



Quality of Life and Satisfaction in Patients Above and Under 65 Years Old Submitted to Total Knee Arthroplasty

Qualidade de vida e satisfação de pacientes com idade superior ou inferior a 65 anos submetidos a artroplastia total de joelho

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Abstract

Objective To compare the level of quality of life and satisfaction after two years of total knee arthroplasties between individuals above and below 65 years of age and to identify predictor factors of poor clinical outcome and low level of satisfaction in patients undergoing arthroplasty.

Methods This is a retrospective cohort with data from patients diagnosed with knee osteoarthritis submitted to primary total knee arthroplasty from 2014 to 2018 ($n = 190$). Clinical outcomes were assessed using the following scores: visual analog scale (VAS) of pain, EQ-5D-3L and EUROQOL-VAS (quality of life scales), patient satisfaction level, and functional scale of the Knee Injury and Osteoarthritis Outcome Score (KOOS), collected through a questionnaire applied preoperatively, as well as 1, 3, 12 and 24 months after surgery.

Results Patients < 65 years old presented significantly lower values (clinical worsening) in KOOS-pain and KOOS-symptoms. There are no differences in the principal clinical scores that assess pain, function, and quality of life after the procedure, as well as in the rate of satisfaction with the procedure, among patients < 65 years old when compared with patients ≥ 65 years old. It was also observed that patients who were not satisfied with the procedure in the 24-month evaluation presented clinical results in some analyzed scores (KOOS-pain and EQ-VAS) similar to patients who declared themselves satisfied.

Conclusion Scores that assess pain, function, quality of life, as well as satisfaction rate are similar between patients < 65 years old and those ≥ 65 years old.

Keywords

- ▶ arthroplasty, replacement, knee
- ▶ musculoskeletal pain
- ▶ osteoarthritis
- ▶ patient satisfaction
- ▶ postoperative complications
- ▶ perioperative care

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Resumo

Objetivo Comparar a qualidade de vida e satisfação 2 anos após a artroplastia total de joelho em indivíduos com idade \geq e $<$ 65 anos e identificar fatores preditivos de pior evolução clínica e baixo nível de satisfação nestes pacientes.

Métodos Trata-se de uma coorte retrospectiva de dados de pacientes com diagnóstico de osteoartrite de joelho submetidos a artroplastia total primária de joelho entre 2014 e 2018 ($n = 190$). Os resultados clínicos foram avaliados de acordo com os seguintes escores: escala visual analógica (EVA) de dor, EQ-5D-3L e EUROQOL-VAS (escalas de qualidade de vida), nível de satisfação do paciente e escala funcional do Knee Injury and Osteoarthritis Outcome Score (KOOS, na sigla em inglês). Estes dados foram coletados por meio de questionário aplicado no período pré-operatório e 1, 3, 12 e 24 meses após a cirurgia.

Palavras-chave

- ▶ artroplastia do joelho
- ▶ assistência perioperatória
- ▶ complicações pós-operatórias
- ▶ dor musculoesquelética
- ▶ osteoartrite
- ▶ satisfação do paciente

Resultados Os pacientes $<$ 65 anos apresentaram valores significativamente menores (piora clínica) nas escalas KOOS-dor e KOOS-sintomas. Não houve diferenças nas principais pontuações clínicas de dor, função e qualidade de vida após o procedimento, nem no índice de satisfação com a cirurgia, entre pacientes $<$ 65 anos em comparação com aqueles \geq 65 anos. Observamos também que os pacientes não satisfeitos com o procedimento à avaliação de 24 meses apresentaram resultados clínicos em alguns escores analisados (KOOS-dor e EQ-VAS) semelhantes aos dos pacientes que se declararam satisfeitos.

Conclusão Os escores que avaliam dor, função, qualidade de vida e índice de satisfação são semelhantes entre os pacientes $<$ 65 anos e aqueles \geq 65 anos.

Introduction

Knowledge about the possible outcomes of total knee arthroplasty (TKA) is becoming increasingly important given the increasing number of surgeries and the related high costs.^{1,2} In general, TKA has been documented as a satisfactory procedure for pain relief and restoration of joint function, a fact that has contributed to the sharp increase in demand for the procedure, with its consequent economic impact.³ Although TKA is generally considered cost-effective and with proven improvement in motor function, mobility, and quality of life, a subset of patients report prolonged pain and functional impairment or remain dissatisfied with the results.⁴ Studies suggest that poor clinical results and dissatisfaction with the procedure may even be higher in the population $<$ 60 years old.⁵⁻⁸

On the other hand, studies in the past decade have shown that TKA in patients $<$ 55 years old has success rates comparable to those observed in an older population.⁹ However, it is important to highlight that the opinions of surgeons and their patients on the outcome of medical and surgical interventions do not always agree, especially regarding the evaluation of pain and function.^{10,11} Similarly, the scores of functional outcomes after surgery do not necessarily correlate with patient satisfaction.¹² As the prevalence of osteoarthritis in young individuals is likely to increase,¹³ it is important to evaluate the efficacy of TKA in this population.

Thus, the present study has the primary objective of comparing the level of quality of life and satisfaction at the 2-year follow-up of TKA between individuals \geq and $<$ 65

years of age and, as a secondary objective, to identify predictor factors of poor clinical outcome and low level of satisfaction in patients undergoing this procedure.

Material and Methods

Data Collection

The present study is a retrospective cohort with data from patients diagnosed with knee osteoarthritis submitted to a primary TKA from 2014 to 2018.

The inclusion criteria were patients whose TKA was primary, diagnosis of knee osteoarthritis, and data in the medical records respecting the proposed follow-ups. The exclusion criteria were: revision TKA, nonconventional TKA, simultaneous bilateral TKA, unicompartmental TKA, and patients not evaluated at the 24-month postoperative follow-up.

Postoperative clinical outcome and patient satisfaction were assessed using the following scores: visual analog scale (VAS) of pain, EQ-5D-3L and EUROQOL-VAS (quality of life scales), patient satisfaction level (very satisfied, satisfied, indifferent, dissatisfied, and very dissatisfied), and functional scale of the Knee Injury and Osteoarthritis Outcome Score (KOOS). For better data analysis, all those who answered the satisfaction questionnaire as “indifferent,” “dissatisfied,” or “very dissatisfied” were grouped as patients who were not satisfied with the treatment. In all the scores analyzed here (except VAS of pain), higher values reflect the clinical improvement of the patient. In surgeries performed since October 2017, the KOOS was replaced by the KOOS Physical

Function – Shortform (KOOS-PS) in the postoperative evaluation of patients. All the mentioned outcomes were collected through a questionnaire applied to the patient via telephone calls at 1, 3, 12, and 24 months after surgery.

The factors analyzed were gender, age, laterality, body mass index (BMI), days of hospitalization, comorbidities, smoking, readmission within 30 days, and acute complications.

Data Analysis

The descriptive analyses of the variables were based on absolute frequencies and percentages for categorical variables and on summary measures such as means and standard deviations (SDs), medians and quartiles, as well as minimum and maximum values for numerical variables. The distributions of the numerical variables were studied through histograms and boxplots and the Shapiro-Wilk normality test.

To compare the scores of knee functionality, quality of life, and knee pain between baseline and postoperative evaluations and between age groups. Generalized mixed models were adjusted considering the dependence between the evaluations in the same patient, with normal or gamma probability distribution, seeking the best fit according to the AIC adjustment quality criterion.

The proportion of patients satisfied or very satisfied at the 24-month postoperative evaluation was compared between age groups using a binary logistic regression model.

The results of the adjusted models were presented by estimated mean values and 95% confidence intervals (CI), with p-values corrected by the sequential Bonferroni method.

The analyses were performed with the aid of the SPSS program, considering a significance level of 5%.

The present study was approved by the Ethics Committee under registration number 4.405.818. The Ethics Committee waived the need for individual informed consent for publication.

Results

A total of 190 patients underwent TKA from 2014 to 2018 and met the eligibility criteria of the present study, 37 (19.5%) patients < 65 years old and 153 (80.5%) ≥ 65 years old. The clinical and demographic data of the patients, according to the age group, are shown in **Table 1**.

In both age groups, there was a significant increase (or significant reduction in VAS for pain) of all scores in the evaluations at 24 months compared with the preoperative evaluations, thus evidencing an improvement of all these parameters. Comparing the age groups, no significant differences were observed between them at 24 months of evaluation in relation to KOOS-PS (**Fig. 1A**), EQ-5D (**Fig. 1B**), EQ-VAS (**Fig. 1C**), and VAS of knee pain (**Fig. 1D**). Regarding the pain and symptom subscales of the KOOS, there was a significant difference in the preoperative evaluation

Table 1 Clinical and demographic data of patients submitted to total knee arthroplasty, according to age group

Demographics	Age group	
	< 65 years old (n = 37)	≥ 65 years old (n = 153)
Gender		
Female	23 (62.2%)	111 (72.5%)
Male	14 (37.8%)	42 (27.5%)
BMI (kg/m ²)		
Average (SD)	30.4 (5.5)	29.3 (5.0)
Comorbidities and habits		
Hypertension	21 (56.8%)	71 (46.4%)
Diabetes mellitus	9 (24.3%)	30 (19.6%)
Behavioral disorders	3 (8.1%)	28 (18.3%)
Smoking	3 (8.1%)	1 (0.7%)
Previous oncological diagnosis	4 (10.8%)	10 (6.5%)
Cardiopathy	1 (2.7%)	18 (11.8%)
Hospital stay (days)		
Average (SD)	4.2 (1.9)	4.6 (2.6)
Readmission in 30 days		
No	37 (100.0%)	153 (100.0%)
Complications		
No	36 (97.3%)	150 (98.0%)
Yes	1 (2.7%)	3 (2.0%)

Abbreviations: BMI, body mass index; SD, standard deviation.

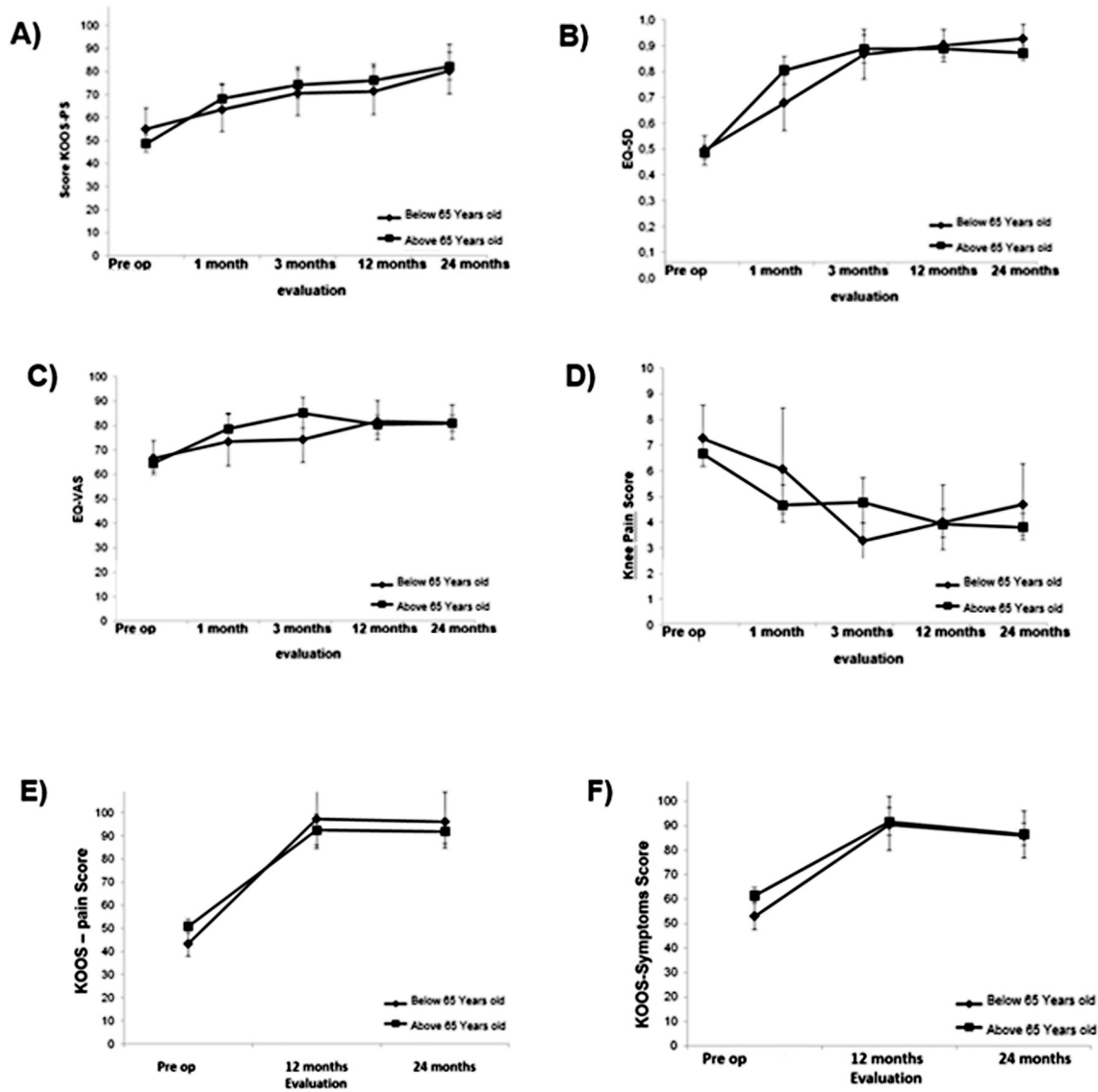


Fig. 1 Estimated means and 95% confidence intervals for the various scores analyzed in pre- and postoperative evaluations of patients submitted to TKA, according to the age group analyzed: (A) score of knee functionality of the KOOS-PS instrument; (B) quality of life score of the EQ-5D instrument; (C) quality of life score of the EQ-VAS instrument; (D) visual analog scale (VAS) of pain; (E) KOOS pain subscale; (F) subscale of KOOS symptoms.

between age groups, in which patients < 65 years old presented lower values than patients \geq 65 years or older (**Figs. 1E** and **1F**). There was no difference between the other KOOS subscales.

Regarding the satisfaction assessment, 134 patients were evaluated, and only 3 patients (12%) in the age group < 65 years old were not satisfied with the treatment. Of the group of patients \geq 65 years old, only 10 patients (9.17%) were not satisfied. However, no differences were observed between satisfied and dissatisfied patients regarding the EQ-VAS score (at 24 months) and the KOOS-pain (at 24 months) in the 2 age groups analyzed. Of the patients not satisfied, none had postoperative complications.

Discussion

The results of the present study show, as its main findings, that there are no differences in the main clinical scores that assess pain, function, and quality of life after TKA, neither in the rate of satisfaction with the procedure, among patients < 65 years old when compared with patients \geq 65 years old. Interestingly, it was also observed that patients who were not satisfied with the procedure at 24 months of follow-up, in both groups, presented clinical results in some analyzed scores (KOOS-pain and EQ-VAS) similar to those of patients who declared themselves satisfied. This fact suggests that the reason for dissatisfaction after TKA should be better

investigated, because the reason for dissatisfaction may not necessarily be only clinical.

Although there is no consensus between age and satisfaction in the literature, some studies report higher dissatisfaction rates in younger patients. Williams et al.¹⁴ demonstrated that the satisfaction of patients < 55 years old is lower due to factors related to functional demands, which tend to be higher in this group of patients. This result was corroborated by Scott et al.,¹⁵ in which 25% of patients < 55 years old submitted to TKA were dissatisfied at 12 months postoperatively. In the present study, in the preoperative evaluation, it was noticed that patients < 65 years old presented significantly lower values (clinical worsening) in 2 clinical scores measured (KOOS-pain and KOOS-symptoms), which can demonstrate that, because they are younger, these patients value their complaints more, leading, in turn, to a higher expectation of clinical improvement and satisfaction after TKA compared with older patients. Therefore, it is necessary to educate the patient and align the expectations between patient and surgeon, thus being in accordance with the results of Noble et al.,¹⁶ who concluded that preoperative expectation was the main predictor of satisfaction in patients < 60 years old.

There was no significant difference in the dissatisfaction rates between the two age groups analyzed, as well as there was no significant difference in any other clinical score analyzed in any time of follow-up between patients younger or older than 65 years old. There was also no difference between satisfied and dissatisfied patients regarding the EQ-VAS score (at 24 months) and KOOS-pain (at 24 months) in the two groups analyzed, demonstrating that there may not be a correlation between satisfaction and the main clinical scores commonly evaluated in the literature. Similarly, other authors have already called attention to satisfaction as a significant result to be measured after TKA, as they had already documented a discrepancy between the satisfaction reported by patients and other clinical scores.^{11,17} This information suggests that other factors, not necessarily clinical or radiographic, may be related to patient satisfaction rates, such as the own experience of the patient during hospitalization. These findings, as already mentioned by Bullens et al.,¹² suggest that the priorities and concerns of patients and surgeons may be different.

As seen in our results, the dissatisfaction rate in the present study was slightly lower than that found by other authors, which is of ~ 15 and 20% in the general population.^{18,19} Therefore, it is suggested that some factors may have contributed to the lower rates of dissatisfaction in our population compared with the literature, such as the socioeconomic profile of patients and, mainly, the implementation of a managed protocol for all TKAs performed at the institution after 2013, which standardized the patient care process and led to improvements in medical practice.²⁰ Similar to the satisfaction rate reported in the present study, there was also no significant difference in clinical scores of pain, function, and quality of life among patients younger or older than 65 years old, thus suggesting that TKA can be an effective treatment even in younger patients. It is interesting

to note that although some studies have reported higher rates of dissatisfaction among younger patients, age may not be a predictive factor for dissatisfaction in itself. Scott et al.,²¹ for example, in a study with 1,217 patients who underwent TKA, concluded in the multivariate analysis of the data that age did not influence satisfaction. The same conclusion was found in another study by the same authors, where the lower age of the patients was not pointed out as an independent predictive factor for dissatisfaction after the procedure.²¹ However, a larger number of studies with a more robust methodology investigating variables interfering with dissatisfaction after TKA is still necessary, and, therefore, it is advisable that the younger patient be informed of the increased risk of dissatisfaction compared with older patients.

Several limitations of the present study need to be addressed. First, it is a study with a retrospective analysis, which can lead to an information bias. This risk was minimized as patients with insufficient data were excluded from the analysis. In addition, the age group < 65 years old was composed of only 37 patients, limiting the statistical power of the analysis. Finally, the follow-up of the patients was considered short (2 years). However, we believe that this time is not at all inadequate, considering the purpose of the present study (finding clinical differences and levels of satisfaction between two age groups). Despite the limitations, the present study brings important questions involving patients undergoing TKA, which come from the analysis of important, but little analyzed clinical scores, such as quality of life and satisfaction, which, therefore, can serve as a reference for other authors.

Conclusion

Based on patient-reported outcomes, after TKA, scores that assess pain, function, and quality of life, as well as the satisfaction rate, are similar among patients < 65 years old and those \geq 65 years old.

Conflict of Interests

The authors have no conflict of interests to declare.

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References

- 1 OECD. (2016). "Hip and knee replacement", in Health at a Glance: Europe 2016: State of Health in the EU Cycle, OECD Publishing, Paris. Available from: https://doi.org/10.1787/health_glance_eur-2016-60-en
- 2 Krummenauer F, Wolf C, Günther KP, Kirschner S. Clinical benefit and cost effectiveness of total knee arthroplasty in the older patient. *Eur J Med Res* 2009;14(02):76-84
- 3 da Silva RR, Santos AA, de Sampaio Carvalho Júnior J, Matos MA. Quality of life after total knee arthroplasty: systematic review. *Rev Bras Ortop* 2014;49(05):520-527
- 4 Felix J, Becker C, Vogl M, Buschner P, Plötz W, Leidl R. Patient characteristics and valuation changes impact quality of life and

- satisfaction in total knee arthroplasty - results from a German prospective cohort study. *Health Qual Life Outcomes* 2019;17(01):180
- 5 Knutson K, Lindstrand A, Lidgren L. Survival of knee arthroplasties. A nation-wide multicentre investigation of 8000 cases. *J Bone Joint Surg Br* 1986;68(05):795-803
 - 6 Klit J, Jacobsen S, Rosenlund S, Sonne-Holm S, Troelsen A. Total knee arthroplasty in younger patients evaluated by alternative outcome measures. *J Arthroplasty* 2014;29(05):912-917
 - 7 Rand JA, Ilstrup DM. Survivorship analysis of total knee arthroplasty. Cumulative rates of survival of 9200 total knee arthroplasties. *J Bone Joint Surg Am* 1991;73(03):397-409
 - 8 Parvizi J, Nunley RM, Berend KR, et al. High level of residual symptoms in young patients after total knee arthroplasty. *Clin Orthop Relat Res* 2014;472(01):133-137
 - 9 Diduch DR, Insall JN, Scott WN, Scuderi GR, Font-Rodriguez D. Total knee replacement in young, active patients. Long-term follow-up and functional outcome. *J Bone Joint Surg Am* 1997;79(04):575-582
 - 10 Rothwell PM, McDowell Z, Wong CK, Dorman PJ. Doctors and patients don't agree: cross sectional study of patients' and doctors' perceptions and assessments of disability in multiple sclerosis. *BMJ* 1997;314(7094):1580-1583
 - 11 Janse AJ, Gemke RJ, Uiterwaal CS, van der Tweel I, Kimpfen JL, Sinnema G. Quality of life: patients and doctors don't always agree: a meta-analysis. *J Clin Epidemiol* 2004;57(07):653-661
 - 12 Bullens PH, van Loon CJ, de Waal Malefijt MC, Laan RF, Veth RP. Patient satisfaction after total knee arthroplasty: a comparison between subjective and objective outcome assessments. *J Arthroplasty* 2001;16(06):740-747
 - 13 Hootman JM, Helmick CG. Projections of US prevalence of arthritis and associated activity limitations. *Arthritis Rheum* 2006;54(01):226-229
 - 14 Williams DP, Price AJ, Beard DJ, et al. The effects of age on patient-reported outcome measures in total knee replacements. *Bone Joint J* 2013;95-B(01):38-44
 - 15 Scott CE, Oliver WM, MacDonald D, Wade FA, Moran M, Breusch SJ. Predicting dissatisfaction following total knee arthroplasty in patients under 55 years of age. *Bone Joint J* 2016;98-B(12):1625-1634
 - 16 Noble PC, Conditt MA, Cook KF, Mathis KB. The John Insall Award: Patient expectations affect satisfaction with total knee arthroplasty. *Clin Orthop Relat Res* 2006;452(452):35-43
 - 17 Mäntyselkä P, Kumpusalo E, Ahonen R, Takala J. Patients' versus general practitioners' assessments of pain intensity in primary care patients with non-cancer pain. *Br J Gen Pract* 2001;51(473):995-997
 - 18 Niemeläinen M, Moilanen T, Huhtala H, Eskelinen A. Outcome of knee arthroplasty in patients aged 65 years or less: a prospective study of 232 patients with 2-year follow-up. *Scand J Surg* 2019;108(04):313-320
 - 19 Gunaratne R, Pratt DN, Banda J, Fick DP, Khan RJK, Robertson BW. Patient Dissatisfaction Following Total Knee Arthroplasty: A Systematic Review of the Literature. *J Arthroplasty* 2017;32(12):3854-3860
 - 20 Foni NO, Costa LAV, Paião ID, et al. Clinical pathway improves medical practice in total knee arthroplasty. *PLoS One* 2020;15(05):e0232881
 - 21 Scott CE, Howie CR, MacDonald D, Biant LC. Predicting dissatisfaction following total knee replacement: a prospective study of 1217 patients. *J Bone Joint Surg Br* 2010;92(09):1253-1258