JOINTS 2025; 3: e1583

Category: Original Article

EVALUATION OF PATIENTS' SATISFACTION AFTER KNEE ARTHROPLASTY

M. LUGHI

• • •

Orthopedic and Traumatology Operative Unit, Ausl Romagna, Forlì Hospital, Forlì, Italy

Corresponding Author
M. Lughi, MD; e-mail: lughim@gmail.com

ABSTRACT – *Objective:* Patients who undergo knee replacement surgery expect an enhancement in their quality of life. Despite good clinical outcomes, the literature reports a high percentage of patients dissatisfied with the results of their surgery. In recent years, the personalization of care and the use of Patient-Reported Outcome Measures (PROMs) have been employed to reduce the percentage of dissatisfied patients.

Subjects and Methods: Eighty-eight patients who underwent surgery between 2017 and 2020 were evaluated. Forty-four patients underwent surgery using customized prosthetic surgery protocols, while the other forty-four did not receive such approaches. A questionnaire was developed for this study, divided into three domains: clinical, functional, and subjective, including 14 questions. Two of these aimed to directly assess patient satisfaction.

Results: A significant improvement in quality of life was observed, with 94% of patients reporting satisfaction with their surgical outcomes. No statistically significant difference in postoperative satisfaction was observed between patients in the two groups. Persistent pain negatively impacted patient satisfaction. Conversely, the ability to ride a bicycle, improved knee mobility, and regained strength positively influenced satisfaction. Statistically significantly, the group of patients who underwent surgery based on customized criteria reported less pain in the immediate postoperative period, as measured by the Numeric Rating Scale (NRS) score, compared to patients in the other group.

Conclusions: Evaluating patient satisfaction independently after knee replacement surgery is essential, as it clearly reflects the patients' comprehensive judgment of their surgical outcomes. Satisfaction with the achieved outcome appears to be independent of the surgical protocols applied.

KEYWORDS: Knee Arthroplasty, Patient-reported outcome measures (PROMs), Patient satisfaction.

INTRODUCTION

Knee replacement surgery is recommended for patients whose quality of life has declined because of degenerative joint issues disease[1]. The percentage of patients dissatisfied with the outcomes of total knee arthroplasty (TKA) ranges from 8% to 27%[2]. In recent years, a cultural shift within the medical, technological, technical-surgical, and evaluative fields has emphasized the importance of focusing the therapeutic strategy around the patient in knee arthroplasty procedures[3-13]. The concept of "personalization" embodies this paradigm shift, aiming to improve both outcomes and patient satisfaction following TKA. A Personalized Diagnostic-Therapeutic Pathway (PDTP) is grounded in adherence to fast track/Enhanced Recovery After Surgery (ERAS) protocols, the application of new alignment philosophies respecting patient phenotypes[14], the use of computer/robot-assisted technologies, and the assessment of outcomes

using Patient-Reported Outcome Measures (PROMs). PROMs evaluate everyday life by directly involving patients, highlighting the significance of their perspectives[4,15-17]. Numerous PROMs are cited in the literature, each exploring clinical, functional, and psychosocial aspects in various ways. An analysis of the domains and questions included in commonly used PROMs reveals a certain level of complexity, difficulty in comprehension, and unintuitive methods for calculating results[18,19].

To simplify the approach to PROMs for collecting postoperative results, a straightforward questionnaire was prepared that included direct questions to assess patients' satisfaction with the overall outcome of knee prosthesis surgery. This allowed for a percentage value to be assigned to the degree of satisfaction expressed directly by the patients. Therefore, since this was the main goal of the study, an examination was conducted to determine which clinical and functional parameters significantly influence the reported satisfaction and whether this could be affected by the type of surgical protocol used.

SUBJECTS AND METHODS

The results of knee prosthesis surgeries performed between 2017 and 2020 were retrospectively evaluated after obtaining the approval of the CEROM (Ethical Committee of Romagna), with determination No. 1590 on May 22, 2023.

For this study, 88 patients were selected, including 29 males and 59 females, aged between 36 and 84 years (Table 1).

Inclusion criteria: all patients underwent surgery due to severe impairment of quality of life and near-constant pain with a Numeric Rating Scale (NRS) value greater than 8. A preoperative pathway was organized for all patients, which always included anesthetic consultation and weight-bearing radiographs of the lower limbs (X-ray of the pelvis and entire lower limbs under weight-bearing conditions; X-ray of the knees in Rosenberg view with bilateral weight-bearing) according to the protocol shared with the Radiology Department of G.B. Morgagni Hospital in Forlì. All surgeries were conducted by the same surgeon. Patients were selected if they were treated with the same model, posterior stabilized (PS), and all prostheses were cemented.

Exclusion criteria: during the study period, all patients operated on by the manuscript's author received posterior-stabilized (PS) cemented knee prostheses, predominantly from a specific brand. Patients who received prostheses from other manufacturers – represented by a limited number of cases – were excluded from the evaluation. In the 2017-2018 period, 44 cemented PS prostheses were implanted without employing fast track/Enhanced Recovery After Surgery (ERAS) protocols or personalized surgical technique concepts, aiming for mechanical alignment. In the 2019-2020 period, another 44 cemented PS prostheses were implanted, following fast-track/ERAS protocols and personalized surgical techniques, targeting constitutional/functional alignment. A study protocol was developed to include not only the evaluation of clinical records but also an administered questionnaire designed to be easily comprehensible. The questionnaire included questions related to pain, function, and postoperative satisfaction. This protocol was approved by the CEROM Ethics Committee. The questionnaire consisted of 14 items divided into three main domains (Table 2):

1. Clinical outcomes: This domain included five questions that primarily retrospectively investigated the clinical parameter of pain. Patients were asked whether they experienced pain in other joints, if they continued to have pain in the operated knee, to quantify their pain using the NRS, and whether they experienced pain at rest and during the night.
2. Functional outcomes: This domain consisted of seven questions evaluating functional aspects. Patients were asked about difficulties in getting out of bed or a chair, their ability to climb stairs, ride a bicycle, assess the movement of the operated knee, perform usual daily activities, and whether they had regained strength in the operated limb.
3. Subjective outcomes: This domain included only two questions. One specifically investigated the patients' satisfaction with the results obtained, while the second question asked if they would undergo the surgery again, indirectly confirming their satisfaction.

Table 1. Demographic data.

Male	Female
29	59
Age	
Min 36 years old	Max 84 years old

Table 2. Questionnaire: three main domains and 14 items.

Clinical outcomes	Functional outcomes	Subjective outcomes
1) Do you experience pain in any other joints?	6) Do you have difficulty getting out of bed?	13) Are you satisfied with the results obtained?
2) Do you experience pain in the operated knee?	7) Do you have difficulty getting up from a chair?	14) Would you undergo the surgery again?
3) How would you rate your pain on a scale from 0 to 10? (Is NRS > or < 4?)	8) Can you climb stairs?	
4) How severe is the pain in the operated knee at rest?	9) Can you ride a bike?	
5) How severe is the pain in the operated knee at night?	10) Do you have a good range of motion of the knee?	
	11) Do you carry out the usual daily activities without difficulty?	
	12) Have you regained your strength?	

Data Analysis

Descriptive statistical analysis was performed on all responses to the questionnaire items. Statistics were calculated overall and separately for each year, with all estimates accompanied by a 95% confidence interval. The association or correlation of various factors with outcomes (clinical, functional, and subjective) was assessed using the Chi-square test or non-parametric rank tests (Mann-Whitney test, Kruskal-Wallis test, Spearman's test), depending on the nature of the variable under study. Overall satisfaction (a dichotomous variable) was utilized as the outcome (y) in a multivariate logistic regression model, incorporating factors (x) found to be significant in univariate analysis, in order to evaluate the adjusted weight of each factor. A significance threshold of 0.05 was applied for all tests. Analyses were conducted using STATA 17.0 software (College Station, TX, USA).

RESULTS

Table 3 presents the percentages of positive responses to the questionnaire items. The percentage of satisfied patients who would undergo the procedure again was very high, with 94% positive responses to questions 13 and 14 of the questionnaire. Table 4 presents odds ratios indicating the association between patient dissatisfaction and the clinical and functional outcomes included in the questionnaire. Odds greater than 1 indicate that the outcome increases patient dissatisfaction with the prosthesis result of the surgery. Conversely, odds less than 1 suggest an improvement in patient dissatisfaction. Neutral odds equal to 1 do not affect patient dissatisfaction. The presence of other painful joints and nighttime pain in the operated knee was associated with lower patient satisfaction. Conversely, the ability to ride a bicycle, move the knee well, and regain strength positively influenced their satisfaction (Table 4). No statistically significant correlations were observed between any of the clinical and functional parameters included in the questionnaire and a personalized surgical approach.

DISCUSSION

Patients undergoing knee prosthesis surgery aim to improve their quality of life. Quality of life reflects personal well-being, shaped by physical health (good function, absence of symptoms), psychological

Table 3. Percentage of responses to the 14 questions of the questionnaire.

Clinical outcomes		
1) Do you experience pain in any other joints?	30% of patients experience soreness in other joints after surgery	84% would undergo the surgery again
2) Do you experience pain in the operated knee?	23% report pain in the operated knee	75% would undergo the surgery again
3) How would you rate your pain on a scale from 0 to 10? (Is NRS > or < 4?)	15% feel pain > 4 NRS	62% would undergo the surgery again
4) How severe is the pain the operated knee at rest?	8% feel pain at rest	7% would NOT undergo the surgery again
5) How severe is the pain in the operated knee at night?	8% feel pain at night	57% would NOT undergo the surgery again
Functional outcomes		
6) Do you have difficulty getting out of bed?	15% have difficulty getting out of bed	85% would undergo the surgery again
7) Do you have difficulty getting up from a chair?	19% of patients have difficulty rising from a chair	19% of patients have difficulty rising again
8) Can you climb stairs?	7% report being unable to climb stairs	5% would NOT undergo the surgery again
9) Can you ride a bike?	11% report being unable to ride a bike	60% would NOT undergo the surgery again
10) Do you have a good range of motion of the knee?	6% report poor knee movement	60% would NOT undergo the surgery again
11) Do you carry out the usual daily activities without difficulty?	3% are unable to perform normal daily activities	100% would NOT undergo the surgery again
12) Have you regained your strength?	92% regained strength to ensure function	99% would undergo the surgery again
Subjective outcomes		
13) Are you satisfied with the results obtained?	94% are satisfied with the surgery	
14) Would you undergo the surgery again?	94% would undergo the surgery again	

well-being (emotional health, no anxiety or depression, full cognitive ability), and social factors (feeling autonomous and independent). These aspects are often interconnected. Patients suffering from chronic degenerative joint diseases experience a close correlation between inflammation, pain, and depression[20]. Patients primarily seek to enhance their quality of life and place high expectations on the surgical intervention. It is the surgeon's responsibility to clarify that the final outcome should be compared to the preoperative psychological and physical status of the patient. Severe joint degeneration and alignment deviation, together with comorbidities such as obesity, diabetes, preoperative anemia, chronic pain ma-

Table 4. Calculated odds ratios from statistical data.

Clinical outcomes	Odds ratio=1	Odds ratio>1	Odds ratio>1
1) Do you experience pain in any other joints?		**OR 11.09**	
2) Do you experience pain in the operated knee?	OR=1		
3) How would you rate your pain on a scale from 0 to 10? (Is NRS > or < 4?)	OR=1		
4) How much pain do you feel in the operated knee at rest?	OR=1		
5) How much pain do you feel in the operated knee at night?		**OR 106.66**	
Functional outcomes			
6) Do you have difficulty getting out of bed?	OR=1		
7) Do you have difficulty getting up from a chair?	OR=1		
8) Can you climb stairs?	OR=1		
9) Can you ride a bike?			**OR 0.019**
10) Do you have a good range of motion of the knee?			**OR 0.05625**
11) Do you carry out the usual daily activities without difficulty?	OR=1		
12) Have you regained your strength?			**OR 0.009375**

naged with ongoing opioid use, and anxiety-depressive traits, are significant predictors of suboptimal clinical, functional, and subjective postoperative outcomes[1]. It would be beneficial to compile all these parameters into "predictive outcome scores" that could improve the information provided to patients who are candidates for knee prosthesis surgery. By comparing patient expectations with preoperative scores, it may be possible to reduce the high percentage of postoperative dissatisfaction reported in the literature. The subjective parameter of "satisfaction" needs to be contextualized more effectively during the collection of results using PROMs. Commonly used questionnaires analyze the topic of "postoperative recovery" in various ways and through multiple questions, detailing the subjective quantification of the physical, psychological, and social aspects involved. However, the parameter of "satisfaction" is rarely treated as a standalone item with a specific meaning and evaluative role regarding the quality of life of patients. Questions such as "Are you satisfied with the results of the surgery you underwent?" and "Would you have the surgery again?" directly and indirectly reflect the projected goals achieved by patients. Satisfaction is not a fixed parameter; instead, it tends to fluctuate over time. As psychological and physical conditions improve over time, the assessment of satisfaction will become more objective and reliable. Consequently, it is helpful to track this subjective parameter through serial evaluations over time.

Limitations

This study has several limitations. The first is the small number of patients, which precludes complete statistical analyses. This small sample of patients does not allow for a statistical validation of the high percentage of satisfied patients regarding the results of the knee prosthesis surgery they underwent. This limited patient group did not allow for statistically significant conclusions about the impact of clinical-surgical "personalization" on overall patient satisfaction. Another limitation, introducing potential bias, is that all patients – although at varying stages of follow-up – were interviewed simultaneously.

This prevented the evaluation of the temporal curve of both objective and subjective recovery. As a result, the assessment elements of the results were considered "static," even though they are known to change over time. Another limitation of the study relates to how the questionnaire was administered. Telephone interviews for data collection are susceptible to various biases. Despite this, all contacted patients acknowledged the purpose of the call, consented to proceed with the interview, and in many cases expressed pleasure at being re-contacted by the surgeon who reached out to them. The PROM prepared and utilized for the telephone interviews with patients may appear overly concise, and its application could be subject to understandable criticism. It has not been validated, which limits its reliability as a tool. It is important to clarify that this work is part of a clinical audit process within the Orthopedics and Traumatology Unit of the Forlì facility of the AUSL of Romagna. The analysis of responses from the selected patients has, however, confirmed that efforts are being made to optimize the patient pathway for knee prosthesis surgery, following protocols that are continually evolving in both conceptual and technical aspects of surgery.

CONCLUSIONS

A high percentage of satisfied patients was observed regarding the outcomes achieved after knee prosthesis surgery across all patients included in this study. Patients who report overall satisfaction are those who consider their postoperative condition acceptable, particularly in relation to their preoperative state, following a process of psychological or subjective re-evaluation. The direct yes-or-no question effectively captured whether the knee prosthesis met patients' expectations satisfactorily.

Informed Consent:

The informed consent form was read aloud to the patient and explained prior to the start of the questionnaire. However, since the questionnaire was conducted *via* telephone, the form was not shared with the patient in written format. The study only included the participants who accepted the conditions of the informed consent. The Ethical Committee of Romagna has approved the informed consent form adopted for the study.

Ethical Approval:

The study was approved by the CEROM (Ethical Committee of Romagna), with determination No. 1590 on May 22, 2023.

Orcid ID:

Marcello Lughi: 0000-0002-5052-1002

Conflict of Interest:

The author has no conflict of interest to declare.

Funding:

None.

Availability of Data and Materials:

Data and materials are available from the corresponding author upon reasonable request.

AI Disclosure

No form of generative artificial intelligence was used to write the manuscript.

REFERENCES

1. The WHOQOL group. The World Health Organization quality of life assessment (WHOQOL): Position paper from the World Health Organization. Soc Sci Med 1995; 41: 1403-1409.
2. Gousopoulos L, Dobbelaere A, Ratano S, Bondoux L, ReSurg, Tibesku CO, Aït-Si-Selmi T, Bonin MP. Custom total knee arthroplasty combined with personalized alignment grants 94% patient satisfaction at minimum follow up of 2 years. Knee Surg Sports Traumatol Arthrosc 2023; 31: 1276-1283. h
3. Ditton E, Johnson S, Hodyl N, Flynn T, Pollak M, Ribbons K, Walker FR, Nilsson M. Improving patient outcomes following total knee arthroplasty: identifying rehabilitation pathways based on modifiable psychological risk and resilience factors. Front Psychol 2020; 29: 11.

4. Sansone V, Fennema P, Applefield RC, Marchina S, Ronco R, Pascale W, Pascale V. Translation, cross-cultural adaptation, and validation of the Italian language Forgotten Joint Score-12 (FJS-12) as an outcome measure for total knee arthroplasty in an Italian population. BMC Musculoskelet Disord 2020; 21: 23.
5. Franceschetti E, Campi S, Gregori P, Giurazza G, Samuelsson K, Hirschmann MT, Laudisio A, Papalia GF, Zampogna B, Papalia R. No differences in terms of complications, readmissions, reoperations, and patient-reported outcomes in simultaneous bilateral versus staged bilateral total knee arthroplasty in selected patients. Knee 2024; 47: 151-159.
6. Perrone FL Baron S, Suero EM, Lausmann C, Kendoff D, Zahar A, Gehrke T, Citak M. Patient-reported outcome measures (PROMs) in patients undergoing patellofemoral arthroplasty and total knee replacement: a comparative study. Technol Health Care 2018; 26: 507-514.
7. Bansback N, Trenaman L, MacDonald KV, Hawker G, Johnson JA, Stacey D, Marshall DA. An individualized patient-reported outcome measure (PROM) based patient decision aid and surgeon report for patients considering total knee arthroplasty: protocol for a pragmatic randomized controlled trial. Musculoskelet Disord 2019; 20: 89-98.
8. Trieu J, Gould DJ, Schilling C, Spelman T, Dowsey MM, Choong PF. Patient-reported outcomes following total knee replacement in patients < 65 years of age. A systematic review and meta-analysis. J Clin Med 2020; 9: 3150.
9. Olsen U, Lindberg MF, Rose C, Denison E, Gay C, Aamodt A, Brox JI, Skare Ø, Furnes O, Lee KA, Lerdal A. Factors correlated with physical function 1 year after total knee arthroplasty in patients with knee osteoarthritis. A systematic review and meta-analysis. PLoS One 2023; 18: e0283446.
10. Toguchi K, Nakajima A, Akatsu Y, Sonobe M, Yamada M, Takahashi H, Saito J, Aoki Y, Suguro T, Nakagawa K. Predicting clinical outcomes after total knee arthroplasty from preoperative radiographic factors of the knee osteoarthritis. BMC Musculoskelet Disord 2020; 21: 9.
11. Woodland N, Takla A, Estee MM, Franks A, Bhurani M, Liew S, Cicuttini FM, Wang Y. Patient-reported outcomes following total knee replacement in patients aged 65 years and over. A systematic review. J Clin Med 2023; 12: 1613.
12. Paulsen A, Djuv A, Ludvigsen J, Dalen I. Excellent PROM results after fast-track hip and knee arthroplasty with no postoperative restrictions: a cohort study validation of fast-track surgery without postoperative restrictions. BMC Musculoskelet Disord 2022; 23: 324-331.
13. Giurazza G, Caria C, Campi S, Franceschetti E, Papalia GF, Basciani S, Zampoli A, Gregori P, Papalia R, Marinozzi A. Femoral cartilage thickness measured on MRI varies among individuals: Time to deepen one of the principles of kinematic alignment in total knee arthroplasty. A systematic review. Knee Surg Sports Traumatol Arthrosc 2025; 33: 634-645.
14. Franceschetti E, Campi S, Giurazza G, Tanzilli A, Gregori P, Laudisio A, Hirschmann MT, Samuelsson K, Papalia R. Mechanically aligned total knee arthroplasty does not yield uniform outcomes across all coronal plane alignment of the knee (CPAK) phenotypes. Knee Surg Sports Traumatol Arthrosc 2024; 32: 3261-3271.
15. Ramkumar PN, Harris JD, Noble PC. Patient-reported outcome measures after total knee arthroplasty. A systematic review. BJR 2015; 4: 120-127.
16. Vogel N, Rychen T, Kaelin R, Arnold MP. Patient-reported outcome measures (PROMs) following knee arthroplasty: a prospective cohort study protocol. BMJ Open 2020; 10: e040811.
17. Adriani M, Becker R, Milano G, Lachowski K, Prill R. High variation among clinical studies in the assessment of physical function after knee replacement: a systematic review. KSSTA 2023; 31: 3854-3860.
18. Wang Y, Yin M, Zhu S, Chen X, Zhou H, Qian W. Patient-reported outcome measures used in patients undergoing total knee arthroplasty. Bone Joint Res 2021; 10: 203-217.
19. Schatz C, Klein N, Marx A, Buschner P. Preoperative predictors of health-related quality of life changes (EQ-5D and EQ VAS) after total hip and knee replacement: a systematic review. BMC Musculoskelet Disord 2022; 23: 58.
20. Walker AK, Kavelaars A, Heijnen CJ, Dantzer R. Neuroinflammation and comorbidity of pain and depression. Pharmacol Rev 2014; 66: 80-101.