 \pm 12.4
3 months	65.8 \pm 10.1	42.3 \pm 10.7
6 months	72.4 \pm 8.6	35.1 \pm 9.2
12 months	78.6 \pm 7.3	28.4 \pm 7.8

After THA, older patients' functional results increase dramatically over 12 months. At 12 months, the patients' mean Harris Hip Score (HHS) rose from 45.2 at baseline, indicating moderate damage, to 78.6, indicating remarkable recovery and enhanced joint function. Like how the average WOMAC score

dropped from 68.5 before surgery to 28.4 after 12 months, indicating less pain and increased mobility.

These findings show that pain alleviation and functional independence increase older patients' quality of life one year after THA surgery.

Statistical Analysis Results

Table 3: Statistical Analysis Result

Variable	Coefficient (β)	Standard Error (SE)	p-value
Age	-0.45	0.12	0.002
Gender (Male)	1.25	0.55	0.025
Hypertension	-0.85	0.65	0.190
Diabetes Mellitus	-1.10	0.60	0.070
Cardiovascular Disease	-1.30	0.58	0.027
Osteoporosis	-0.95	0.75	0.210
Preoperative HHS	0.58	0.10	<0.001

The data shows that several factors affect functional recovery in older THA patients. Age was associated with slower recovery rates ($\beta = -0.45$, $p = 0.002$), but male gender had a positive influence ($\beta = 1.25$, $p = 0.025$). Preoperative HHS significantly predicted postoperative outcomes ($\beta = 0.58$, $p < 0.001$), but cardiovascular disease had a negative impact ($\beta = -1.30$, $p = 0.027$). Preoperative screening and tailored therapy that consider health profiles and demographics are needed to optimise THA results in senior patients.

Discussion

The study's findings suggest ways elders can speed up their functional recovery after total hip arthroplasty. Postoperative outcomes improved slowly in older patients, demonstrating age strongly predict recovery. Reduced muscle strength and slower healing rates may hamper rehabilitation due

to physiological ageing. Given the beneficial link between male gender and recovery, gender-specific surgical reactions should be investigated. The HHS's high prediction power before surgery illustrates how essential the patient's functional status was, highlighting the need for rigorous examinations and optimisation efforts. Comorbid patients need special perioperative care because cardiovascular disease worsens recovery. This vulnerable group can reduce risks and increase recovery times by prioritising cardiovascular health and perioperative care.

Hypertension, diabetes, and osteoporosis do not appear to affect THA results statistically. This shows that various comorbidities may affect THA outcomes differently in patients and therapeutic regimes.

Comparison Table with Existing Studies

Table 4: Comparison Table

Study Title and Reference	Study Type	Sample Size	Findings	Limitations
Current Study	Retrospective Cohort	60	Age, gender, and preoperative HHS significantly predict post-THA functional recovery. Cardiovascular disease negatively impacts outcomes.	Limited to single-center data, small sample size may limit generalizability.
Study 1 [13]	Prospective Cohort	200	Showed significant improvements in pain relief and functional outcomes post-THA.	Limited follow-up duration, potential for loss to

				follow-up affecting long-term outcomes.
Study 2 [14]	Comparative Study	150	Minimally invasive THA resulted in shorter hospital stays and faster recovery compared to traditional methods.	Limited generalizability due to specific surgical techniques and patient demographics.
Study 3 [15]	Retrospective Study	80	Elderly patients showed slower initial recovery but similar long-term outcomes compared to younger cohorts.	Variability in surgical techniques and rehabilitation protocols across study sites.

Comparing the present study to earlier research helps older patients understand functional recovery after THA. Study 1 indicated that THA considerably improved pain alleviation and functional results in a larger prospective cohort, but our retrospective investigation found that age, gender, and preoperative Harris Hip Score critically affected recovery. Assessing a patient before surgery is crucial for predicting their post-surgical performance. The superior outcomes of minimally invasive THA are consistent with our findings, although Study 2 focused on hospital stay and recovery speed. Due to its small sample size and single-center emphasis, our study may have less generalizability than Study 2, which examined many surgical procedures. Despite similar long-term results to younger cohorts, older patients have delayed initial recovery. Study 3's retrospective examination indicated age-related recovery trajectories. Additionally, our research demonstrates that cardiovascular comorbidities negatively impact post-THA recovery. Our work illuminates the characteristics that predict THA recovery in older patients, but our data is from a single centre and our sample size is modest, making it difficult to generalise our findings to different patient demographics or healthcare systems. Further research should confirm these findings in larger, multicenter trials with extended follow-up to improve prediction models for clinical usage.

Strengths

The study's strengths are its broad data collection from a well-defined sample of older THA patients and its rigorous methodology. The study's retrospective cohort methodology and focus on elderly patients illuminate their real-world clinical outcomes and challenges. Use standardised functional assessment tools like the WOMAC index and Harris Hip Score to assess functional recovery following surgery. This improves accuracy and comparability. In addition, the statistical study used rigorous methods to uncover recovery predictors for clinical practice and future research.

Limitations

This study has some strength, but it has some major problems. The retrospective inquiry biases and limits data availability and completeness.

Differences in medical record recording and follow-up intervals may have affected results evaluation precision and reliability. The study's 60 patients are enough for early analysis, but its small sample size may prevent it from generalising to larger populations or finding more subtle correlations or subgroup differences. Since the study was single-center, the results may not apply to other healthcare institutions or places with different patient populations or medical procedures. The study did not consider socioeconomic level, nutritional status, or psychosocial factors, which could have affected recovery outcomes. Future research should incorporate these criteria and use prospective designs with larger, more diverse cohorts to better understand the complex interaction of factors affecting THA outcomes in older patients.

Conclusion

This study illuminates key factors affecting older adults' functional recovery after complete hip arthroplasty. Postoperative recovery was delayed in older patients, suggesting age is a factor. Men had better surgical outcomes, suggesting gender-specific differences. The preoperative HHS predicts postoperative functional recovery, emphasising the need of baseline functional assessment in surgical decision-making. Patients with comorbidities need careful preoperative treatment. Cardiovascular illness also hampered recovery. This study's findings can improve elderly THA outcomes. Knowing which characteristics predict functional recovery helps clinicians protect patients during surgery and aid in rehabilitation. Comprehensive preoperative evaluations, including functional assessments and comorbidity management, can improve surgical outcomes and patient satisfaction. Studying how age, gender, and preoperative status affect recovery in this at-risk population helps adapt treatment to each patient's needs and improve functional outcomes over time.

Recommendations for Future Research

Future research in this topic could go several paths. First, longitudinal research with larger, multicenter cohorts would be more applicable to different patients and facilities. Long-term follow-up beyond 12 months post-THA should help understand functional outcomes and late issues. Studying how

socioeconomic status, food, and psychosocial support affect THA healing could reveal patient-specific characteristics. Comparative investigations of surgical procedures, rehabilitation programmes, and implant technologies should reveal best practices to improve therapeutic results. Patient-reported outcomes and quality-of-life measures can complete a patient-centered evaluation of post-THA recovery. Research should optimise perioperative care pathways and provide evidence-based medicines to improve recovery trajectories and patient care in older THA patients.

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