

ORIGINAL ARTICLE

Influence of fulfilment patient expectations in outcomes after total knee arthroplasty[☆]



A. Espinosa^{a,*}, M. Jiménez^a, P. Zorrilla^a, A. López^b, J.A. Salido^a, M. Amo^c

^a Servicio Cirugía Ortopédica y Traumatología, Hospital General Universitario de Ciudad Real, Ciudad Real, Spain

^b Departamento de Ciencias Morfológicas y Cirugía, Facultad de Medicina, Universidad Alcalá de Henares, Alcalá de Henares, Madrid, Spain

^c Área Docente de Bioestadística, Departamento de Matemáticas, Universidad de Castilla La Mancha, Ciudad Real, Spain

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KEYWORDS

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Abstract

Background and objective: Compliance with preoperative expectations of patients undergoing total knee arthroplasty (TKA) is related to the degree of satisfaction, but its effect on other outcomes has not been studied. The aim of this study is to determine whether meeting expectations influences clinical, functional and quality of life outcomes at one year after surgery.

Material and methods: The expectations of 183 patients were evaluated through the Hospital for Special Surgery Knee Replacement Expectations Survey. The Visual Analog Scale, Knee Society Score, WOMAC and SF-36 questionnaires were administered preoperatively and at the annual review. Comparisons were made between compliance with expectations and socio-demographic variables, postoperative complications, improvement in the questionnaires and degree of satisfaction.

Results: Patients without postoperative complications were significantly ($p < 0.005$) in the group that had fulfilled all their expectations. A statistically significant relationship ($p < 0.001$) was also observed between this group and a higher degree of satisfaction. Finally, the fulfillment of all expectations was associated with a greater improvement ($p < 0.001$) in the KSS-Function and SF-36 questionnaires.

Conclusions: Compliance with preoperative expectations is related to a greater improvement in functionality and quality of life at one year of the RTA and significantly affects satisfaction. These findings will allow us to adjust expectations to what is really expected from the surgery, in order to avoid poor results and dissatisfaction.

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* Corresponding author.

E-mail address: alfonso.espinosa.ruiz@gmail.com (A. Espinosa).

PALABRAS CLAVE

Expectativas;
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Influencia del cumplimiento de las expectativas del paciente en los resultados de la artroplastia total de rodilla**Resumen**

Antecedentes y objetivo: El cumplimiento de las expectativas preoperatorias de los pacientes sometidos a una artroplastia total de rodilla (ATR) está relacionado con el grado de satisfacción, pero no se ha estudiado su efecto en el resto de resultados. El objetivo del presente estudio es determinar si el cumplimiento de las expectativas influye sobre los resultados clínicos, funcionales y de calidad de vida al año de la intervención.

Material y métodos: Las expectativas de 183 pacientes se evaluaron a través del Hospital for Special Surgery Knee Replacement Expectations Survey. Se administraron los cuestionarios Escala Analógica Visual, Knee Society Score, WOMAC y SF-36 de forma preoperatoria y en la revisión anual. Se establecieron comparaciones entre el cumplimiento de las expectativas y las variables sociodemográficas, las complicaciones postoperatorias, la mejoría en los cuestionarios y el grado de satisfacción.

Resultados: Los pacientes sin complicaciones postoperatorias se encontraron de forma significativa ($p < 0.005$) en el grupo que había cumplido todas sus expectativas. También se observó una relación estadísticamente significativa ($p < 0.001$) entre este grupo y un mayor grado de satisfacción. Por último, el cumplimiento de todas las expectativas se asoció con una mejoría mayor ($p < 0.001$) en los cuestionarios KSS-Función y SF-36.

Conclusiones: El cumplimiento de las expectativas preoperatorias se relaciona con una mejoría mayor en la funcionalidad y la calidad de vida al año de la ATR e incide significativamente sobre la satisfacción. Estos hallazgos permitirán ajustar las expectativas a lo realmente esperable de la cirugía, de manera que se eviten malos resultados e insatisfacción.

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Introduction

Total knee arthroplasty (TKA) is an effective treatment which has been proven to alleviate pain, improve function and provide a better quality of life.^{1,2} As a result its use has notably increased, especially in young patients, and it has been estimated that in the year 2030 in the United States patients under 65 years of age³ will receive over half of all joint replacements. However, some authors remark on the high percentages of dissatisfaction after TKA related to non fulfilment of preoperative patient^{4,5} expectations. The higher these expectations the higher the rates of dissatisfaction.⁶

Patient expectations are a major factor to consider in the decision to undergo a TKA.⁷ they may be classified into several categories which refer to pain relief, improvement in functional status and the re-establishment of psychosocial well-being.^{8,9} Several studies establish that sociodemographic factors impact the amount of expectations regarding surgery,^{10,11} although there is controversy in this regard.¹² There is however, consensus, on the fact that patients who are over optimistic tend to demonstrate unrealistic expectations regarding postoperative pain, function and recovery.¹³

These findings have raised growing interest from the scientific community in establishing the relationship between preoperative patient expectations, outcomes and satisfaction levels. Although it has been demonstrated that there is a close correlation between fulfilment of expectations and

satisfaction,¹⁴ there are no available studies which assess whether the fulfilment of patient expectations impacts other TKA outcomes.

For this reason, the aim of this study was to determine the effect of preoperative expectation fulfilment by patients who underwent TKA on clinical, functional and quality of life outcomes one year after surgery. The aim was to conduct a holistic approximation to assess the outcomes of TKA which incorporated the effect of patient expectation fulfilment.

Material and methods**Study design**

A prospective observational study was conducted of patients who were going to undergo primary TKA by 4 specialist surgeons. The study was approved by the hospital ethics committee prior to its commencement and the patients signed their informed consent prior to their inclusion in the same. The patients were consecutively included with a follow-up of one year.

Patients

All the patients were implanted with a primary TKA Triathlon® (Stryker Howmedica) model, using the medial parapatellar approach in all cases. Patients with primary osteoarthritis of the knee and secondary to osteonecrosis or rheumatic diseases were included. Exclusion criteria

were: serious psychiatric disorders, aged under 50 years, re-interventions and death during follow-up.

Data collection

Preoperative data were collected in a medical practice prior to surgery and were compared with those collected at the annual review. Preoperative assessment included questions on age, sex, body mass index (BMI) and comorbidities using the Charlson index.¹⁵ The following questionnaires were administered in each assessment: *Hospital for Special Surgery Knee Replacement Expectations Survey* (TKR Survey),⁷ Visual Analogue Scale (VAS),¹⁶ *The Knee Society Score* (KSS),¹⁷ in its subscales of *knee and function*, *Western Ontario and McMaster Universities Osteoarthritis Index* (WOMAC),¹⁸ as specific questionnaire on quality of life, in its subscales of *pain, stiffness and function* and *Short Form-36* (SF-36),¹⁹ as a generic quality of life questionnaire, in its domains of *physical function and mental health*. Moreover, in the annual review the level of satisfaction was revised through a Likert²⁰ scale with 5 answers – ‘not at all’, ‘a little’, ‘Quite a lot’, ‘a lot’ and ‘a great deal’ – and as surgical complications.

The TKR Survey is a commonly used questionnaire^{21,22} to determine the importance that each patient attaches to their expectations, which are classified from ‘very important’ to ‘it does not affect me’. In our study we requested that patients chose between the 17 items in the preoperative questionnaire the 3 most relevant ones and ranked them as first, second and third most important expectation. In the annual review patients were asked about their fulfilment and responded with a dichotic ‘yes’ or ‘no’ on whether they had been satisfied with each of the 3 most important expectations.

In the annual review, after analyzing fulfilment of preoperative expectations through the response of the patients with ‘yes’ or ‘no’, 3 groups were established. The first comprised 123 patients (67.2%) who had fulfilled all their expectations, which was called total fulfilment; the second comprised 48 patients (26.2%) who had fulfilled at least one, which was called partial fulfilment; and the third comprised 12 patients (6.6%) where no satisfaction had been achieved, which was called non fulfilment.

Comparison between these 3 groups was established, together with the preoperative variables (age, sex, BMI, Charlson comorbidities index, KSS category), postoperative complications, improvement experienced in each of the questionnaires (VAS, KSS, WOMAC and SF-36) and the degree of satisfaction.

Statistical analysis

Statistical analysis was performed using SPSS v.22. In the descriptive analysis the mean was used to describe quantitative variables and frequencies relating to the qualitative variables.

In inferential analysis Pearson’s Chi-square test was used to analyze the relationship between qualitative variables and the Student’s t-test to analyze the relationship between a qualitative and a quantitative variable.

Finally the repeated measures ANOVA was used, considering an inter-subject factor for studying the relationship of the variable referring to fulfilment of expectations and the evolution of the measures taken before and after surgery. In all analyses the necessary suppositions were verified with the test indicated for this.

The level of significance was established at $p < .05$.

Results

A total of 187 patients were recruited, of whom 4 (2.1%) died during follow-up due to causes not related to the procedure and they were excluded. This resulted in an analysed sample of 183 patients. The choice percentage of each of the expectations was collected, chosen between the 17 items from the TKR survey questionnaire, and its degree of compliance (Table 1). The three preoperative expectations considered to be the most important for the patients ranked in order of priority were Improvement in pain (88.5%), Improvement in walking (86.%) and Improvement for daily life activities (35.5%). The percentage of fulfilment of each one of the expectations showed there was a heterogeneous distribution, with good movement of the knee and an Improvement in pain being the highest in proportion at 97.7% and 89.5%, respectively.

The establishment of a relationship between age, sex, BMI and comorbidities with the fulfilment of expectations revealed no significant differences between the 3 groups (Table 2). However, a statistically significant relationship was found with the postoperative complications, associating them with total compliance with the absence of complications ($p < .005$). Similarly, significant differences were found between the level of satisfaction, with the observation that 94.44% of patients who had described their level of satisfaction as ‘a great deal’ and 79.67% as ‘a lot’ were located in the total compliance group.

Lastly, the Improvement in the VAS, KSS, WOMAC and SF-36 questionnaires one year after TKA was compared with the 3 groups established according to the level of expectation compliance (Table 3). Homogenous groups were created from the post hoc test in Turkey to aid analysis. From here it was determined that the total fulfilment group presented with a higher statistically significant ($p < .001$) Improvement than the others in the KSS-Function and SF-36 physical and mental health questionnaire. In other words, a statistically significant relationship was established between fulfilment of all expectations and a higher degree of Improvement in functionality and quality of life. In contrast, the non fulfilment group experienced a lower Improvement than the others which were also statistically significant ($p < .001$) – in the VAS and KSS-Knee scales, but they perceived of a lower Improvement in pain and knee function.

Discussion

The results of this study show there is a statistically significant relationship between the fulfilment of patient expectations and pain, the clinical-functional state, quality of life and satisfaction after TKA. Thus, the importance of expectations have been confirmed as a potentially deter-

Table 1 Preoperative patient expectations and fulfilment one year after surgery.

| | Preoperative expectations, % | Fulfilment of expectations, % |
|---|------------------------------|-------------------------------|
| 1. Improvement in pain | 88.5 | 89.5 |
| 2. Improvement in walking | 86.3 | 80.4 |
| 3. Improvement for daily life activities | 35.5 | 81.5 |
| 4. Good knee mobility | 23.5 | 97.7 |
| 5. Does not need crutch or stick | 20.2 | 48.6 |
| 6. Improvement in walking up stairs | 12.6 | 87.0 |
| 7. Improvement for leisure activities | 10.4 | 84.2 |
| 8. Improvement in sensation of well being | 9.8 | 77.8 |
| 9. Ability to work | 2.7 | 80 |
| 10. Improvement in social activities | 2.7 | 60 |
| 11. Improvement in mobility | 2.2 | 75 |
| 12. Improvement in kneeling | 2.2 | 0 |
| 13. Improvement in squatting | 1.1 | 100 |
| 14. Improvement in going down stairs | 1.1 | 50 |
| 15. Improvement in playing sports | 0.5 | 100 |
| 16. Improvement in sexual activities | 0.5 | 100 |
| 17. Improvement in using the bus or metro | 0 | 0 |

Table 2 Relationship of sociodemographic variables. Postoperative complications and satisfaction with fulfilment of expectations.

| | Total fulfilment of expectations (67.2%) | Partial fulfilment of expectations (26.2%) | Non fulfilment of expectations (6.6%) | p |
|---|---|---|---------------------------------------|-------|
| <i>Sex, women (%)</i> | 61.7 | 79.1 | 75.0 | .081 |
| <i>Age (mean)</i> | 71.5 | 73.0 | 72.0 | .690 |
| <i>Body mass index (mean; kg/m²)</i> | 31.6 | 32.1 | 31.9 | .901 |
| <i>Comorbidity (mean)</i> | 2.4 | 2.6 | 3.0 | .108 |
| <i>KSS Category (%)</i> | | | | |
| A | 68.5 | 23.4 | 8.1 | .339 |
| B | 64.7 | 33.3 | 2.0 | |
| C | 62.5 | 25.0 | 12.5 | |
| <i>Postoperative complications (%)</i> | | | | |
| Yes | 38.9 | 38.9 | 22.2 | .005* |
| No | 70.4 | 24.8 | 4.8 | |
| <i>Satisfaction (%)</i> | | | | |
| Nothing | 0 | 0 | 100 | .000* |
| Little | 0 | 27.3 | 72.7 | |
| Quite a lot | 20 | 75 | 5 | |
| A lot | 79.67 | 18.64 | 1.69 | |
| A great deal | 94.44 | 5.56 | 0 | |

* Statistical significance.

minant factor in the variability of results, as documented in other studies.^{12,23}

The expectations considered to be the most important by patients prior to undergoing TKA were improvement in pain, followed by Improvement in walking and doing daily life activities. In line with this, Lingard et al.⁹ observed that most patients of the United States, United Kingdom and Australia expected to have no pain 12 months after TKA, and no significant differences were found between the 3 countries regarding pain expectations. However, the Australian patients presented with higher expectations to improve their functional state than those of the United

States and United Kingdom. From here we may conclude that the main demands of the TKA patient candidates were pain relief and functional Improvement.

The rate of fulfilment of expectations in our study was high, with the highest satisfaction in good movement of the knee and an improvement in pain. The rate of fulfilment for improvement in pain which was the most requested expectation, was similar to that reported by Nildotter et al.,¹³ which was 93% at 12 months and 63% at 5 years. Thus, in our study non fulfilment of expectations was associated with a lower level of improvement in pain, and this provided us with relevant information on its importance.

Table 3 Improvement experienced of assessment questionnaires mean after TKA according to the fulfilment of expectations.

| | Total fulfilment of expectations (67.2%) | Partial fulfilment of expectations (26.2%) | Non fulfilment of expectations (6.6%) | p |
|------------------------------|--|--|---------------------------------------|---------|
| VAS (0–10) | 4.8 ^a | 5.4 ^a | 7.2 ^b | < .001* |
| KSS knee (0–100) | 78.2 ^a | 69.6 ^a | 58.9 ^b | < .001* |
| KSS function (0–100) | 60.5 ^a | 46.7 ^b | 43.3 ^b | < .001* |
| WOMAC pain (0–20) | 6.0 ^a | 8.2 ^b | 10.8 ^c | < .001* |
| WOMAC stiffness (0–8) | 1.1 ^a | 1.4 ^a | 1.7 ^a | .119 |
| WOMAC function (0–68) | 20.2 ^a | 29.2 ^b | 34.6 ^c | < .001* |
| SF36 mental health(0–100) | 53.1 ^a | 45.8 ^b | 42.3 ^b | < .001* |
| SF36 physical health (0–100) | 40.4 ^a | 33.9 ^b | 30.8 ^b | < .001* |

The superscript letters indicate homogenous groups according to the post hoc test in Turkey.

* Statistical significance.

Fulfilment of expectations was closely linked to level of satisfaction, with observation that the patients who fulfilled all their expectations classified their level of satisfaction as ‘‘a lot’’ or ‘‘a great deal’’ at 79.67% and 94.44%, respectively. In the same way, Bourne ET al.²⁴ observed that 19% of patients who underwent TKA were not satisfied with the outcomes, and the main factor of dissatisfaction was non fulfilment of expectations. In other studies such as that of Lützner et al.²⁵ it was demonstrated that fulfilment of expectations and the high score in the *Knee Score* were associated with higher levels of satisfaction, These facts were compatible with the systematic reviews of Gunaratne et al.,²⁶ who reported that the dissatisfaction of the patient was caused by several key factors. Preoperative patient expectations, the level of improvement in knee function and pain relief were therefore the factors most reported in the literature.

In our study we aimed at evaluating expectations from a qualitative sphere based on fulfilment. We were therefore able to determine that fulfilment of expectations is linked with higher improvement in functionality and quality of life one year after surgery. We believe this function is vital in outcome assessment and may provide key information to the patient prior to undergoing surgery. A variety of alterable psychological factors may impact patient expectations. As a result, educational interventions aimed at the population may help to better align expectations with expected surgical outcomes, fostering more appropriate use of a procedure which has proven to be effective.²⁷

This study has several limitations. Firstly, it did not consider the preoperative variables which could potentially have had an impact on expectations, such as education, professional activity and economic status. Secondly, the comparison of outcomes was established with a follow-up period of one year, and further research would need to be conducted to assess long term changes.

To conclude, the results of this study show that there is a significant relationship between the fulfilment of expectations and the improvement of functional results and quality of life one year after TKA. Extrapolating these data to the general population would provide information to the patient of the possibilities of fulfilling their expectations, in order to prevent dissatisfaction with outcomes. Consequently, analysis more strongly based on the risk-benefit balance of the

procedure could be pursued, helping the patient to make a reasoned decision and improving the quality of medical care.

Knowledge on the part of the surgeon of these factors would lead to broad preoperative work which would be highly useful when reaching a consensus between the doctor and the patient, so that the real perspectives to surgery could be resolved and adapted to patient needs.

Level of evidence

Level of evidence II.

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This research study did not receive any specific aids from public sector agencies, commercial sector agencies or not-for-profit entities.

Conflict of interests

The authors have no conflict of interests to declare.

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