

**Original research article**

# The effectiveness of total knee arthroplasty in improving quality of life for patients with advanced knee osteoarthritis

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## **Abstract**

Total knee arthroplasty (TKA) is one of the most common surgical interventions for patients suffering from advanced knee osteoarthritis (OA). As OA progresses, patients experience increasing pain, reduced mobility, and diminished quality of life (QoL). This study aims to evaluate the outcomes of TKA in improving pain, function, and overall QoL in patients with severe knee OA. A cohort of 150 patients who underwent TKA was analyzed, focusing on pre-operative and post-operative scores using the Western Ontario and McMaster Universities Arthritis Index (WOMAC) and the Short Form-36 (SF-36) health survey. The findings suggest significant improvements in pain relief, functional mobility, and QoL, emphasizing the value of TKA in managing advanced knee OA.

**Keywords:** Total knee arthroplasty, osteoarthritis, quality of life, knee replacement, WOMAC, SF-36

## **Introduction**

Knee osteoarthritis (OA) is a degenerative joint disease affecting millions of people worldwide. Characterized by cartilage loss, joint stiffness, and pain, OA significantly impairs a patient's quality of life (QoL) as it progresses. Conservative treatments, such as physiotherapy, nonsteroidal anti-inflammatory drugs (NSAIDs) and intra-articular injections, provide symptomatic relief in the early stages. However, for advanced cases where the pain becomes unbearable and function is severely compromised, total knee arthroplasty (TKA) is often the recommended treatment.

TKA involves the surgical replacement of the damaged knee joint with an artificial prosthesis, relieving pain and restoring joint function. This paper aims to assess the effectiveness of TKA in improving the QoL of patients with advanced knee OA by analyzing functional outcomes, pain levels, and patient satisfaction following surgery.

## **Methods**

### **Study Design and Participants**

This retrospective study reviewed 150 patients who underwent TKA for advanced knee osteoarthritis at a tertiary care hospital between January 2017 and December 2018. The inclusion criteria were as follows:

- Patients diagnosed with end-stage knee osteoarthritis, confirmed by radiographic evidence (Kellgren-Lawrence Grade III or IV).
- Patients aged 50-80 years.
- Patients who underwent unilateral TKA and had completed at least 12 months of follow-up.

Exclusion criteria included patients with revision knee arthroplasty, bilateral procedures, and other knee pathologies such as rheumatoid arthritis or trauma.

## **Outcome Measures**

Two primary outcome measures were used to assess the effectiveness of TKA:

1. **Western Ontario and McMaster Universities Arthritis Index (WOMAC):** This index evaluates pain, stiffness, and physical function. Scores range from 0 to 96, with higher scores indicating greater disability.
2. **Short Form-36 (SF-36) Health Survey:** This measures general health status across eight domains, including physical functioning, bodily pain, and general health perception. Scores range from 0 to 100, with higher scores indicating better health.

Both WOMAC and SF-36 were administered pre-operatively and post-operatively at 3 months, 6 months, and 12 months after surgery.

### Statistical Analysis

Data were analyzed using SPSS version 26.0. Continuous variables were presented as mean  $\pm$  standard deviation (SD). A paired t-test was used to compare pre-operative and post-operative scores. A p-value of less than 0.05 was considered statistically significant.

### Results

#### Demographic and Clinical Characteristics

Of the 150 patients, 90 were female (60%), and 60 were male (40%), with a mean age of  $65.4 \pm 7.8$  years. Table 1 shows the baseline demographic characteristics of the study participants.

**Table 1:** Baseline Demographic and Clinical Characteristics

Characteristic	Value
Number of patients	150
Mean age (years)	$65.4 \pm 7.8$
Gender (Male/Female)	60/90 (40%/60%)
BMI (kg/m <sup>2</sup> )	$30.2 \pm 5.3$
Kellgren-Lawrence Grade	III: 55%, IV: 45%
Mean pre-operative WOMAC	$76.8 \pm 10.4$
Mean pre-operative SF-36	$38.6 \pm 12.3$

#### WOMAC and SF-36 Outcomes

The mean pre-operative WOMAC score was  $76.8 \pm 10.4$ , indicating severe pain and disability. At 12 months post-operatively, the mean WOMAC score improved significantly to  $22.4 \pm 8.1$  ( $p < 0.001$ ). Similarly, the SF-36 score improved from a pre-operative mean of  $38.6 \pm 12.3$  to  $76.4 \pm 10.9$  at 12 months ( $p < 0.001$ ).

**Table 2:** Changes in WOMAC and SF-36 Scores After TKA

Time Point	WOMAC Score (Mean $\pm$ SD)	SF-36 Score (Mean $\pm$ SD)
Pre-operative	$76.8 \pm 10.4$	$38.6 \pm 12.3$
3 months post-operative	$45.3 \pm 9.7$	$60.1 \pm 10.6$
6 months post-operative	$30.7 \pm 8.9$	$68.5 \pm 11.2$
12 months post-operative	$22.4 \pm 8.1$	$76.4 \pm 10.9$

#### Patient Satisfaction

At the 12-month follow-up, patient satisfaction was assessed using a 5-point Likert scale (1 = very dissatisfied, 5 = very satisfied). Overall, 85% of patients reported being either "satisfied" or "very satisfied" with the outcomes of their surgery, while 10% reported neutral satisfaction, and only 5% were dissatisfied, primarily due to residual stiffness or ongoing pain.

#### Discussion

The results of this study indicate that TKA significantly improves pain relief, joint function, and overall QoL for patients with advanced knee osteoarthritis. The substantial reduction in WOMAC scores reflects decreased pain and improved mobility, while the increase in SF-36 scores suggests better overall health and well-being.

Despite the general success of TKA, a small subset of patients remained dissatisfied due to ongoing pain or stiffness. This could be attributed to factors such as comorbidities, higher body mass index (BMI), or pre-existing psychological distress, all of which may negatively influence post-operative recovery. Future research should focus on identifying predictive factors for poorer outcomes to optimize patient selection for TKA.

The role of enhanced recovery after surgery (ERAS) protocols and advancements in surgical techniques may also further improve outcomes. Implementing minimally invasive approaches and optimizing pain management may reduce recovery times and increase patient satisfaction.

#### Conclusion

Total knee arthroplasty is a highly effective intervention for patients with advanced knee osteoarthritis, offering significant improvements in pain relief, functional mobility, and overall quality of life. The marked reduction in WOMAC scores and improvement in SF-36 scores highlight the efficacy of TKA in restoring joint function and enhancing patient well-being. While the majority of patients experience satisfactory outcomes, further research is warranted to address the small subset of patients who continue

to experience post-operative challenges.

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