



A Prospective Study on Assessment of Quality of Life in TKR Patients Using Sf-36 and Koos-12 in a Tertiary Care Hospital

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ABSTRACT:

Introduction: Total Knee Replacement (TKR) is a surgical procedure designed to relieve pain and restore function in severely diseased knee joints. The primary indication for TKR is osteoarthritis, rheumatoid arthritis and post-traumatic arthritis. Patients typically report significant improvement in symptoms postoperatively, including a reduction in pain and an increase in mobility. The procedure has evolved significantly over time, with advancements in surgical techniques, prosthetic designs, and postoperative rehabilitation contributing to improved outcomes. The success of TKR depends on careful patient selection, surgical expertise, and the individual's adherence to a rehabilitation program.

Aim: To assess the quality of life in TKR patients using SF-36 and KOOS-12.

Materials: A prospective observational study was carried out in a 450 bedded tertiary care hospital by collecting data from patient case sheet and patient medication interview. The study subject involves 86 patients in orthopaedics who had undergone TKR surgery.

Result: A total of 100 patients were enrolled in the study including 83 Females and 17 Males. The data obtained upon completion of all phases of the study using SF-36 and KOOS-12 affirms that there is significant improvement in the pain, function and QOL of patients in which both scores agree upon. As well as social and emotional enhancement postoperatively assessed using SF-36 score. The improved QOL of patient with adherence to physiotherapy also affirmed that TKR is a highly successful surgical intervention.

Conclusion: The study measured patient specific factors affecting overall QOL outcome and demonstrated that along with the preoperative assessment and proper postoperative rehabilitation leads to successfully maximized QOL using SF-36 and KOOS-12 questionnaires.

1. Introduction

Total knee replacement (TKR) or total knee arthroplasty (TKA) is a common orthopaedic surgery that involves replacing the articular surfaces (femoral condyles and tibial plateau) of the knee joint with smooth metal and highly cross-linked polyethylene plastic ^[1]. This procedure involves the removal of damaged cartilage and bone from the surface of the knee joint and replacing them with artificial components ^[2]. This surgery is typically recommended for individuals suffering from severe knee pain and disability due to conditions such as osteoarthritis, rheumatoid arthritis, or post-traumatic arthritis. ^[3]. TKA aims to improve the quality of life of

individuals with end-stage osteoarthritis by reducing pain and increasing function and was found to improve patients' sports and physical activity ^[4]. There are two main types of the surgery: total knee replacement, where the entire joint is replaced with artificial surfaces and partial knee replacement (PKR) where only one damaged compartment of the knee is replaced ^[1].

Pain relief, restoration of function and improved QOL are outcomes that patients rank highly after TKR and they expect improvement which is achieved on most cases through this intervention efficiently. Long-term studies using quality of life metrics like SF-36 and KOOS-12 show sustained improvements, though the



success of TKR can be influenced by factors such as rehabilitation adherence and the management of potential complications. [3]

Total knee replacement (TKR) is a highly effective surgical intervention for patients with advanced knee joint damage, typically due to osteoarthritis, rheumatoid arthritis, or traumatic injury. It significantly reduces pain, improves joint function, and enhances the overall quality of life for patients who have not responded to conservative treatments. With advancements in surgical techniques, prosthetic design, and postoperative rehabilitation, TKR has demonstrated excellent long-term outcomes and high patient satisfaction. However, proper patient selection, surgical expertise, and adherence to rehabilitation protocols are crucial for optimal results and minimizing complications.

2. Methods

Study design and setting:

A prospective observational study was conducted in Orthopaedic department of a 450 bedded tertiary care hospital for a period of 6 months.

Inclusion and exclusion criteria:

A total of 86 patients were taken into the study. The inclusion criteria were all the patients who have undergone TKR including traumatic injury and patients greater than 45 years of age. The exclusion criteria were patients who are not willing to participate in the study

Ethical approval:

The study was approved from the hospital authority and institutional human ethical committee (IHEC/SJCP/A 010/2022-2023).

Study Procedure:

Data was collected using questionnaires given to the study group. These questionnaires were provided to patients who could fill them out on their own. For those who could not, questions were read aloud in Malayalam to help them understand better. The answers were recorded in an organized way. Patient details were gathered using a data entry form that included information like name, age, gender, admission date, discharge date, reason for admission, medical history, medication history, social history, known allergies, and lab results. Two types of questionnaires were used to assess the patients' quality of life: SF-36 and KOOS-12.

The SF-36 (Short Form Survey-36) consists of eight areas: Physical Functioning, Physical Role, Pain, General Health, Vitality, Social Functioning, Emotional Role, and Mental Health, which focus on health-related quality of life and the impact of physical and mental health on daily activities. On the other hand, the KOOS-12 questionnaire included Pain score, Function score, and Quality of Life. Each item in the questionnaire is rated on a 5-point scale, with scores from 1 (very dissatisfied/very poor) to 5 (very satisfied/very good). Domain scores are calculated by adding the item scores within each area and converting them to a 0-100 scale, where higher scores indicate a better quality of life.

Statistical analysis:

The analysis of the data was conducted utilizing the Statistical Package for the Social Sciences 22.0 (SPSS). Various statistical methods, including the student t test and p value and results were prepared and shown by graphical method.

3. Results

A prospective observational study titled "Assessment of quality of life in TKR patients using KOOS-12 and SF-36" was conducted over a span of 6 months. The study included a total of 100 patients. Data from 86 patients, who were regularly reviewed, was analysed to evaluate pain relief and functional improvements, as well as the emotional well-being of those who were advised on the significance of sticking to physiotherapy.

Table 1: Demographic characteristics

The patients in this study were divided into eight age groups, with the highest occurrence of total knee replacement (TKR) observed in the 61–65 age group and the lowest in those aged 76-80; most patients were under 70 years old. Gender-wise distribution showed that females made up the majority at 83%, while males accounted for only 17%, suggesting a higher predisposition to TKR among women. The primary cause of TKR was osteoarthritis, affecting 72% of patients, followed by rheumatoid arthritis at 12%. Surgical site data revealed that the left knee was more commonly involved (47%) than the right (39%), with bilateral procedures performed in 14% of cases. Analysis based on body mass index (BMI) indicated that 52% of patients were overweight and 32% were obese, emphasizing a strong link between elevated BMI and the incidence of TKR. Regarding postoperative outcomes, 64 patients reported satisfaction, while 22 expressed



dissatisfactions during follow-up. Physiotherapy adherence was assessed among 82 patients, and despite counselling, 4 were found non-adherent. Comorbidities were also prevalent, with 79 patients suffering from osteoarthritis along with lifestyle diseases such as

hypertension (53), diabetes mellitus (45), coronary artery disease, asthma, and rheumatoid arthritis, as outlined in Tables 1, highlighting the significant impact of these conditions on the quality of life in TKR patients.

Table 1: Demographic characteristics

CHARACTERISTICS		FREQUENCY	PERCENTAGE
AGE	45-50	9	9.00
	51-55	8	8.00
	56-60	15	15.00
	61-65	21	21.00
	66-70	20	20.00
	71-75	17	17.00
	76-80	8	8.00
GENDER	Male	83	83
	Female	17	17
ETIOLOGY	OA	72	72
	RA	12	12
	Trauma	5	5
	Others	11	11
SITE OF SURGERY	Left	47	47
	Right	39	39
	Both	14	14
BMI	Healthy Weight	16	16
	Overweight	52	52
	Obese	32	32
PATIENT SATISFACTION	Satisfied	64	64
	Dissatisfied	22	22
ADHERENCE TO PHYSIOTHERAPY	Adherence	82	82
	Nonadherence	4	4
COMORBIDITY	OA	79	79
	HTN	53	53
	DM	45	45
	DLP	31	31

Table 2: Comparative domains of SF-36 and KOOS - 12

Table 2 presents a comprehensive comparison of SF-36 and KOOS-12 scores assessing pain, physical function, and quality of life over time. Two months postoperatively, pain scores showed marked

improvement, with SF-36 and KOOS-12 scores increasing to 95.69% and 93.63%, respectively. Physical function also improved significantly, with SF-36 rising to 83.55% and KOOS-12 to 91.66%. The overall quality of life, assessed preoperatively, after one week, and again at two months, demonstrated a substantial rise in KOOS-12 scores from 18.50% to 81.33%. Similarly, physical



health in KOOS-12 improved drastically from 6.4% to 92.44%. Emotional health, as measured by SF-36, showed an increase from 18.59% preoperatively to 78.44% after two months. Fatigue levels decreased significantly, reflected in improved energy levels on SF-36 from 27.03% to 80.76%. Emotional well-being also saw notable enhancement, with scores rising from 31.58% preoperatively to 78.6% postoperatively. Social

functioning improved substantially in SF-36, from 17.3% to 88.02%, indicating greater patient

participation in social activities. General health perception in SF-36 increased from 30.81% to 87.09%, and overall health change was significant, with an increase from 5.23% preoperatively to 88.66% postoperatively, indicating a notable improvement in patients' overall health and well-being after TKR.

Table 2: Comparative domains of SF-36 and KOOS -12

SF-36				KOOS-12			
DOMAIN	PRE-OP	POST OP - 1WEEK	POSTOP-2 MONTHS	DOMAIN	PRE-OP	POST OP - 1WEEK	POSTOP-2 MONTHS
PAIN	13.92	46.95	95.69	PAIN	15.39	22.82	93.63
PHYSICAL FUNCTION	12.5	26.34	83.55	PHYSICAL FUNCTION	14.51	14.51	14.51
PHYSICAL HEALTH	6.4	38.08	92.44	QUALITY OF LIFE	18.5	18.5	18.5
EMOTIONAL PROBLEMS	18.59	38.35	74.44				
ENERGY FATIGUE	27.03	45.42	80.76				
EMOTIONAL WELL BEING	31.58	45.16	78.6				
SOCIAL FUNCTION	17.3	45.06	88.09				
GENERAL HEALTH	30.81	46.92	87.09				
HEALTH CHANGE	5.23	57.85	88.66				

Table 3: Comparison of pain scores in all three phases

The pain scores were evaluated at preoperative, one-week post-operation, and two months postoperatively, demonstrating a statistically significant improvement in pain reduction as determined by the student's t-test.

TIME OF DATA COLLECTION	MEAN	STANDARD DEVIATION	MEAN DIFFERENCE	t VALUE	P VALUE
PRE-OP	15.39	10.37	7.43	5.869	<0.001*
AFTER 1 WEEK	22.82	5.92			
PRE-OP	15.38	10.37	78.21	58.469	<0.001*
AFTER 2 MONTHS	93.63	5.00			
AFTER 1 WEEK	22.82	5.92	70.81	79.063	<0.001*
AFTER 2 MONTHS	93.63	5.00			

*Significant at 0.001

Table 4: Comparison Of Functional Scores Among All 3 Phases

The functional score from Koos-12 was analysed at preoperative, one-week post-operation, and two months postoperatively, demonstrating a statistically significant improvement in the patients' functional abilities at the 0.001 level, as determined by the t-test.



TIME OF DATA COLLECTION	MEAN	STANDARD	TIME OF DATA COLLECTION	MEAN	STANDARD
PRE-OP	14.51	8.95	10.88	9.337	<0.001*
AFTER 1 WEEK	25.40	6.20			
PRE-OP	14.51	8.95	77.12	51.091	<0.001*
AFTER 2 MONTHS	91.64	8.09			
AFTER 1 WEEK	25.40	6.20	66.24	55.537	<0.001*
AFTER 2 MONTHS	91.64	8.09			

*Significant at 0.001

Table 5: Comparison Of Quality of Life Among All 3 Phases

The quality-of-life domain score, derived from the statistical analysis of all three phases of the study, demonstrated a statistically significant improvement at the 0.001 level, as determined by the t-test.

TIME OF DATA COLLECTION	MEAN	STANDARD	TIME OF DATA COLLECTION	MEAN	STANDARD
PRE-OP	18.48	8.99	4.32	3.561	<0.001*
AFTER 1 WEEK	22.82	7.45			
PRE-OP	18.48	8.99	62.57	47.528	<0.001*
AFTER 2 MONTHS	81.05	8.60			
AFTER 1 WEEK	22.82	7.45	58.23	49.764	<0.001*
AFTER 2 MONTHS	81.05	8.60			

*Significant at 0.001

Table 6: Comparison Of Emotional Scores Among All 3 Phases

The emotional quotient of the patient was assessed during all three phases of the study and was found to exhibit a statistically significant improvement.

TIME OF DATA COLLECTION	MEAN	STANDARD DEVIATION	MEAN DIFFERENCE	t VALUE	P VALUE
PRE-OP	18.59	20.83	19.76	6.976	<0.001*
AFTER 1 WEEK	38.35	14.94			
PRE-OP	18.59	20.83	55.85	20.090	<0.001*
AFTER 2 MONTHS	74.44	16.70			
AFTER 1 WEEK	38.35	14.94	49.67	26.336	<0.001*
AFTER 2 MONTHS	74.44	16.70			

*Significant at 0.001

**Table 7: Comparison of social function scores among all 3 phases**

The functional limitations of the patients were analysed at all three phases of the study and were found to have a statistically significant improvement.

TIME OF DATA COLLECTION	MEAN	STANDARD DEVIATION	MEAN DIFFERENCE	t VALUE	P VALUE
PRE-OP	17.30	9.62	27.76	17.722	<0.001*
AFTER 1 WEEK	45.06	13.46			
PRE-OP	17.30	9.62	70.73	49.213	<0.001*
AFTER 2 MONTHS	88.02	9.23			
AFTER 1 WEEK	45.06	13.46	42.97	24.763	<0.001*
AFTER 2 MONTHS	88.02	9.23			

*Significant at 0.001

3. Discussion

Total Knee Replacement (TKR), or total knee arthroplasty, is a common and effective surgical intervention aimed at relieving pain and restoring function in patients with end-stage knee joint disorders, particularly osteoarthritis. Globally, osteoarthritis is one of the leading causes of disability among older adults, and the knee is among the most commonly affected joints [5]. TKR is considered when conservative treatments—such as pharmacological therapy, lifestyle modification, and physical therapy—fail to provide adequate relief [6].

The findings of this study provide valuable insights into the demographic trends, clinical characteristics, and postoperative outcomes of patients undergoing total knee replacement (TKR). The age distribution observed in this study aligns with previous literature, with the majority of cases clustered in the 61–65-year range, indicating the common onset of degenerative joint diseases such as osteoarthritis within this age group which is similar to the study conducted by Yazan Al Thaher et.al [32]. Notably, TKR was less common in the elderly population (76–80 years), possibly due to concerns related to surgical risks, comorbidities, and reduced physiological reserve, which may influence surgical candidacy or willingness to undergo major procedures. The predominance of female patients (83%) is consistent with global trends suggesting a higher prevalence of osteoarthritis and knee-related degenerative conditions among women which shown similarity with the findings of Yazan Al Thaher et.al [32]. Estrogen deficiency post-menopause, anatomical differences, and higher rates of obesity in females have been proposed as contributing factors. Furthermore, the high proportion of patients presenting with osteoarthritis (72%) reinforces its role as the principal indication for

TKR, followed by autoimmune causes like rheumatoid arthritis.

The findings regarding laterality indicated a greater prevalence of left knee involvement (47%) in comparison to the right knee (39%), with bilateral procedures constituting 14%. Although not extensively documented, this asymmetry may be indicative of individual patient activity patterns, leg dominance, or occupational behaviors. Additionally, the significant rates of overweight (52%) and obesity (32%) reinforce the accumulating evidence that associates a higher BMI with the development and advancement of knee osteoarthritis, attributed to increased mechanical stress and systemic inflammation.

The study also evaluated comorbidity profiles, highlighting a significant burden of coexisting conditions, particularly hypertension and diabetes mellitus. These comorbidities not only affect perioperative outcomes but also impact rehabilitation and long-term quality of life. This underscores the importance of multidisciplinary management in TKR patients, integrating both surgical and medical care.

Postoperative outcomes were encouraging, with statistically significant improvements across all measured domains. Pain reduction was marked, as evidenced by improved SF-36 and KOOS-12 scores, suggesting the efficacy of surgical intervention in alleviating chronic knee pain. Improvements in physical function and emotional health were also substantial, indicating that TKR contributes positively to mobility and psychological well-being which was similar to the study conducted by Xie F et.al [33] where all the domains were improved. The dramatic rise in scores related to energy, emotional well-being, and social participation



suggests a broader impact of TKR beyond physical recovery, possibly reflecting better reintegration into daily and social activities.

The improvement in quality of life and general health perception from preoperative to two-month follow-up, particularly the rise in KOOS-12 scores from 18.5% to 81.33%, highlights the rapid postoperative recovery and patient satisfaction with the procedure as seen in study conducted by Gandek B et.al (28). Furthermore, significant changes were observed in SF-36 domains such as fatigue and social functioning, emphasizing the holistic benefits of TKR. Despite counselling, 4 out of 82 patients were non-adherent to physiotherapy, indicating that while adherence was high, barriers still exist. These could be explored further in future studies to improve compliance and outcomes. The subjective dissatisfaction reported by 22 patients may relate to unmet expectations, persistent pain, or complications, warranting further qualitative research. Statistical analysis using the student's t-test confirmed the robustness of these outcomes, with significant differences across preoperative, one-week, and two-month follow-up intervals ($p < 0.001$) in all domains. This affirms the effectiveness of TKR in significantly improving pain, function, and overall health-related quality of life over a relatively short duration.

4. Conclusion

This study is aimed to assess the quality of life of TKR patients in a tertiary care hospital using SF 36 and KOOS-12 scores. Our studies demonstrated that TKR significantly improves the quality of life as evidenced by the substantial increase in both SF-36 and KOOS-12. SF-36 shows a marked improvement across the eight domains particularly in Emotional Health, Pain, Physical Function and Social Domain. These improvements show successful alleviation of pain and elevated physical capabilities which in turn leads to improvement of overall wellbeing of the patients. Similarly, KOOS-12 scores indicated enhancement in the three subscales particularly pain, physical function and Quality of life highlighting the comprehensive effect of TKR on Key functions and overall life satisfaction. Our analysis further identifies the patient specific factors like Age, Gender, Etiology, BMI, Patient satisfaction and Physiotherapy which influences the quality-of-life outcomes. The younger patients and with better preoperative health status exhibited more pronounced improvement. The need for personalised preoperative assessment and tailored postoperative rehabilitation is

required to maximise the quality of life. The strict adherence to health practitioner's advice and postoperative adherence to physiotherapy enables faster recovery and better quality of life.

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