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Patient satisfaction after total knee arthroplasty: A retrospective observational study.

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Abstract

Background:

Patient satisfaction is a key measure of total knee arthroplasty (TKA) success. Despite advances, up to 19% remain dissatisfied. This study assessed satisfaction, functional improvement, and influencing factors in an Indian cohort using the Oxford Knee Score (OKS) and Kellgren–Lawrence (KL) grading.

Methods:

A retro-prospective observational study was conducted on 243 patients (301 knees) undergoing unilateral or bilateral primary TKA between September 2014 and November 2016 at a tertiary care hospital. Demographic data, comorbidities, diagnosis, and postoperative complications were recorded. Functional outcomes were assessed using pre- and postoperative OKS at ≥12 months follow-up. Satisfaction rates were documented using direct patient responses. Statistical analysis included chi-square and t-tests, with significance set at $p < 0.05$.

Results:

Of 243 patients, 74.9% were female, and the mean age was 63.5 ± 7.50 years. Overall, 85.6% reported satisfaction with surgery. Satisfaction rates did not significantly differ by gender ($p = 0.928$) or age group ($p = 0.216$). Comorbidities influenced satisfaction: diabetes (76.3% vs. 88.6%, $p = 0.033$) and hypertension (80.7% vs. 91.7%, $p = 0.026$) were associated with lower satisfaction.

In KL grade III knees, mean preoperative OKS improved from 18.5 ± 1.78 to 35.6 ± 4.44, and in KL grade IV knees, from 14.5 ± 2.44 to 33.1 ± 6.07 ($p < 0.001$ for both). Satisfied KL grade IV knees showed a greater mean improvement in OKS (21.2 ± 2.75) compared to grade III (18.1 ± 2.22, $p < 0.001$), despite poorer baseline scores.

Conclusion:

High satisfaction rates were observed after TKA, with significant functional improvement across KL grades. Diabetes, hypertension, and lower preoperative OKS were associated with reduced satisfaction. Functional gain was greater in advanced KL grade osteoarthritis.

Recommendations:

Comorbidity optimization, patient education, and tailored postoperative rehabilitation should be prioritized to enhance satisfaction and functional outcomes after TKA.

Keywords: *Total Knee Arthroplasty, Patient Satisfaction, Oxford Knee Score, Kellgren–Lawrence Grade, Osteoarthritis, Comorbidities*
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Introduction

Total knee arthroplasty (TKA) is one of the most effective surgical procedures for alleviating pain and restoring function in patients with advanced degenerative osteoarthritis or rheumatoid arthritis [1]. The prevalence of knee osteoarthritis increases with age, contributing to a growing global demand for TKA [2]. Advances in surgical techniques, implant designs, and postoperative rehabilitation have substantially improved outcomes;

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however, a subset of patients remains dissatisfied despite technically successful procedures [3].

Historically, most TKA outcome studies have focused on surgeon-reported parameters such as implant survivorship, radiographic alignment, and range of motion [4]. These measures, while clinically relevant, do not always correlate with patient-perceived success. Patient satisfaction—first described in a clinical context by Ware et al. in 1973—has emerged as a critical endpoint, influenced by residual pain, functional limitations, comorbidities, postoperative complications, and psychological factors [1,2]. Dissatisfaction rates of up to 19% have been reported, with unmet preoperative expectations identified as a major determinant [5].

Patient-reported outcome measures (PROMs), including the Western Ontario and McMaster Universities Arthritis Index (WOMAC), Knee Injury and Osteoarthritis Outcome Score (KOOS), Knee Society Score (KSS), Short Form Health Surveys (SF-12, SF-36), and the Oxford Knee Score (OKS), have been developed to assess results from the patient's perspective [2,5]. Among these, the OKS is widely adopted due to its reliability, validity, ease of administration, and suitability for long-term follow-up [1,5].

While most existing literature on TKA satisfaction originates from Western populations, there is limited evidence from the Indian context, where cultural expectations, lifestyle factors, and socioeconomic conditions may influence outcomes. This study was therefore undertaken to evaluate patient satisfaction following TKA in an Indian cohort using the OKS, to identify factors influencing satisfaction—including age, gender, diagnosis, comorbidities, and complications—and to compare functional outcomes between radiographic Kellgren–Lawrence grades of osteoarthritis.

Methodology

Study Design and Setting

A retro-prospective observational study was conducted at Manipal Hospital, Bangalore, on patients who had undergone or were scheduled to undergo primary total knee arthroplasty (TKA) for osteoarthritis, rheumatoid arthritis, or non-traumatic arthritis, between September 2014 and November 2016. This was a retrospective observational cohort study conducted at Manipal Hospital, Bangalore, a tertiary care teaching hospital catering to a large urban and semi-urban population. The hospital is a high-volume center for orthopaedic surgeries, equipped with advanced joint replacement facilities, specialized rehabilitation units, and comprehensive diagnostic support, making it a suitable setting for studying long-term arthroplasty outcomes.

Study Population

Participants were selected using a consecutive sampling technique, whereby all eligible patients undergoing primary TKA during the study period and meeting the inclusion criteria were recruited.

Inclusion criteria

Age 25–80 years, both sexes.

Patients undergoing unilateral or bilateral primary TKA for osteoarthritis, rheumatoid arthritis, or non-traumatic arthritis.

Exclusion criteria

Revision TKA.

Post-infective arthritis (e.g., tuberculosis, septic arthritis).

Psychiatric disorders.

Severe cardiac or neurologic comorbidities contraindicate surgery.

Post-traumatic arthritis or malignancy of the knee.

Bias

Efforts were made to minimize bias. Selection bias was reduced by including consecutive patients meeting eligibility criteria during the study period. Information bias was limited by using standardized data collection forms and validated instruments such as the Oxford Knee Score. Recall bias was addressed by including only patients with a minimum 12-month follow-up, ensuring reliable recollection of satisfaction levels. Observer bias was minimized by having functional assessments independently reviewed by trained research staff not involved in surgery.

Sample Size

Sample size was calculated for the proportion of satisfied patients with TKA using previous literature values ($p = 82\%$, $p_0 = 75.1\%$), $\alpha = 0.05$, and power = 80%, resulting in **n = 243 patients**.

Data Collection

Baseline demographic data, diagnosis, comorbidities (diabetes mellitus, hypertension), and perioperative complications were recorded. Preoperative radiographs were graded according to the **Kellgren–Lawrence (KL) scale**.

Surgical Procedure

All surgeries were performed by experienced orthopedic consultants using a standard midline incision and medial parapatellar approach. Bone cuts were made with external jigs, soft-tissue balancing was performed, and cemented

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prostheses were implanted. Postoperative care involved a standard regimen consisting of antibiotics and analgesics during the first week, prophylactic anticoagulation for 3–4 weeks, and a structured physiotherapy program extending over 4–6 weeks.

Outcome Measures

Functional outcome was assessed using the **Oxford Knee Score (OKS)** preoperatively and at ≥12 months postoperatively. For bilateral TKA, each knee was scored separately. Patient satisfaction was assessed by direct questioning:

Would you undergo the same procedure on the other knee if indicated? (Yes/No)

Would you recommend the procedure to a relative/friend? (Yes/No)

Are you satisfied with the surgery? (Yes/No)

Statistical Analysis

Data were analyzed using R software (version 3.2.2). Continuous variables were expressed as mean ± SD; categorical variables as frequency and percentage. Paired t-test compared pre- and postoperative OKS. Chi-square test evaluated associations between categorical variables. An independent t-test compared means between two groups. $p < 0.05$ was considered statistically significant.

Ethical Considerations

The study was approved by the Institutional Ethics Committee of Manipal Hospital, Bangalore. Written informed consent was obtained from all participants before inclusion. Patient confidentiality was maintained throughout the study, and all procedures adhered to the ethical principles outlined in the Declaration of Helsinki.

Results

A total of 243 patients (182 females, 61 males) who underwent total knee arthroplasty (TKA) were included in the analysis. The mean age was 63.5 ± 7.50 years (range: 47–79 years). The majority of patients belonged to the age groups 55–65 years (39.9%) and >65 years (42.4%). Overall, 85.6% of patients reported satisfaction with the surgical outcome, while 14.4% were not satisfied (Table 1). No statistically significant association was observed between satisfaction rate and either gender ($p = 0.928$) or age group ($p = 0.216$).

Table 1: Demographic and Overall Satisfaction Profile of Patients (n = 243)

Parameter	Subgroup	n	%	p-value
Gender	Female	182	74.9	0.928
	Male	61	25.1	
Age Group (years)	<55	43	17.7	0.216
	55–65	97	39.9	
	>65	103	42.4	
Overall Satisfaction	Satisfied	208	85.6	—
	Not Satisfied	35	14.4	

Comorbidity analysis revealed that the presence of diabetes mellitus was significantly associated with lower satisfaction rates (76.3% vs. 88.6% in non-diabetics; $p = 0.033$). Similarly, patients with hypertension had a lower satisfaction rate (80.7%) compared to those without hypertension (91.7%), which was statistically significant ($p = 0.026$) (Table 2).

Table 2: Influence of Comorbidities on Satisfaction Rates

Comorbidity	Status	Satisfied (n, %)	Not Satisfied (n, %)	p-value
Diabetes	Present	45 (76.3)	14 (23.7)	0.033
	Absent	163 (88.6)	21 (11.4)	
Hypertension	Present	109 (80.7)	26 (19.3)	0.026
	Absent	99 (91.7)	9 (8.3)	

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Evaluation of functional outcomes using the Oxford Knee Score (OKS) demonstrated significant improvement postoperatively in both Kellgren–Lawrence (KL) grade III and IV knees. For KL grade III knees, the mean preoperative OKS was 18.5 ± 1.78, which improved to 35.6 ± 4.44 postoperatively, with a mean change of 17.1 ± 4.09. For KL grade IV knees, the mean preoperative OKS was 14.5 ± 2.44, which improved to 33.1 ± 6.07, with a mean change of 18.6 ± 6.18 ($p < 0.001$ for both groups) (Table 3).

Table 3: Oxford Knee Score (OKS) Based on Kellgren–Lawrence (KL) Grade

KL Grade	Knees (n)	Pre-op OKS (Mean ± SD)	Post-op OKS (Mean ± SD)	Change in OKS (Mean ± SD)	p-value*
III	107	18.5 ± 1.78	35.6 ± 4.44	17.1 ± 4.09	<0.001
IV	194	14.5 ± 2.44	33.1 ± 6.07	18.6 ± 6.18	<0.001

**p-value for the difference between KL grades in each category.*

When analysis was restricted to satisfied knees, KL grade IV patients demonstrated a greater mean improvement in OKS compared to KL grade III (21.2 ± 2.75 vs. 18.1 ± 2.22; $p < 0.001$), although preoperative scores were lower in grade IV knees (14.5 ± 2.39 vs. 18.5 ± 1.75) (Table 4)

Table 4: Satisfaction Rates According to KL Grade and OKS Thresholds

KL Grade	Satisfied Knees (n)	Pre-op OKS (Mean ± SD)	Post-op OKS (Mean ± SD)	Change in OKS (Mean ± SD)	p-value
III	98	18.5 ± 1.75	36.7 ± 2.31	18.1 ± 2.22	<0.001
IV	161	14.5 ± 2.39	35.7 ± 1.72	21.2 ± 2.75	<0.001

At the 12-month follow-up, satisfaction analysis based on Kellgren–Lawrence grading demonstrated that both grade III and grade IV knees showed significant improvement in Oxford Knee Scores (OKS). The detailed comparison of preoperative and postoperative scores is shown in Table 4

Discussion

This retro-prospective observational investigation explored patient satisfaction and functional recovery following total knee arthroplasty (TKA) in an Indian tertiary care hospital, with emphasis on demographic variables, associated comorbidities, and severity of osteoarthritis as determined radiographically. The overall satisfaction rate of 85.6% in this study is consistent with the range of 80–85% reported globally [6,7]. These findings indicate that outcomes achieved in Indian patients are not inferior to those in Western cohorts, despite substantial differences in social background, healthcare infrastructure, and postoperative rehabilitation resources.

Interpretation of Findings

One of the most striking observations was that individuals with advanced radiographic osteoarthritis (KL grade IV) recorded a greater degree of functional improvement compared with patients in grade III, although their preoperative scores were considerably lower. This highlights an important clinical message: patients with more severe structural damage may perceive a more profound benefit from arthroplasty, as the procedure offers significant pain relief and restoration of mobility in situations where conservative interventions are inadequate [12,13]. This reinforces the view that radiographic severity should not delay surgical intervention, as greater relative improvement is often observed in those with more advanced disease.

Demographic Influences

Age and gender were not significantly associated with satisfaction outcomes in this study. These results align with the growing evidence that demographic characteristics alone are poor predictors of postoperative satisfaction [8–10]. Instead, elements such as functional status before surgery, presence of systemic illnesses, and patient expectations are more influential in determining outcomes. This observation underscores the need for clinicians to

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focus less on chronological age or sex and more on modifiable clinical parameters when counseling patients.

Impact of Comorbidities

The presence of diabetes mellitus and hypertension was significantly linked to lower satisfaction. Chronic systemic conditions can compromise postoperative recovery through delayed wound healing, impaired muscle strength, and increased cardiovascular risk [11]. Furthermore, they may adversely influence a patient's perception of quality of life, independent of knee function. These findings highlight the necessity for rigorous preoperative medical optimization and integrated care involving endocrinologists, cardiologists, and physiotherapists to maximize postoperative gains. Counseling patients with such comorbidities regarding realistic expectations may further enhance satisfaction levels.

Radiographic Severity and Functional Gain

Improvement in Oxford Knee Scores was significant across both KL grade III and IV groups. However, the magnitude of functional gain was greater among patients with more advanced radiographic disease, reinforcing the view that the baseline severity of osteoarthritis plays a decisive role in perceived benefit. This suggests that patients with end-stage arthritis, although functionally more impaired preoperatively, stand to gain the most from surgical intervention [12,13]. Such information is clinically relevant for counseling patients and justifying early surgical referral in severe cases.

Generalizability

The external validity of these findings is most applicable to tertiary care hospitals in low- and middle-income countries, where patient demographics, cultural practices, and healthcare delivery systems are comparable. In such contexts, resource limitations, socioeconomic diversity, and differences in postoperative rehabilitation facilities mirror the environment of the present study. Nevertheless, caution is necessary when extending these results to high-income or Western settings. Variability in patient expectations, access to advanced rehabilitation protocols, and cultural perceptions of recovery can substantially influence satisfaction rates and functional outcomes. Hence, while the core clinical message is relevant globally, outcomes may differ according to health system capacity and social context.

Conclusion

This study demonstrated that total knee arthroplasty (TKA) provides high satisfaction rates (85.6%) and significant functional improvement in Indian patients, irrespective of age or gender. Functional gains, measured by the Oxford Knee Score, were substantial in both Kellgren–Lawrence grade III and IV knees, with greater relative improvement observed in advanced disease. However, diabetes mellitus, hypertension, and lower preoperative scores were associated with reduced satisfaction, underscoring the importance of optimizing comorbidities before surgery. These findings align with international literature while highlighting specific factors relevant to the Indian context. Overall, TKA remains a highly effective intervention for pain relief and functional restoration in advanced knee osteoarthritis.

Strengths and Limitations

Strengths include a clearly defined cohort, standardized surgical techniques, and use of a validated PROM (OKS) with ≥12-month follow-up. Limitations include the single-center design, potential recall bias in self-reported satisfaction, and the absence of long-term survival and revision data.

Recommendations

Preoperative optimization of comorbidities such as diabetes mellitus and hypertension should be prioritized to reduce postoperative complications and improve satisfaction. Comprehensive patient education must address realistic functional outcomes, recovery timelines, and potential limitations. Culturally tailored counselling should be incorporated to align surgical expectations with achievable results. Postoperative rehabilitation programs should be individualized, focusing on early mobilization, muscle strengthening, and joint range of motion restoration. Functional assessments, including validated PROMs like the Oxford Knee Score, should be routinely used for monitoring recovery. Multidisciplinary coordination between surgeons, physicians, physiotherapists, and nursing teams is essential to ensure holistic care and maximize long-term functional gains.

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Abbreviations

AP – Antero-posterior
BMI – Body Mass Index
DVT – Deep Vein Thrombosis

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KL – Kellgren–Lawrence grade of osteoarthritis
KOOS – Knee Injury and Osteoarthritis Outcome Score
KSS – Knee Society Score
OA – Osteoarthritis
OKS – Oxford Knee Score
PROM – Patient-Reported Outcome Measures
RA – Rheumatoid Arthritis
ROM – Range of Motion
SD – Standard Deviation
SF-36 – 36-item Short Form Health Survey
SF-12 – 12-item Short Form Health Survey
TKA – Total Knee Arthroplasty
WOMAC – Western Ontario and McMaster Universities Arthritis Index

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Conflict of interest
The authors declare no conflict of interest.

Author contributions
TPK-Concept and design of the study, results interpretation, review of literature, and preparation of the first draft of the manuscript. Statistical analysis and interpretation, revision of manuscript. **DS**- design of the study, results interpretation, review of literature, and preparing the first draft of the manuscript, and revision of the manuscript.

Data availability
Data available on request

Author Biography
Dr.Thatipamula Praful Kumar, MBBS, DNB ORTHOPAEDICS, is a highly talented orthopedic surgeon with over 5 years of clinical experience and commitment to medical education. He began his academic career as a senior resident in the Department of Orthopaedics at MNR Medical College, Sangareddy, serving from 2020 to 2021, and was promoted to Assistant Professor in 2021. He played a key role in training undergraduate and postgraduate students till 2023. Since 2023 to date, he has been working as an assistant professor in Mediciti Medical College, Ghanpur, Medchal, where he continues to mentor future orthopedic surgeons with dedication and insight. Dr.T.Praful Kumar is renowned for his exceptional surgical skills, encompassing complex trauma fixation, joint replacement, arthroscopic procedures & deformity correction, soft tissue repair and reconstructions, all performed with meticulous precision and an evidence-based approach.
He has authored several publications in reputed peer-reviewed journals, with his research Articles Indexed in leading international databases such as Directory of Open Access Journals (DOAJ), reflecting the scientific rigor, credibility, and impact of his scholarly work in advancing the field of orthopaedics. Highly regarded for his clear, methodical teaching style and his ability to instill both confidence and competence in his trainees, Dr.T.Praful Kumar embodies professionalism, integrity, and excellence in every facet of his clinical and academic endeavours. **ORCID ID:** https://orcid.org/0009-0009-2592-5740
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Her expertise spans musculoskeletal disorders, trauma care, spine surgery, and joint reconstruction. She is actively engaged in research on arthroplasty outcomes, fracture management, and orthopaedic innovations, and is dedicated to evidence-based practice, patient-centered care, and mentoring future orthopaedic surgeons. **ORCID ID:** https://orcid.org/0009-0004-2166-0670

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