Health-related quality of life and costs in patients with osteoarthritis on waiting list for total knee replacement

M. Núñez Ph.D.†*, E. Núñez Ph.D.‡, J. M. Segur M.D.§, F. Maculé M.D.¶, A. Sanchez Ph.D.∥, Mª V. Hernández M.D.† and C. Vilalta M.D.§

† Department of Rheumatology, Biomedical Research Institute August Pi i Sunyer (IDIBAPS), Hospital Clínic, Villarroel 170, 08036 Barcelona, Spain
‡ Health Services, Institut Català de la Salut, Numancia, 23, 08024 Barcelona, Spain
§ Department of Orthopaedic Surgery, Biomedical Research Institute August Pi i Sunyer (IDIBAPS), Hospital Clínic, Villarroel 170, 08036 Barcelona, Spain
∥ Department of Biostatistics, University of Barcelona, Spain

Summary

Objectives: To determine: (1) health-related quality of life (HRQL) in patients with severe osteoarthritis (OA) on a waiting list (WL) for total knee replacement (TKR) and to compare it with general Spanish reference population values (RPVs); (2) the influence of sociodemographic and clinical variables on HRQL dimensions and (3) the use and cost of resources related to knee OA.

Methods: Cross-sectional study. HRQL was measured by Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC) and Medical Outcomes Study 36 Item Short Form Health Survey (SF-36) questionnaires. Sociodemographic and disease characteristics, body mass index, pharmacological treatment and the cost and use of economic resources related to knee OA during the 6-months previous to baseline were recorded. Relationships were analyzed using linear regression models.

Results: One hundred consecutive outpatients (71 female, mean age 71 ± 6.89 years, mean disease duration 11.84 ± 10.52 years) were included. Patients showed worse HRQL measured by SF-36 than the reference population, mainly in physical function, physical role and bodily pain dimensions (P < 0.05). A low number of visits to physicians were recorded (mean 0.62 ± 1.04). Total mean direct medical costs were 200.24 € (95%CI 167.08–233.40) and total mean direct non-medical costs were 1234.87 € (95%CI 612.74–1657.00).

Conclusions: The HRQL of patients on a WL is worse than that of the reference population. The main costs of these patients were on non-medical resources, mainly functional limitations and loss of autonomy. The results suggest little compliance with knee OA management guidelines.

Key words: Quality of life, Costs, Osteoarthritis, Waiting list.

Introduction

Studies have shown that health-related quality of life (HRQL) measures, although not yet standardized, are valid, reliable, and responsive for the evaluation of health results, especially chronic processes. HRQL can be measured by generic and specific measures. These include, among others, health profiles such as the Medical Outcomes Study 36 Item Short Form Health Survey (SF-36) general questionnaire. In knee osteoarthritis (OA), the Western Ontario and McMaster Universities Osteoarthritis Index is recommended (WOMAC LK 3.0).

OA causes disability and limitation of activity, especially when it affects load-bearing joints. Total knee replacement (TKR) is the treatment of choice in many cases, above all in older people. TKR is indicated to recover function in patients with untreatable pain and/or severe disability when conservative treatment does not yield acceptable results. However, in the Spanish National Health Service, as in other nationalized health services, the demand for this surgery means that delays occur, generating waiting lists. The unsatisfactory situation of patients on WL offers the opportunity to monitor and observe the impact of knee OA end stage disease on health results and the use of health resources in these patients. These aspects assume a greater importance given the increasing number of older people in our society. Although the number of reports on the health and economic impact of knee OA is increasing, there are few data on patients on WL. The objectives of this study were: (1) to determine HRQL in patients with OA grade IV on a WL for TKR and to compare it with general Spanish reference population values (RPVs); (2) to determine the influence of sociodemographic and clinical variables on HRQL dimensions and (3) to analyze the use and cost of economic resources in relation to knee OA.
Patients and methods

SETTING

Cross-sectional study was carried out in the Rheumatology Service and the Knee Unit of the Orthopaedic Surgery Service of the Hospital Clinic Provincial (HCP), Barcelona (Spain), a public tertiary care center. Patients were enrolled between February and October 2001. Hospital Ethics Committee approval was obtained.

PARTICIPANTS

The study population was 104 consecutive outpatients of all ages diagnosed with knee OA grade IV (according to Kellgren and Lawrence criteria)\(^\text{13}\), on a WL for TKR, for less than 6 months, who agreed to participate and gave informed consent. Exclusion criteria were: functional illiteracy; inflammatory or other severe musculoskeletal conditions (e.g., rheumatoid arthritis (RA), sciatica), metabolic or neoplastic disease and severe psychopathology or comorbidity, defined as a diagnosis in the medical record severe enough that the patient could not participate fully in the study procedures (e.g., heart failure).

VARIABLES DETERMINED

All variables were determined at study entry (baseline). 1) HRQL was measured by the self-reported Spanish version of the SF-36 [Ref. 14] and the knee-specific questionnaire WOMAC LK 3.0 adapted to the Spanish population\(^\text{15}\). The SF-36 has four physical and four mental health dimensions, with scores ranging from 0 (worst) to 100 (best): physical function, social function, physical role limitations, emotional role limitations, general mental health, energy, bodily pain, and general health perception. It allows age—sex standardized comparisons to be made with general Spanish RPVs\(^\text{4,14}\). The SF-36 questionnaire also includes a self-perceived health transition question: “Compared with 12 months ago, how would you rate your general health now?” (not used to score any of the eight multi-item scales). The responses are: much better, somewhat better, about the same, somewhat worse, and much worse\(^\text{14}\). The WOMAC has three dimensions: pain, stiffness, and function. These dimensions produce scores of 0—20, 0—8, and 0—68, respectively, with higher scores indicating more pain and stiffness, and worse physical function\(^\text{4,15}\).

2) A structured questionnaire collected information on (i) sociodemographic and (ii) disease characteristics, pharmacological treatment and (iii) the use and cost of economic resources related to knee OA during the 6-months previous to baseline.

- Sociodemographic data included: gender, age, educational level, marital status, social support based on living status, occupation, main type of job during working life (standing, seated, or mixture of two), heavy lifting, occupational situation and family income per year.
- Disease characteristics included: disease duration (since diagnosis in years), time on WL for TKR (in months), comorbidity (participants were asked if they currently had, or if a physician ever told them that they had any of the following medical comorbidities: hypertension, cardiovascular disease, diabetes, respiratory disease, gastrointestinal disease, and problems of hearing and vision); total number of reported comorbidities which had persisted for more than 6 months; and previous prostheses (contralateral knee, hip). Pharmacological treatment included: the current number of analgesics (paracetamol) and non-steroidal anti-inflammatory drugs (NSAIDs) per week and other drugs related to knee OA in tablets per week. Other questions related to treatment were: satisfaction with current treatment (yes/no) and common adverse events related with knee OA treatment (nausea, diarrhea, heartburn, skin eruptions, etc.).

- Self-reported use of economic resources during the 6 months previous to baseline included:
  a) Weekly number of hours of formal or informal home care by paid private household help or unpaid help from family or relatives and out-of-pocket expenses (prescriptions or taxis to attend medical visits).
  b) Number of visits to general practitioners (GP), specialists (S), other health care professionals (e.g., physiotherapist, nurse practitioner, psychotherapist and other) and alternative practitioners.

The cost of home adaptations, waiting time and travel to health visits were not included.

All questionnaires were carried out in the hospital. An independent researcher provided aid, if necessary, to patients answering the questionnaires.

3) Body mass index (BMI), overweight and/or obesity duration (since diagnosis in years) (<25 kg/m\(^2\) [BMI] 25–30 kg/m\(^2\) [overweight] and >30 kg/m\(^2\) [obesity])\(^\text{16}\) were determined.

4) Medical records and a systematic search of the central HCP information system provided information on the use of health resources related to knee OA during the 6 months previous to baseline. We recorded the number of technical procedures performed due to knee OA (conventional radiographic examinations and all other technical procedures, including computed tomography (CT) scan, and magnetic resonance imaging); blood tests and non-pharmacological treatments (number and duration of rehabilitation treatments). In addition, data reported by patients on current pharmacological treatment were confirmed using the primary care chronic medication system which records all medication taken by primary care patients.

These data were reviewed by another independent researcher.

ESTIMATE OF THE COST OF ECONOMIC RESOURCES

The costs of the economic resources used due to knee OA were assessed as direct medical and non-medical costs from a societal perspective, meaning that all relative costs were taken into account regardless of the financier\(^\text{17}\). The Spanish National Health Service provides universal primary and specialized care. All care, including tests and analyses, is provided free. People aged \(\geq 65\) years receive free medical prescriptions (all study subjects were aged \(\geq 65\) years).

a) Direct medical costs were considered as: visits to physicians (GP and S) or other health care professionals and alternative practitioners; technical procedures (medical devices); and pharmacological treatments (number of analgesics, NSAIDs and other drugs taken per week related to knee OA) and ancillary non-pharmacological treatments.
b) Direct non-medical costs were considered as: total weekly number of hours of paid formal/informal home care and out-of-pocket costs.

Unit prices for direct medical costs, including technical procedures and blood tests, were calculated according to 2001 Catalan Health Service tariffs\(^\text{18}\) and pharmacological treatments according to the Spanish National Pharmacotherapeutical Catalogue. If the cost of alternative practitioners could not be officially determined, the amount specified by patients during the interview was considered correct.

The market cost method, based on the assumption that the salary reflected the marginal production value of a worker, was used to quantify the cost of informal home care\(^\text{19}\). Thus, it was assumed that the cost was equal to the normal salary paid to a worker employed in home care\(^\text{19}\) and was calculated as the average hourly cost of a professional carer in Barcelona\(^\text{20}\). Therefore, the lost salary of a family member (or other) in terms of informal home care was valued at 7 euros per hour\(^\text{20}\).

Out-of-pocket expenses were quantified as the amount specified during the interview that was spent on prescriptions and taxi fares to attend medical visits.

All prices are expressed in 2001 euros (one euro = $1.17). The accumulated increase in the retail price index of Catalonia during the years 2001–2006 is 20%\(^\text{21}\). Discounting was not relevant because of the limited time horizon of the analysis\(^\text{17}\).

**STATISTICAL ANALYSIS**

Accepting an alpha risk of 0.5 for an estimated proportion of 0.50 and a rate of loss of 10%, a minimum of 90 subjects was required.

A descriptive analysis was performed using univariate frequency tabulation for categorical variables or mean values for continuous variables and confidence intervals (CIs). Mean SF-36 scores were compared with age—sex-matched Spanish RPV\(^\text{14}\). Differences between study sample values and Spanish RPV were analyzed using t-tests.

Multiple linear regression models were used to analyze the influence of sociodemographic and disease variables (independent variables) on the dimensions of HRQL measured by SF-36 and WOMAC questionnaires (dependent variables). Regression diagnostics for ordinary least-squares regression (OLS) were conducted. Appropriate transformations were applied to those variables not fulfilling OLS assumptions. The variable pain (WOMAC) was converted by logarithms (response = log(y)). Other variables taking zero values were re-scaled using a power transformation (response = \(y^{1/0.33}\)). Physical function (\(\alpha = 1.75\)), physical role (\(\alpha = 25\)), bodily pain (\(\alpha = 1.5\)) and emotional role (\(\alpha = 0.33\)). Categorical variables were coded as dummies. Variable selection was performed by combining the step-wise and all subset regression methods. Model fit is presented in the results using adjusted \(R^2\) and \(P\)-values for significance of regression coefficients.

The relationship between costs and the other variables studied was determined using Spearman’s correlation coefficient for continuous variables and the Mann—Whitney test or Kruskal—Wallis test for categorical variables of two or more categories, respectively, as the distribution was not normal. The influence of HRQL (SF-36 and WOMAC) on costs was analyzed by linear regression. The CI was established at 95%. A value of \(P < 0.05\) was considered statistically significant. The statistical analysis was performed using the Statistical Package for Social Sciences (SPSS) 12.0 adapted to Windows.

**Results**

Of the 104 patients, four were excluded due to RA. Of the 100 patients analyzed, 71% were female. The mean age was 71.2 (SD 6.9) years. Sixty-seven per cent lived with their family. No patient was in paid employment. Mean disease duration was 11.8 (SD 10.5) years. Current pharmacological treatment was: weekly analgesics 5.3 (SD 9.7) tablets, weekly NSAIDs 7.6 (SD 7.3) tablets, and weekly other drugs 2.6 (SD 4.7) tablets. Eighty-seven per cent of patients reported one or more medical comorbidities (mean 1.79, SD 1.18). Sixty-three per cent were satisfied with current treatment. The mean time on the WL at the study entry was 3.7 (SD 1.7) months. Family income was < 6000 euros 39%, 6000–12,000 euros 50%, 12,000–18,000 euros 6% and >18,000 euros 5%.

The eight dimensions of the SF-36 showed worse values than the age—sex-matched Spanish population\(^\text{14}\). The physical function, physical role and bodily pain dimension scores were >40% worse than RPV (Fig. 1). The SF-36 self-perceived transition question showed that 55% of the patients reported feeling worse (33 patients) or much worse (22 patients) than 1 year before. The mean scores of the three WOMAC dimensions were: pain 10.78 (95%CI 9.98–11.58), stiffness 3.98 (95%CI 3.54–4.41) and function 39.65 (95%CI 37.13–42.72).

Multiple linear regression was used to evaluate the influence of the sociodemographic and disease variables on HRQL. Separate regression models were developed for the eight dimensions of the SF-36 and the three WOMAC dimensions. Table I shows the variables which were independently significant (using multiple linear regression coefficients). The variables retained in each of the models explained between 21% and 40% (\(R^2\) adjusted) of the variability of each HRQL dimension.

The factors that had a negative impact (worse) on HRQL included: female gender in the vitality (\(P < 0.02\)) and social function (\(P = 0.04\)) dimensions of the SF-36 and the pain (\(P = 0.04\)) and function (\(P = 0.04\)) dimensions of the WOMAC; disease duration in the bodily pain dimension (\(P = 0.01\)) of the SF-36; the number of comorbidities in the general health (\(P = 0.01\)) and mental health (\(P = 0.02\)) dimensions of the SF-36; consumption of NSAIDs (>7/week) in the physical function (\(P = 0.02\)) and emotional role (\(P = 0.02\)) dimensions of the SF-36 and the stiffness dimension (\(P = 0.02\)) of the WOMAC; and dissatisfaction with current treatment in the pain dimension (\(P = 0.04\)) of the WOMAC. In addition, a worse score in the self-perceived health transition question was associated with worse HRQL in all dimensions of the SF-36 and the WOMAC (\(P < 0.05\)).

In contrast, factors that had a positive (better) impact on HRQL were: older age in the general health (\(P = 0.01\)) and social function (\(P = 0.04\)) dimensions of the SF-36 and the pain (\(P = 0.02\)) and function (\(P = 0.04\)) dimensions of the WOMAC; higher educational level, in the social function dimension (\(P = 0.04\)) of the SF-36; heavy lifting (\(P = 0.02\)) the physical function dimension (\(P = 0.01\)) of the SF-36; higher family income in the emotional role dimension (\(P = 0.04\)) of the SF-36; and no previous prostheses in the physical function (\(P = 0.04\)) and physical role (\(P = 0.04\)) dimensions of the SF-36.

Table II shows the use and cost of economic resources including medical visits, technical procedures and
Discussion

The main objectives of this study were to evaluate the quality of life of patients with severe knee OA included on a WL for TKR, using the SF-36 and the WOMAC questionnaires\(^3\) and the use and cost of economic resources related to knee OA. As in other studies\(^3,22\), we found that these patients had substantially worsened HRQL, measured by the SF-36, compared with general Spanish RPVs\(^3,14\). In addition, when we compared the HRQL function and pain dimensions of our patients with the results of other series, with a similar age but with no WL, we found that in these series patients presented values that were approximately 50% better for function (SF-36 and WOMAC) and 15–20% for pain (SF-36)\(^{23,24}\). Furthermore, in our patients, the perception of health had worsened in the last year in more than half. The physical aspect of HRQL was the most-affected (physical function, physical role and bodily pain dimensions of the SF-36 and function dimension of the WOMAC)\(^{22}\).

Most of our patients had a high level of associated comorbidities, mainly cardiovascular and impaired sight; they were overweight and almost half were obese\(^3,12\). Other studies have also found an association between worse HRQL and lower educational level\(^{12,25}\) and lower income\(^{25}\). Hawker et al.\(^{26}\) also reported that women had more symptoms (worse scores on the WOMAC) and greater disability (worse scores on physical function and vitality dimensions of the SF-36), as in our study. As in other studies, we found that a worsened perception of health in the last year, longer disease duration, a greater number of associated comorbidities and a greater consumption of NSAID were associated with worsened HRQL\(^{24,25,27}\).

When the use of resources by these patients was analyzed, the results showed a surprisingly-low use of physician care, with most patients making only one medical visit, generally to a GP. The low number of visits to specialists such as rehabilitative physicians is also surprising, as reports have recommended physiotherapy to maintain correct muscular tone before interventions as a factor in better postoperative recovery, due to the severe locomotor deficits present in OA\(^{28}\). Patients reported taking low doses of NSAIDs and practically no analgesics, with no case comply- ing with anti-inflammatory or analgesic guidelines (2400 mg of ibuprofen or similar would correspond to 4 tablets per day and 3–4 g/day of acetaminophen would correspond to 3–4 tablets)\(^{29}\), possibly because, in our patients, alterations in physical function were more important than pain. Nevertheless, some evidence suggests that medications are often prescribed at doses too low for optimal control of symptoms\(^{30}\). Jordan et al.\(^{16}\) reported that, in patients with a substantial impact of OA on HRQL, both pharmacological and non-pharmacological treatments that can improve disease symptoms are underused. However, none of our patients had received any non-pharmacological treatments. Less than half of the patients had undergone some technical procedure, mainly radiographies. Consequently, their direct medical costs were very low, above all when compared with other series\(^{11,31}\). In one patient, Magnetic
Table I
Influence of sociodemographic and disease variables on HRQL (SF-36 and WOMAC). Multiple linear regression

<table>
<thead>
<tr>
<th>SF-36 dependent variables</th>
<th>Physical function</th>
<th>Physical role</th>
<th>Bodily pain</th>
<th>General health</th>
<th>Vitality</th>
<th>Social function</th>
<th>Emotional role</th>
<th>Mental health</th>
<th>WOMAC dependent variables</th>
<th>Pain</th>
<th>Stiffness</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adjusted ( R^2 )</td>
<td>0.25</td>
<td>0.28</td>
<td>0.30</td>
<td>0.39</td>
<td>0.39</td>
<td>0.35</td>
<td>0.23</td>
<td>0.33</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Raw scores</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Independent variables</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gender (female)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Educational level (secondary)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Heavy lifting (yes)</td>
<td>8.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Family income &gt;12000 €</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Disease duration</td>
<td></td>
<td></td>
<td></td>
<td>-0.54</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number comorbidities</td>
<td></td>
<td></td>
<td></td>
<td>-3.60</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prior prostheses (no)</td>
<td>6.34</td>
<td>16.13</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NSAID/week &gt;7</td>
<td>-10.29</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Satisfaction with current treatment (no)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Independent variables were entered to examine their combined influence on the dimensions of SF-36 and WOMAC. Only values of regression coefficients of statistically significant variables are shown ($P < 0.05$). The raw scores or unstandardized coefficients of regression models which are computed in the natural scale of each dimension, in order to facilitate their interpretation and indicate if an increase in the explanatory variables is related with an increase (positive coefficient) or decrease (negative coefficient) in HRQL dimensions. \( R^2 \) is the proportion of variance in the dependent variable explained by the relevant independent variables shown. SF-36: Medical Outcomes Study 36-Item Short Form (scores ranging from 0 [worst] to 100 [best]). WOMAC: Western Ontario and McMaster Universities Osteoarthritis Index (scores ranging from pain 0–20, stiffness 0–8 and function 0–68).
Total direct medical cost women/men (€):

<table>
<thead>
<tr>
<th>Resource</th>
<th>Quantity of resources used per patient (Mean (95%CI))</th>
<th>Cost of economic resources used per patient (€) (Mean (95%CI))</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of visits to: (n)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>General practitioner</td>
<td>2.42 (1.78–2.88)</td>
<td>79.8 (58.7–95.1)</td>
</tr>
<tr>
<td>Specialist</td>
<td>0.62 (0.41–0.83)</td>
<td>20.46 (13.63–27.28)</td>
</tr>
<tr>
<td>Other health care professionals: nurse practitioner</td>
<td>1.57 (0.81–2.33)</td>
<td>23.11 (11.95–34.26)</td>
</tr>
<tr>
<td>Alternative practitioners</td>
<td>0.09 (0.00–0.18)</td>
<td>2.16 (–0.09–4.41)</td>
</tr>
<tr>
<td>Number of technical procedures: (n)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Conventional radiographic examinations</td>
<td>0.46 (0.25–0.67)</td>
<td>10.34 (5.59–15.09)</td>
</tr>
<tr>
<td>Magnetic resonance imaging</td>
<td>0.13 (0.06–0.20)</td>
<td>27.35 (12.04–42.65)</td>
</tr>
<tr>
<td>Other technical procedures</td>
<td>0.08 (0.03–0.13)</td>
<td>6.09 (1.54–10.64)</td>
</tr>
<tr>
<td>Blood test</td>
<td>0.12 (0.00–0.24)</td>
<td>2.52 (–0.01–5.06)</td>
</tr>
<tr>
<td>Pharmacological treatment: (n tablets/week)*</td>
<td>15.38 (12.33–18.43)</td>
<td>31.34 (25.52–37.15)</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>200.24 (167.08–233.40)</td>
</tr>
</tbody>
</table>
| Costs are estimated at 2001 prices (€) (the accumulated increase in the retail price index of Catalonia during the years 2001–2006 is 20%); n: number; h: hours; €: euros.

*Pharmacological treatment included analgesics, NSAIDs and other drugs related to knee OA.

**Mann–Whitney test.}

Cost of economic resources

<table>
<thead>
<tr>
<th>Table II Use and cost of economic resources related to knee OA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resource</td>
</tr>
<tr>
<td>Direct medical cost women/men (€): mean rank</td>
</tr>
<tr>
<td>Direct non-medical cost women/men (€): mean rank</td>
</tr>
</tbody>
</table>

Resonance imaging was carried out, which may indicate a unnecessary waste of resources, as it is not justified in most cases of OA, particularly when surgical disease is present.

As reported by other studies\(^{11,34}\), the main costs incurred by these patients were on non-medical resources, mainly as a consequence of functional limitation and loss of autonomy. In a study on the economic burden of disabling hip and knee OA, Gupta et al.\(^{11}\) concluded that costs increased with the worsening of the health status and greater OA severity and that the value of caregiver time accounted for, on average, 40% of direct non-medical costs. In our study, although in a different context, the cost of caregiver time corresponded to almost 98% of direct non-medical costs. Likewise, as in other studies, direct and non-medical (mainly help from family and friends) costs were related to gender, with women incurring a greater economic burden associated with OA than men\(^{1,23}\). Out-of-pocket expenses were low, probably because our patients reported incomes between two or three times lower than that reported by Gupta et al.\(^{11}\).

However, our results, besides showing the impact of knee OA on the life of the patients, both in quality of life and economic terms, seem to suggest indirectly that other aspects of the therapeutic management of this group of patients should be reconsidered. Thus, some results, such as the overweight and/or obesity of long evolution, the low number of visits to physicians and other health professionals, or the high use of only one pharmacological treatment, suggest little compliance with knee OA management guidelines. These emphasize the principal roles of weight loss, exercises, physical therapy, or drugs combined with non-pharmacological strategies to reduce disability and pain in knee OA\(^{12,28,29}\). As Bradley stated\(^{32}\), “Unfortunately, there is also evidence that a minority of physicians counsel their knee OA patients about exercise, and fewer than 50% of physicians follow up on performance of exercise by patients who have been counseled. Why then, don’t physicians devote more time, effort, and resources to knee patient education, exercise instruction and follow up, and weight control?... Perhaps what is needed is an evaluation of the barriers to incorporation into clinical practice of these fundamental components of knee OA management”. Our results seem to support these comments. We have not observed, at least in our setting, the use of therapeutic strategies, except pharmacological ones, which have been shown to be useful in the treatment of knee OA\(^{8,29,52}\).

The study was carried out in a single tertiary center. Therefore, the results are only representative of this particular group of patients and might vary in other geographical areas. We were not able to contrast our results with those of other Spanish studies as there are none. Thus, we compared the results with other preoperative studies in countries with different health systems and cultures. In addition, few studies have evaluated the costs of informal care and thus our study may provide data of interest. However, significant costs, such as the time spent on health care visits, the quality of life or the costs borne by caregivers, were not included and the relatively small number of patients could influence the results of the cost-analyses. Thus, our findings should be interpreted with care. This study only provides data on one measurement of patient variables. We are at present carrying out a larger study with a follow-up of 5 years including these and other patients.

The strengths of the study are that it provides data of interest on patients included on a WL, which may be seen as the frontier between conservative and surgical treatments.
and a cut-off point to measure the impact of the disease in health terms. In addition, the study of costs clearly showed that conservative treatments were underutilized in these patients and that this may lead to earlier and possibly unnecessary surgical interventions with a consequent increased risk of future replacement joint surgery. The study is also one of the few to study the cost of informal care and the first that we know of HRQL in patients on a WL, as well as being the first Spanish study of HRQL and health costs in this group.

In summary, our results are similar to those of other studies\(^1,3\) that found that the burden attributable to knee OA, both in quality of life and economic terms, falls mainly on sufferers and their families. As stated by March \textit{et al.}\(^3\), greater attention paid to the physical function and the health status before surgery could improve results and decrease the costs from the patient’s perspective.

Acknowledgments

We wish to thank X. Segura, G. Lopez Casasnovas, A. di Paolo, F. Segura and D. Buss for their help and advice.

References


27. Rabenda V, Burlet N, Ethgen O, Raeman F, Belaiche J, Reginster JY. A naturalistic study of the determinants...


