

Patient Reported Outcome Measures Following Surgical Fixation of Intertrochanteric Hip Fractures in Elderly Population: A Short Term Retrospective Observational Study

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Abstract

Background: Intertrochanteric hip fractures in elderly patients are associated with significant morbidity, functional decline, and reduced quality of life. While surgical fixation is the standard of care, assessment of recovery using patient-reported outcome measures provides valuable insight beyond traditional clinical outcomes. **Objectives:** To evaluate short-term patient-reported outcomes following surgical fixation of intertrochanteric hip fractures in elderly patients using the EQ-5D-5L questionnaire. **Methods:** This retrospective observational study included elderly patients who underwent surgical fixation for intertrochanteric hip fractures at a tertiary care center. Patients were followed for one year postoperatively. Outcomes were assessed using the EQ-5D-5L questionnaire, evaluating five health domains: mobility, self-care, usual activities, pain/discomfort, and anxiety/depression. Data were analyzed descriptively and presented as frequencies and percentages. **Results:** A total of 33 patients were included in the final analysis after excluding deaths and losses to follow-up. The mean age of the study population was 74.23 years. Most patients reported favorable outcomes at final follow-up, with more than half indicating no problems across EQ-5D-5L domains. Improvements were most prominent in mobility, self-care, and usual activities. However, a subset of patients continued to report residual pain/discomfort and symptoms of anxiety or depression. **Conclusion:** Surgical fixation of intertrochanteric hip fractures results in favorable short-term patient-reported outcomes in the majority of elderly patients. Incorporating patient-reported outcome measures such as EQ-5D-5L is essential for comprehensive evaluation, and a multidisciplinary postoperative approach is recommended to optimize recovery and quality of life.

Keywords: Hip Fractures, Intertrochanteric Fractures, Quality of Life, Patient-Reported Outcome Measures, EQ-5D

Introduction

Intertrochanteric hip fractures are a major public health concern in the elderly population, owing to their high incidence, associated morbidity, loss of independence, and increased mortality [1,2]. These injuries often result in prolonged disability and deterioration in health-related quality of life, even after surgical treatment. With increasing life expectancy worldwide, the burden of hip fractures is expected to rise, placing growing demands on orthopaedic trauma services.

Traditionally, outcomes following hip fracture surgery have been evaluated using clinician-reported parameters such as mortality, complication rates, and need for reoperation [3]. While these measures remain important, they provide limited insight into functional recovery and patient-perceived health status. Consequently, patient-reported outcome measures (PROMs) have emerged as valuable tools for assessing treatment effectiveness from the patient's perspective, encompassing physical function, pain, emotional well-being, and overall quality of life [4,5].

The use of PROMs in elderly hip fracture populations is accompanied by specific challenges, including high mortality, cognitive impairment, and loss to follow-up, all of which may influence response rates and introduce bias [6,7]. Nevertheless, when applied systematically, PROMs offer important insights into recovery trajectories that are not captured by traditional clinical outcomes.

Among available PROM instruments, the EuroQol EQ-5D questionnaire is widely used in orthopaedic research due to its simplicity and reliability [8]. The five-level version (EQ-5D-5L) improves sensitivity and reduces ceiling effects compared with earlier versions, making it particularly suitable for elderly populations [9,10]. The EQ-5D-5L evaluates five key dimensions of health: mobility, self-care, usual activities, pain/discomfort, and anxiety/depression.

Surgical fixation is the standard of care for intertrochanteric hip fractures, with intramedullary devices such as the proximal femoral nail offering biomechanical stability and facilitating early mobilization [11-13]. Although radiological and perioperative

outcomes of these implants are well documented, fewer studies have focused on patient-reported quality-of-life outcomes following surgery, particularly in the Indian geriatric population.

In this context, the present study aimed to evaluate short-term patient-reported outcomes following surgical fixation of intertrochanteric hip fractures in elderly patients using the EQ-5D-5L questionnaire. By focusing on patient-centered outcomes over a one-year follow-up period, this study seeks to provide clinically relevant insights into functional recovery and quality of life after intertrochanteric hip fracture surgery.

Methods

This study was conducted as a retrospective observational study in accordance with the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) guidelines. It was carried out in the Department of Orthopaedics at PSG Institute of Medical Sciences & Research, a tertiary care teaching hospital in Coimbatore, Tamil Nadu, India. Elderly patients who underwent surgical fixation for intertrochanteric hip fractures between May 2023 and May 2024 were included, with postoperative follow-up extending up to 12 months.

Hospital records were screened to identify eligible participants. A total of 43 patients aged 65 years and above with radiologically confirmed intertrochanteric hip fractures were initially included. Patients were managed surgically with intramedullary fixation using short or long PFNA2 implants. Individuals with pathological or non-traumatic fractures, pre-existing physical or mental disabilities, documented cognitive impairment affecting reliable outcome assessment, incomplete medical records, or refusal for follow-up were excluded from the study.

Data were retrospectively collected from the hospital Health Information System (HSIS) and Electronic Medical Records (EMR). Extracted variables included demographic details such as age and sex, associated comorbidities, fracture characteristics, type of surgical fixation, and perioperative details. These data formed the clinical basis for evaluating postoperative outcomes.

Patient-reported outcomes were assessed using the EuroQol EQ-5D-5L questionnaire, a validated tool for measuring health-related quality of life across five domains: mobility, self-care, usual activities, pain or discomfort, and anxiety or depression. A Tamil-translated and culturally validated version of the EQ-5D-5L questionnaire, obtained from the EuroQol Group, was used to ensure clarity and accurate comprehension. Outcome assessments were performed at 3 months, 6 months, and 12 months following surgery, either during routine fracture follow-up visits or through structured telephone interviews for patients unable to attend hospital visits.

To minimize selection bias, predefined inclusion and exclusion criteria were applied uniformly. Patients who were lost to follow-up or who expired during the study period were documented and excluded from the final outcome analysis. No imputation techniques were applied for missing data. Of the 43 patients initially included, 7 were lost to follow-up and 3 expired, resulting in a final analytical cohort of 33 patients.

Statistical analysis was performed using the Statistical Package for the Social Sciences (SPSS) and Microsoft Excel. Continuous variables were summarized using means, while categorical variables were expressed as frequencies and percentages. EQ-5D-5L outcomes were analyzed descriptively across individual domains at the final follow-up. Ethical approval for the study was obtained from the Institutional Ethics Committee of PSG Institute of

Medical Sciences & Research on 3 September 2024. This was an IRB-approved retrospective study. All patient data were anonymized, and verbal consent was obtained in accordance with institutional ethical guidelines.

Results

A total of 43 elderly patients with intertrochanteric hip fractures who met the inclusion criteria were initially enrolled in the study. During the follow-up period, 3 patients expired and 7 patients were lost to follow-up, resulting in a final analytical cohort of 33 patients. The mean age of the study population was 74.23 years. The demographic characteristics of the study population, including age and sex distribution, are presented in **Table 1**.

Table 1: Demographic Characteristics of the Study Population

Male	14
Female	29
Total Study Population	43
Mean Average Age of the Population	74.23 years
Expired / Death	3
Lost Follow Up	7
Total Study Population	33

Mobility outcomes assessed using the EQ-5D-5L questionnaire at the final follow-up are summarized in **Table 2**. A total of 36.36% of patients reported no mobility problems (Level 1), while 39.39% reported slight mobility problems (Level 2). Moderate mobility limitations (Level 3) were observed in 18.18% of patients, whereas 3.03% each reported severe mobility problems (Level 4) and extreme mobility limitations or inability to ambulate (Level 5).

Table 2: Distribution of EQ-5D-5L Mobility Scores at Final Follow-Up

Score Level	Number of Patients	Percentage (%)
Level 1- No problems	12	36.36
Level 2- Slight problems	13	39.39
Level 3- Moderate problems	6	18.18
Level 4- Severe problems	1	3.03
Level 5- Unable to / extreme problems	1	3.03

Self-care outcomes, including the ability to wash and dress independently, are detailed in **Table 3**. The majority of patients (78.78%) reported no difficulty with self-care activities (Level 1). Mild difficulty (Level 2) was reported by 15.15%, while 3.03% experienced moderate difficulty (Level 3). Extreme difficulty with self-care (Level 5) was reported in 3.03% of patients, with no patients reporting severe difficulty (Level 4).

Table 3. Distribution of EQ-5D-5L Self-Care Scores at Final Follow-Up

Score Level	Number of Patients	Percentage (%)
Level 1- No problems	26	78.78
Level 2- Slight problems	5	15.15
Level 3- Moderate problems	1	3.03
Level 4- Severe problems	0	0
Level 5- Unable to / extreme problems	1	3.03

The ability to perform usual daily activities and return to routine functions is presented in **Table 4**. At the end of the follow-up period, 63.63% of patients reported no difficulty (Level 1) in resuming usual activities, while 30.30% reported slight difficulty (Level 2). Moderate difficulty (Level 3) was noted in 3.03%, and 3.03% reported extreme difficulty (Level 5). No patients reported severe difficulty (Level 4).

Table 4: Distribution of EQ-5D-5L Usual Activities Scores at Final Follow-Up

Score Level	Number of Patients	Percentage (%)
Level 1 – No problems	21	63.63
Level 2 – Slight problems	10	30.30
Level 3 – Moderate problems	1	3.03
Level 4 – Severe problems	0	0
Level 5 – Unable to / extreme problems	1	3.03

Pain and discomfort outcomes at final follow-up are summarized in **Table 5**. Absence of pain or discomfort (Level 1) was reported by 36.36% of patients, while 39.39% experienced mild pain or discomfort (Level 2). Moderate pain (Level 3) was observed in 18.18%, whereas 3.03% each reported severe pain (Level 4) and extreme pain or discomfort (Level 5).

Table 5. Distribution of EQ-5D-5L Pain / Discomfort Scores at Final Follow-Up

Score Level	Number of Patients	Percentage (%)
Level 1- No pain / discomfort	12	36.36
Level 2- Slight pain / discomfort	13	39.39
Level 3- Moderate pain /discomfort	6	18.18

Table 7: Summary of EQ-5D-5L Outcomes Across All Health Domains

EQ-5D-5L Level	Mobility	Self-Care	Usual Activities	Pain / Discomfort	Anxiety / Depression	Average (%)
Level 1	36.36%	78.78%	63.63%	36.36%	84.84%	59.4%
Level 2	39.39%	15.15%	30.30%	39.39%	6.06%	26.05%
Level 3	18.18%	3.03%	3.03%	18.18%	3.03%	9.00%
Level 4	3.03%	0%	0%	3.03%	3.03%	1.81%
Level 5	3.03%	3.03%	3.03%	3.03%	3.03%	3.03%

Level 4- Severe pain / discomfort	1	3.03
Level 5- Extreme pain / discomfort	1	3.03

Psychological outcomes related to anxiety and depression are detailed in **Table 6**. The majority of patients (84.84%) reported no symptoms of anxiety or depression (Level 1). Mild symptoms (Level 2) were reported by 6.06%, moderate symptoms (Level 3) by 3.03%, and severe or extreme symptoms (Levels 4 and 5) by 6.06% combined.

Table 6: Distribution of EQ-5D-5L Anxiety / Depression Scores at Final Follow-Up

Score Level	Number of Patients	Percentage (%)
Level 1- No anxiety / depression	28	84.84
Level 2- Slight anxiety / depression	2	6.06
Level 3- Moderate anxiety / depression	1	3.03
Level 4- Severe anxiety / depression	1	3.03
Level 5- Extreme anxiety / depression	1	3.03

A consolidated summary of EQ-5D-5L outcomes across all five domains is presented in **Table 7**. Overall, 59.4% of patients demonstrated Level 1 responses, indicating favorable outcomes across domains. 26.05% exhibited Level 2 responses, reflecting mild limitations, while 9.0%, 1.81%, and 3.03% of patients demonstrated Levels 3, 4, and 5 responses, respectively. The proportional distribution of EQ-5D-5L severity levels across the study population is illustrated in **Figure 1**, with an overall graphical summary shown in **Figure 2**.

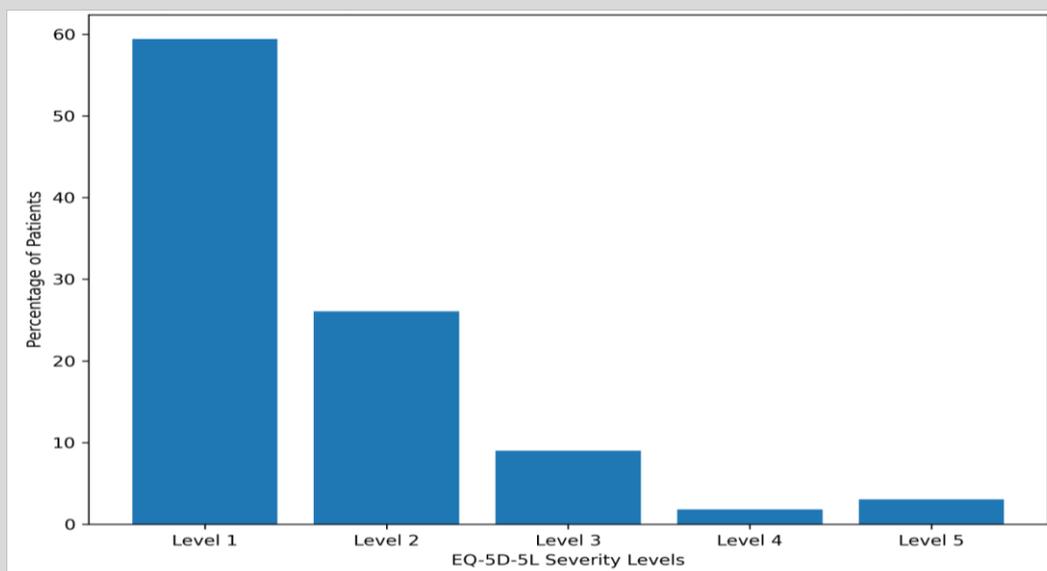


Figure 1: Percentage Distribution of Patients Across EQ-5D-5L Severity Levels

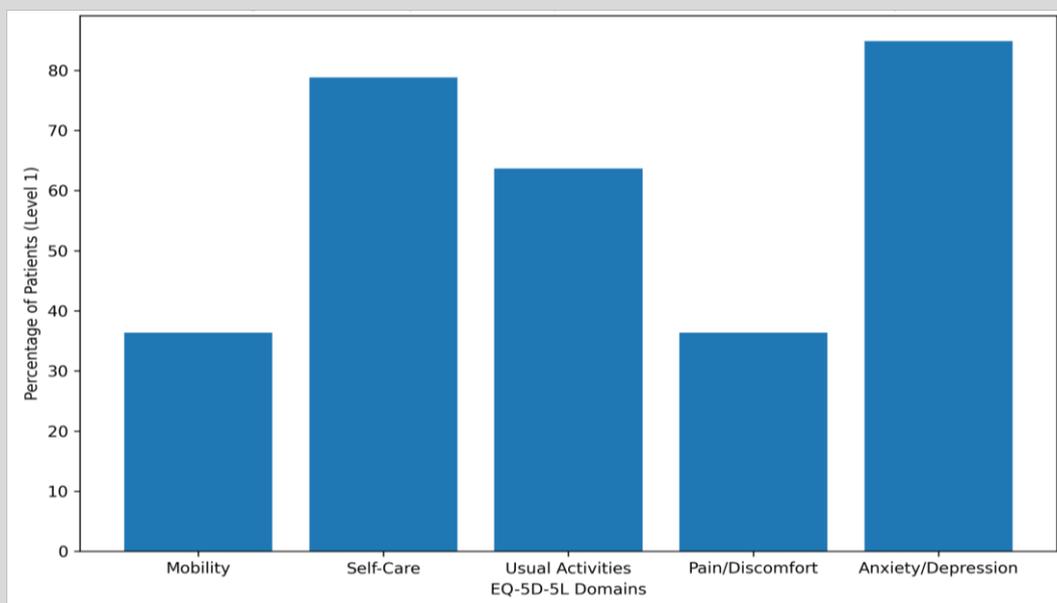


Figure 2: Summary of Patient-Reported Outcomes at Final Follow-Up

Discussion

Intertrochanteric hip fractures in elderly patients continue to represent a major challenge in orthopaedic trauma practice because of their strong association with functional decline, reduced quality of life, and increased mortality [1,2]. These fractures frequently result in prolonged disability and loss of independence, even after definitive surgical treatment. As the aging population increases globally, the burden of such injuries is expected to rise, underscoring the need for comprehensive evaluation of treatment outcomes beyond traditional clinical parameters.

Historically, outcome assessment following hip fracture surgery has focused primarily on clinician-reported endpoints such as mortality rates, perioperative complications, radiographic union, and need for reoperation [3]. While these measures are essential for evaluating surgical safety and technical success, they do not fully capture the patient's functional recovery or subjective health status. Consequently, patient-reported outcome measures (PROMs) have gained prominence as complementary tools that provide insight into functional ability, pain, emotional well-being, and overall health-related quality of life from the patient's perspective [4,5].

The application of PROMs in elderly hip fracture populations, however, presents specific challenges. High mortality rates, cognitive impairment, and loss to follow-up can significantly affect response rates and introduce selection and attrition bias, potentially limiting the validity of outcome assessments [6,7]. Despite these limitations, PROMs remain valuable instruments when applied and interpreted carefully within a clearly defined methodological framework.

Among the available PROM instruments, the EuroQol EQ-5D questionnaire has been widely adopted in orthopaedic research due to its simplicity, reliability, and applicability across diverse patient populations [8]. The five-level version (EQ-5D-5L) offers improved sensitivity and reduced ceiling effects compared with earlier versions, making it particularly suitable for evaluating outcomes in elderly patients recovering from hip fractures [9,10]. In the present study, the EQ-5D-5L enabled structured assessment across five key health domains, facilitating a comprehensive evaluation of postoperative recovery.

The findings of this study indicate that the majority of patients experienced favorable short-term outcomes following

surgical fixation of intertrochanteric hip fractures. More than half of the cohort reported no limitations across EQ-5D-5L domains at final follow-up, particularly in mobility, self-care, and usual activities. These results suggest that stable fixation with intramedullary devices, such as the proximal femoral nail, supports functional recovery and restoration of independence in elderly patients. Similar improvements in functional outcomes following intramedullary fixation have been reported in previous studies [11-13].

Despite overall positive outcomes, a subset of patients in the present cohort reported persistent pain, discomfort, and psychological distress at final follow-up. Residual pain and symptoms of anxiety or depression are recognized sequelae following hip fracture surgery and can negatively affect rehabilitation, mobility, and long-term quality of life [14]. These findings emphasize that satisfactory surgical fixation alone may not be sufficient to ensure complete recovery, particularly in vulnerable elderly populations.

Social and socioeconomic factors also appear to play an important role in postoperative recovery. Limited access to rehabilitation services, transportation difficulties, and inadequate family support can adversely affect functional outcomes and patient-reported quality of life, especially in low- and middle-income settings [15]. These factors may partly explain the variability observed in recovery trajectories among patients with similar clinical profiles. Addressing such determinants through multidisciplinary and community-based interventions may improve postoperative outcomes.

The present study has limitations that should be acknowledged. Its retrospective design limits causal inference, and the relatively small sample size may restrict generalizability. In addition, although EQ-5D-5L is a validated and widely used instrument, patient-reported outcomes are inherently subjective and may be influenced by recall bias and individual expectations. Long-term outcomes beyond one year were not evaluated, and further prospective studies with larger cohorts and extended follow-up are warranted to better characterize long-term recovery patterns.

Conclusion

Surgical fixation of intertrochanteric hip fractures using intramedullary devices leads to favorable short-term patient-

reported outcomes in most elderly patients. Improvements were most evident in mobility, self-care, and usual activities, indicating effective functional recovery. However, some patients continued to experience residual pain and psychological symptoms, underscoring the need for comprehensive postoperative care. The use of EQ-5D-5L highlights the value of patient-reported outcome measures in capturing recovery beyond clinical parameters. A multidisciplinary approach incorporating rehabilitation, pain management, and psychological support is essential to optimize quality of life following surgery.

Declarations

Ethical Approval

This study was approved by the Institutional Ethics Committee of PSG Institute of Medical Sciences & Research on 3rd September 2024.

This was an Institutional Review Board (IRB)-approved retrospective study. All patient data were de-identified, and verbal consent was obtained in accordance with institutional policy.

Author Contribution Statement

Dr. Sandeep MMR: Conceptualization, study design, data collection, data analysis, manuscript drafting.

Dr. Ezhil Vikrama Vell G: Data interpretation, statistical analysis support, critical revision of manuscript.

Dr. Hari Prasath P: Supervision, study coordination, manuscript review and editing, final approval of the version to be published, corresponding author responsibilities.

All authors have read and approved the final manuscript.

Conflict of Interest Statement

The authors declare that there are no conflicts of interest regarding the publication of this manuscript.

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