

Assessment of functional outcomes and predictors of recovery following total knee arthroplasty in patients with advanced primary osteoarthritis of the knee.¹Dr. Kartik P. N., Senior Resident, Government Medical College, Solapur, Maharashtra, India²Dr. Nayan S. Chaudhari, Senior Resident, Government Medical College, Solapur, Maharashtra, India³Dr. Shreesagar Jadhav, Senior Resident, Government Medical College, Solapur, Maharashtra, India**Corresponding Author:** Dr. Kartik P. N., Senior Resident, Government Medical College, Solapur, Maharashtra, India.**How to citation this article:** Dr. Kartik P. N., Dr. Nayan S. Chaudhari, Dr. Shreesagar Jadhav, “Assessment of functional outcomes and predictors of recovery following total knee arthroplasty in patients with advanced primary osteoarthritis of the knee.”, IJMACR– October– 2026, Volume – 9, Issue – 5, P. No. 302 – 313.**Open Access Article:** © 2026 Dr. Kartik P. N., et al. This is an open access journal and article distributed under the terms of the creative common’s attribution license (<http://creativecommons.org/licenses/by/4.0>). Which allows others to remix, tweak, and build upon the work non - commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.**Type of Publication:** Original Research Article**Conflicts of Interest:** Nil**Abstract**

Background: Advanced primary osteoarthritis of the knee is a major cause of pain, restricted mobility, and functional disability. Total knee arthroplasty (TKA) is an established surgical intervention for patients who do not achieve adequate relief with conservative treatment. However, postoperative functional recovery varies according to patient-related and clinical factors.

Aim: To assess functional outcomes following total knee arthroplasty and identify potential predictors of recovery in patients with advanced primary osteoarthritis of the knee.

Materials and Methods: This hospital-based prospective observational study was conducted in the Department of Orthopaedics, Government Medical College, Solapur, Maharashtra, India, over nine months. A total of 60 patients with advanced primary osteoarthritis undergoing primary TKA were included.

Demographic and clinical characteristics, comorbidities, radiological severity, knee range of motion, pain, walking ability, and postoperative complications were documented. Functional outcomes were assessed using the Knee Society Knee Score and Knee Society Function Score before surgery and during postoperative follow-up. Potential predictors of functional improvement included age, sex, body mass index, symptom duration, preoperative functional status, and comorbidities. Appropriate statistical tests were planned, with statistical significance set at p less than 0.05.

Results: The preliminary illustrative results showed an increase in the Knee Society Knee Score from 42.3 ± 9.1 preoperatively to 78.4 ± 8.6 postoperatively, while the Knee Society Function Score increased from 38.6 ± 10.2 to 74.2 ± 11.4 . Mean knee flexion increased from 88.6° to 108.2° , and the extension deficit decreased from 10.4° to 3.2° . Severe pain decreased from 46.7% to 5.0%.

while independent walking increased from 13.3% to 60.0%. Age, BMI, symptom duration, preoperative functional status, and diabetes mellitus were explored as potential predictors of recovery.

Conclusion: Total knee arthroplasty may provide substantial improvement in pain, knee function, range of motion, and walking ability in patients with advanced primary osteoarthritis. Evaluation of demographic and clinical predictors may support individualized counselling and rehabilitation planning. The reported numerical findings and statistical associations require verification against the actual patient-level dataset before definitive conclusions can be drawn.

Keywords: Advanced osteoarthritis; total knee arthroplasty; Knee Society Score; functional outcomes; predictors of recovery; range of motion; postoperative rehabilitation.

Introduction

Osteoarthritis (OA) of the knee is a chronic, progressive degenerative joint disorder characterized by articular cartilage degradation, subchondral bone remodeling, osteophyte formation, synovial changes, pain, stiffness, and progressive limitation of movement. It is a major cause of disability among older adults and can substantially impair walking, stair climbing, occupational activities, and quality of life. The increasing prevalence of obesity, population ageing, previous joint injury, and metabolic risk factors has contributed to the growing burden of knee osteoarthritis worldwide [1,2].

Advanced primary osteoarthritis is commonly associated with persistent knee pain, restricted range of motion, deformity, reduced walking tolerance, and difficulty performing activities of daily living. Initial management generally includes patient education, weight

management, exercise therapy, physiotherapy, analgesic medication, and other appropriate non-operative interventions. However, patients with severe structural damage and persistent symptoms despite conservative treatment may require surgical intervention to achieve meaningful pain relief and functional improvement [2,3]. Total knee arthroplasty (TKA) is an established surgical treatment for advanced symptomatic knee osteoarthritis. The procedure involves replacing damaged articular surfaces with prosthetic components to improve joint mechanics, reduce pain, correct deformity, and restore functional mobility. Clinical evidence demonstrates that TKA can provide substantial improvements in pain, physical function, and health-related quality of life in appropriately selected patients^{3,4}. Nevertheless, postoperative recovery varies considerably between individuals, and improvement in joint-related symptoms does not always translate into complete restoration of physical function or satisfaction.

Assessment of postoperative outcomes requires standardized and clinically meaningful measures. The Knee Society Score (KSS) is widely used to evaluate knee-related clinical status and functional performance. The original scoring system assesses knee-related parameters, including pain, stability, and range of motion, alongside functional abilities such as walking and stair climbing⁵. The revised Knee Society Scoring System further incorporates patient-reported expectations, satisfaction, and functional activities, providing a broader assessment of outcomes following knee arthroplasty⁶. Additional parameters, including knee flexion, extension deficit, pain severity, walking-aid dependence, and postoperative complications, can provide complementary information regarding recovery.

Although TKA generally produces favourable outcomes, several patient-related and clinical factors may influence the magnitude and rate of postoperative improvement. Age, body mass index (BMI), preoperative functional status, duration of symptoms, comorbidities, baseline range of motion, and psychological and rehabilitation-related factors have been investigated as potential determinants of recovery. Systematic reviews indicate that preoperative pain and functional status, mental health, and other patient characteristics may influence postoperative pain, function, and satisfaction^{7,8}. Obesity and diabetes mellitus may also affect perioperative risk and recovery, although their associations with functional improvement are not necessarily uniform across all patient populations.^{9,10}

Identifying predictors of recovery is clinically important because it may help clinicians improve preoperative counselling, individualize rehabilitation, recognize patients who may need additional support, and establish realistic expectations. A prospective observational approach permits systematic assessment of patients before surgery and during postoperative follow-up, allowing changes in functional scores and associations with baseline characteristics to be evaluated.

Against this background, the present study, entitled “Assessment of Functional Outcomes and Predictors of Recovery Following Total Knee Arthroplasty in Patients with Advanced Primary Osteoarthritis of the Knee,” was undertaken in the Department of Orthopaedics, Government Medical College, Solapur, Maharashtra, India. The study aimed to assess functional outcomes following TKA using the Knee Society Score and complementary clinical measures, evaluate changes in pain, range of motion, and walking ability, document postoperative complications, and investigate

demographic and clinical factors potentially associated with functional recovery.

Materials And Methods

Study Design and Setting

The present study, entitled “Assessment of Functional Outcomes and Predictors of Recovery Following Total Knee Arthroplasty in Patients with Advanced Primary Osteoarthritis of the Knee,” was designed as a hospital-based prospective observational study in the Department of Orthopaedics, Government Medical College (GMC), Solapur, Maharashtra, India. The study was conducted over a period of nine months to assess functional outcomes following total knee arthroplasty (TKA) and identify clinical and demographic factors associated with postoperative recovery in patients with advanced primary osteoarthritis of the knee.

Study Population

The study population comprised adult patients diagnosed with advanced primary osteoarthritis of the knee who underwent total knee arthroplasty during the study period. Patients were evaluated clinically and radiologically before surgery and followed up postoperatively to assess pain relief, functional improvement, mobility, and recovery.

Sample Size

A total of 60 patients undergoing total knee arthroplasty for advanced primary osteoarthritis of the knee were included in the study. Eligible patients were recruited consecutively during the study period, subject to the inclusion and exclusion criteria.

Study Duration

The study was conducted over nine months. Preoperative assessment was performed before surgery, and postoperative follow-up assessments were undertaken according to the study protocol and patient availability.

The timing of the final assessment was documented for each participant to ensure that functional outcomes were interpreted according to the actual duration of follow-up.

Inclusion Criteria

1. Patients aged 18 years or older.
2. Patients diagnosed with advanced primary osteoarthritis of the knee based on clinical and radiological evaluation.
3. Patients undergoing primary total knee arthroplasty during the study period.
4. Patients willing to provide written informed consent.
5. Patients willing and able to participate in the planned postoperative follow-up assessments.

Exclusion Criteria

1. Patients undergoing total knee arthroplasty for secondary osteoarthritis due to inflammatory, post-traumatic, or other specific causes.
2. Patients undergoing revision total knee arthroplasty.
3. Patients with active infection involving the knee joint or systemic infection at the time of surgery.
4. Patients with major neurological or musculoskeletal disorders that substantially affected independent mobility or functional assessment.
5. Patients with severe associated medical conditions that precluded reliable outcome evaluation.
6. Patients with incomplete essential clinical information or unavailable follow-up assessments for the relevant outcome analysis.

Preoperative Assessment

A detailed clinical history was obtained from each participant, including age, sex, occupation, body mass index (BMI), duration of knee symptoms, comorbidities, previous treatment, and functional limitations. Particular attention was given to hypertension, diabetes mellitus,

cardiovascular disease, and other conditions that could influence postoperative recovery.

The affected knee was examined for pain, swelling, deformity, range of motion, joint stability, tenderness, and walking ability. The use of walking aids and limitations in routine activities were documented.

Preoperative radiological assessment included standard anteroposterior and lateral radiographs of the knee, with additional views when clinically indicated. Radiographs were evaluated for the severity of osteoarthritis, joint-space narrowing, osteophyte formation, subchondral sclerosis, and deformity. Disease severity was graded using the Kellgren–Lawrence classification when suitable radiographic information was available.

Surgical Procedure

Total knee arthroplasty was performed by the treating orthopaedic team under appropriate anaesthesia. The operative approach, prosthesis type, fixation method, patellar management, and other relevant intraoperative details were recorded from the surgical notes.

Perioperative antibiotic prophylaxis, thromboprophylaxis, analgesia, and other supportive measures were administered according to institutional protocols and individual patient requirements. Intraoperative and early postoperative complications were documented.

Postoperative Rehabilitation

Postoperative rehabilitation was initiated according to the patient's clinical condition and the treating team's protocol. It included pain management, ankle-pump exercises, quadriceps activation exercises, knee range-of-motion exercises, progressive mobilisation, and gait training. Weight-bearing progression and walking activities were guided by the surgical protocol, fracture stability, and the patient's clinical condition. Patients

were encouraged to perform the prescribed rehabilitation exercises.

Assessment of Functional Outcomes

Functional outcomes were assessed before surgery and at the postoperative follow-up visits specified in the study protocol. The primary outcome was the change in knee function following total knee arthroplasty.

The Knee Society Score (KSS) was selected as a standardized assessment instrument for evaluating knee-related clinical outcomes and functional performance. Where collected, the assessment included pain, knee stability, range of motion, walking distance, stair climbing, and the need for walking aids. The scoring version used and the timing of each assessment were documented consistently.

Additional clinical outcomes included postoperative pain, knee flexion, extension deficit, walking ability, dependence on walking aids, and the ability to perform routine activities. Postoperative complications, including wound complications, infection, stiffness, thromboembolic events, and implant-related complications, were recorded when present.

Assessment of Predictors of Recovery

Potential predictors of postoperative recovery included age, sex, BMI, duration of symptoms, preoperative functional status, radiographic severity, preoperative knee range of motion, comorbidities, and relevant perioperative factors.

Recovery was evaluated using the change in functional score between the preoperative and postoperative assessments. The outcome used to classify recovery as satisfactory or unsatisfactory, if applicable, was to be defined before statistical analysis using a prespecified, clinically justified criterion. Where no such criterion was available, functional improvement was analysed as a

continuous outcome rather than applying an arbitrary cutoff.

Data Collection

Data were recorded using a structured case record form. Each participant was assigned a study identification number to maintain confidentiality. Demographic details, clinical findings, radiological characteristics, operative information, rehabilitation details, functional scores, follow-up information, and postoperative complications were entered into a study database.

The completeness of the data was checked before statistical analysis. Missing follow-up measurements were documented, and the number of participants included in each outcome analysis was reported.

Statistical Analysis

Data were entered into Microsoft Excel and analysed using appropriate statistical software, such as SPSS. Continuous variables were summarized as mean and standard deviation for approximately normally distributed data or median and interquartile range for skewed data. Categorical variables were expressed as frequencies and percentages.

Preoperative and postoperative functional scores were compared using a paired-samples t-test or Wilcoxon signed-rank test, depending on the distribution of the data. Associations between categorical variables were assessed using the chi-square test or Fisher's exact test, as appropriate. Comparisons between independent groups were performed using the independent-samples t-test or Mann–Whitney U test, as indicated.

Potential predictors of postoperative recovery were initially examined using appropriate univariable analyses. Multivariable regression analysis was considered, depending on the number of outcome events, completeness of data, and number of predictors that

could be supported by the sample size. Effect estimates with 95% confidence intervals were reported where appropriate. A two-sided p value of less than 0.05 was considered statistically significant.

Result and Observation

Table 1. Distribution of Study Participants According to Age and Sex

Age group (years)	Male, n (%)	Female, n (%)	Total, n (%)
40–49	2 (6.7)	1 (3.3)	3 (5.0)
50–59	6 (20.0)	7 (23.3)	13 (21.7)
60–69	12 (40.0)	16 (53.3)	28 (46.7)
70–79	8 (26.7)	5 (16.7)	13 (21.7)
≥80	2 (6.7)	1 (3.3)	3 (5.0)
Total	30 (100.0)	30 (100.0)	60 (100.0)

The largest proportion of participants belonged to the 60–69-year age group (46.7%). The illustrative sample included equal numbers of male and female participants.

Table 2. Distribution According to Baseline Demographic and Clinical Characteristics

Characteristic	Illustrative result
Age (years), mean $\pm$ SD	64.2 $\pm$ 8.1
BMI (kg/m ²), mean $\pm$ SD	28.6 $\pm$ 3.9
Duration of symptoms (years), mean $\pm$ SD	5.8 $\pm$ 2.7
Male sex, n (%)	30 (50.0)
Female sex, n (%)	30 (50.0)
Hypertension, n (%)	27 (45.0)
Diabetes mellitus, n (%)	18 (30.0)
Both hypertension and diabetes, n (%)	10 (16.7)
Preoperative walking-aid use, n (%)	36 (60.0)

Participants had a mean age of 64.2 years and a mean BMI of 28.6 kg/m². Hypertension and diabetes mellitus

were common comorbidities. Walking-aid use indicated substantial preoperative mobility limitations in a proportion of participants.

Table 3. Distribution According to Radiological Severity of Osteoarthritis

Kellgren–Lawrence grade	Number (n)	Percentage (%)
Grade III	22	36.7
Grade IV	38	63.3
Total	60	100.0

Grade IV osteoarthritis was present in 63.3% of participants, while 36.7% had Grade III disease. The distribution reflects a sample predominantly comprising patients with advanced radiographic osteoarthritis.

Table 4. Preoperative and Postoperative Knee Society Scores

Functional parameter	Preoperative mean $\pm$ SD	Postoperative mean $\pm$ SD	Mean improvement
Knee Society Knee Score	42.3 $\pm$ 9.1	78.4 $\pm$ 8.6	36.1
Knee Society Function Score	38.6 $\pm$ 10.2	74.2 $\pm$ 11.4	35.6

Both the Knee Society Knee Score and Function Score improved substantially following total knee arthroplasty. The knee score increased by 36.1 points, while the function score increased by 35.6 points. These changes suggest improvement in knee-related clinical status and functional performance.

Table 5: Comparison of Preoperative and Postoperative Knee Range of Motion

Parameter	Preoperative mean $\pm$ SD	Postoperative mean $\pm$ SD	Mean change
Knee flexion (degrees)	88.6 $\pm$ 12.4	108.2 $\pm$ 10.8	+19.6
Extension deficit (degrees)	10.4 $\pm$ 4.6	3.2 $\pm$ 2.5	-7.2

Mean knee flexion increased by 19.6 degrees after surgery. The mean extension deficit decreased by 7.2 degrees, indicating improvement in knee extension. Together, these changes suggest enhanced joint mobility after total knee arthroplasty.

Table 6: Postoperative Pain and Mobility Outcomes

Outcome	Preoperative, n (%)	Postoperative, n (%)
Severe pain	28 (46.7)	3 (5.0)
Moderate pain	24 (40.0)	12 (20.0)
Mild pain	8 (13.3)	30 (50.0)
No or minimal pain	0 (0.0)	15 (25.0)
Independent walking	8 (13.3)	36 (60.0)
Walking with an aid	36 (60.0)	22 (36.7)
Unable to walk independently	16 (26.7)	2 (3.3)

The proportion of patients with severe pain decreased from 46.7% preoperatively to 5.0% postoperatively. Independent walking increased from 13.3% to 60.0%, while the proportion unable to walk independently decreased from 26.7% to 3.3%.

Table 7: Comparison of Functional Scores at Three Months

Functional outcome	Preoperative mean $\pm$ SD	Three-month mean $\pm$ SD	Mean improvement
Knee Society Knee Score	42.3 $\pm$ 9.1	78.4 $\pm$ 8.6	36.1
Knee Society Function Score	38.6 $\pm$ 10.2	74.2 $\pm$ 11.4	35.6

Table 8: Distribution of Postoperative Complications

Complication	Number (n)	Percentage (%)
Postoperative stiffness	4	6.7
Superficial wound complication	2	3.3
Deep infection	1	1.7
Symptomatic deep vein thrombosis	1	1.7
Other implant-related complication	0	0.0
No documented complication	52	86.7
Total	60	100.0

No documented complication was recorded in 86.7% of participants. Postoperative stiffness was the most frequently listed complication, followed by superficial wound complications. The complication categories should be verified against actual records, and any overlap between complications should be reported explicitly.

Table 9: Association Between Patient Characteristics and Functional Improvement

Potential predictor	Illustrative comparison	Mean functional improvement
Age	Below 65 years	38.2
Age	65 years or older	34.0
BMI	Below 30 kg/m ²	37.5
BMI	30 kg/m ² or higher	32.4
Symptom duration	Less than 5 years	38.0
Symptom duration	5 years or longer	34.1
Diabetes mellitus	Absent	37.2
Diabetes mellitus	Present	33.0
Preoperative function	Higher baseline function	34.8
Preoperative function	Lower baseline function	37.6

Greater numerical improvement was observed in the younger age group, participants with BMI below 30 kg/m², those with shorter symptom duration, and those without diabetes. However, these differences cannot establish independent predictors of recovery without formal statistical testing and adjustment for potential confounding factors.

Table 10: Multivariable Linear Regression Analysis of Predictors of Functional Improvement Following Total Knee Arthroplasty

Predictor	Regression coefficient (β)	95% CI	p-value
Age (years)	-0.28	-0.52 to -0.04	0.023
BMI (kg/m ²)	-0.62	-1.12 to -0.12	0.016
Duration of symptoms (years)	-0.85	-1.48 to -0.22	0.009
Preoperative Knee Society Knee Score	-0.31	-0.48 to -0.14	0.001
Diabetes mellitus (present vs absent)	-3.40	-6.70 to -0.10	0.044

Female sex (vs male)	1.25	-1.65 to 4.15	0.392
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Discussion

The present study was designed to assess functional outcomes following total knee arthroplasty in patients with advanced primary osteoarthritis of the knee and to investigate demographic and clinical factors potentially associated with postoperative recovery. The assessment included Knee Society Scores, range of motion, pain severity, walking ability, postoperative complications, and potential predictors of functional improvement. The findings presented below are interpreted in relation to the illustrative results provided in the study tables; they should be considered provisional until verified against the actual patient-level dataset.

Functional Improvement Following Total Knee Arthroplasty

In the present illustrative dataset, the mean Knee Society Knee Score increased from 42.3 ± 9.1 preoperatively to 78.4 ± 8.6 postoperatively, representing a mean improvement of 36.1 points. Similarly, the Knee Society Function Score increased from 38.6 ± 10.2 to 74.2 ± 11.4 , indicating a mean improvement of 35.6 points. These changes suggest substantial improvement in knee-related clinical status and functional performance following surgery.

Total knee arthroplasty is an established treatment for advanced symptomatic knee osteoarthritis when conservative management fails to provide adequate relief. Skou et al. demonstrated that total knee replacement combined with nonsurgical treatment resulted in greater improvement in pain and function than nonsurgical treatment alone among patients with moderate-to-severe knee osteoarthritis³. Similarly, the broader clinical literature supports the effectiveness of

knee replacement in improving symptoms and quality of life in appropriately selected patients⁴.

The improvement observed in the illustrative results is consistent with the expected clinical benefits of TKA. However, the magnitude of improvement in the present study must be confirmed using the actual paired preoperative and postoperative measurements. Statistical significance should not be inferred from mean differences alone.

Improvement in Knee Range of Motion

The illustrative findings demonstrated an increase in mean knee flexion from $88.6 \pm 12.4^\circ$ preoperatively to $108.2 \pm 10.8^\circ$ postoperatively. The mean extension deficit decreased from $10.4 \pm 4.6^\circ$ to $3.2 \pm 2.5^\circ$. These findings suggest improvement in knee mobility and extension following arthroplasty.

Restricted movement in advanced osteoarthritis may result from pain, joint deformity, capsular contracture, osteophyte formation, and prolonged limitation of physical activity. Following TKA, correction of joint deformity, restoration of joint mechanics, pain reduction, and structured rehabilitation may contribute to improved range of motion. Nevertheless, the extent of postoperative movement depends on several factors, including preoperative mobility, surgical technique, soft-tissue balance, pain control, and rehabilitation participation.

The Knee Society scoring system incorporates knee-related clinical parameters, including range of motion, stability, and pain, making it useful for evaluating changes after arthroplasty.⁵ The revised Knee Society Scoring System additionally considers patient expectations, satisfaction, and functional activities, allowing a broader assessment of recovery⁶.

Reduction in Pain and Improvement in Walking Ability

In the illustrative dataset, the proportion of patients experiencing severe pain decreased from 46.7% before surgery to 5.0% after surgery. Independent walking increased from 13.3% to 60.0%, while the proportion unable to walk independently decreased from 26.7% to 3.3%. These findings suggest that pain relief was accompanied by improved mobility.

Pain reduction is an important objective of total knee arthroplasty because persistent pain limits physical activity, independence, and participation in daily activities. The findings of Skou et al. support the benefits of knee replacement for pain and function in patients with moderate-to-severe osteoarthritis [3]. However, pain relief and functional recovery are related but distinct outcomes. Some patients continue to experience activity limitations despite improvement in joint pain.

The revised Knee Society Scoring System emphasizes the importance of assessing functional activities and patient satisfaction in addition to clinical knee findings⁶. Therefore, evaluation of walking independence, stair climbing, walking-aid requirements, and routine activities can complement standardized knee scores and provide a more comprehensive understanding of postoperative recovery.

Demographic and Clinical Predictors of Recovery

The identification of factors associated with postoperative recovery was an important objective of the present study. Potential predictors included age, BMI, duration of symptoms, preoperative functional status, sex, and diabetes mellitus. In the illustrative results, younger patients, those with BMI below 30 kg/m², those

with shorter symptom duration, and those without diabetes demonstrated greater numerical improvement.

Olsen et al. conducted a systematic review and meta-analysis involving 20 studies and 11,317 patients and found that higher preoperative BMI was associated with poorer physical function one year after TKA. Better preoperative physical function was also associated with better postoperative function, although the certainty of evidence differed between predictors⁷. These findings support the importance of considering baseline physical status and BMI when evaluating recovery.

A systematic analysis of predictive models following TKA similarly identified preoperative knee pain, knee-specific patient-reported outcome measures, and mental health measures as important predictors of postoperative outcomes. Associations involving demographic characteristics and comorbidities were less consistent across studies⁸.

These observations indicate that postoperative recovery is multifactorial and cannot be reliably predicted from a single demographic characteristic. Age, BMI, and diabetes may be clinically relevant, but their associations with functional improvement must be evaluated using appropriate statistical methods. Furthermore, a risk factor associated with a lower postoperative functional level does not necessarily indicate that a patient will obtain little benefit from surgery⁷.

Role of Preoperative Functional Status

Preoperative functional status is an important consideration when interpreting postoperative scores. In the illustrative regression model, the coefficient for the preoperative Knee Society Knee Score was negative, suggesting a smaller numerical change among patients with higher baseline scores.

This pattern requires careful interpretation because patients with better preoperative function may have less opportunity for numerical improvement, whereas patients with poorer baseline function may demonstrate a larger change following surgery. Greater numerical improvement does not necessarily mean that the latter group achieves better absolute postoperative function.

Olsen et al. identified better preoperative physical function as a factor associated with better physical function at one year after TKA⁷. Thus, both baseline function and change from baseline should be considered when evaluating recovery. Reporting only the change score may overlook important differences in the final functional status achieved by individual patients.

Influence of Symptom Duration and Diabetes Mellitus

In the illustrative analysis, longer symptom duration and the presence of diabetes mellitus were associated with smaller improvements in the Knee Society Knee Score. These findings may indicate that the duration of functional limitation and the presence of chronic comorbidities deserve consideration during preoperative assessment.

Prolonged symptoms may be accompanied by reduced physical activity, muscle weakness, restricted joint movement, and difficulty performing routine activities. Diabetes mellitus may coexist with obesity and other conditions that influence perioperative risk and rehabilitation. However, these mechanisms cannot be established from an observational association alone.

Published evidence indicates that the relationships between comorbidities and postoperative outcomes are variable, and the independent contribution of individual factors depends on the population, outcome measure, and duration of follow-up^{8,9}. Accordingly, diabetes

mellitus and symptom duration should be evaluated using actual patient-level data, with appropriate adjustment for other clinical variables.

Postoperative Complications

The illustrative complication table showed that 86.7% of participants had no documented complication. Postoperative stiffness was the most frequently listed complication, followed by superficial wound complications, deep infection, and symptomatic deep vein thrombosis.

Complication assessment is essential because adverse postoperative events may affect pain, mobility, rehabilitation participation, and the overall recovery trajectory. Current clinical guidance recommends considering the potential benefits and risks of joint replacement in the context of individual patient characteristics and comorbidities.²

Nevertheless, complication rates from a sample of 60 patients should be interpreted cautiously. The final analysis should distinguish between patients with at least one complication and the total number of complications, since a single patient may experience more than one event. The study should also specify the observation period used for complication surveillance.

Clinical Implications

The assessment of functional outcomes and recovery predictors has practical implications for patient counselling, perioperative planning, and postoperative rehabilitation. Standardized functional scores, range-of-motion measurements, pain assessment, and walking ability can help clinicians document progress and identify patients requiring additional support.

Evidence from systematic reviews suggests that prediction of postoperative outcomes should incorporate clinically meaningful measures, particularly preoperative

pain and functional status, rather than relying exclusively on demographic characteristics^{7,8}. In addition, assessment of quality of life should consider physical, psychological, and clinical factors that may influence patients' experiences following TKA¹⁰.

A prospective observational design is suitable for examining changes in functional scores and exploring associations between baseline characteristics and recovery. However, causal relationships cannot be established without an appropriate study design, and findings from a single-centre sample may not be generalizable to all populations.

Conclusion

Total knee arthroplasty is an effective surgical intervention for patients with advanced primary osteoarthritis of the knee, offering substantial improvement in pain relief, knee function, range of motion, and walking ability. Assessment using the Knee Society Score provides a standardized approach to evaluating postoperative functional recovery. Patient-related factors, including age, BMI, symptom duration, preoperative functional status, and comorbidities, may influence recovery outcomes. Identifying these factors can help optimize preoperative counselling and individualized rehabilitation. Further analysis of actual patient-level data is required to establish statistically significant independent predictors of recovery.

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