*Article*

# Assessment Outcomes of Knee Osteoarthritis

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**Abstract:** Knee osteoarthritis (KOA) mainly impacts older individuals and is a common source of disability and decreased quality of life in this age group. This study was contributed to assess outcomes of patients with knee osteoarthritis. A cross-sectional study was conducted for patients with osteoarthritis of the knee, which included 80 patients with osteoarthritis of the knee, and samples were collected from different hospitals in Iraq during the period between July 15, 2022, and August 28, 2023. This study contributed to assessing the quality of life for all patients with osteoarthritis in the Knee before and after surgery under Health Quality Questionnaire SF-36. The clinical results of the patients were recorded, which showed that patients in the age group between (60 - 70) years were 50% of the total rate of patients, followed by patients in the age group between (50 - 59) years, which was 30%. Female patients had a higher rate of 70% than Males at a rate of 30%. The rates of body mass index > 30 included 44 patients, the body mass index between (25 - 29.9) was 20 patients, and the body mass index was 16 patients. This study showed the rates of patients' quality of life assessment before and after surgery, the most prominent of which was the aspect Physical was 32.51±12.85 before surgery and 65.46±10.09 after surgery, and mental health was 51.92±8.52 before surgery and 78.63±10.35 after surgery. This study indicated that knee osteoarthritis negatively affects daily activities and well-being, which contributes to improving the quality of patients' general health.

**Keywords:** Knee osteoarthritis (KOA); KOOS; Health quality of life; and Pain scores.

## 1. Introduction

Osteoarthritis is by far the most common joint disease. Since the knee is the loaded joint, it is also the one with the highest prevalence of osteoarthritis, causing disabling symptoms in approximately 10% of the population over the age of 55 [1], [2].

To properly evaluate the degree of osteoarthritis of the knee condition, various scoring systems have been developed because they have not proven to be completely reliable, specifically to identify the biases and reliability of the data in the clinical knee scoring systems, showing great variability in the results [3], [4], [5], [6].

In the evaluation of the clinical status of patients with osteoarthritis of the knee and with total knee arthroplasty, the results have been more valid when the variables pain, function, and mobility are studied in a grouped way than when they are evaluated separately; the information is more useful and representative when the result is described on a maximum score scale between 30 and 70 points, allowing substantial agreement to be identified when they present concordance values among the observers [7], [8], [9].

In the last few years, the analysis of validity (that measures what should be measured), consistency (that provides the same score repeatedly), and sensitivity (ability to detect changes) of seven of the most widely used indices or scores in the world for the evaluation of osteoarthritis of the knee has been carried out: Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC), Knee Society Clinical Rating Scale, Six-Minute Walk, Thirty-Second Stair Climb, Short Form-36 Physical Component Summary, Time Trade Off, and Short Form-36 Mental Component Summary. The most appropriate values were achieved with the scores of the WOMAC and Knee Society Clinical Rating Scales [10], [11], [12], [13].

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## 2. Materials and Methods

We conducted a cross-sectional study of clinical data that included 80 patients with osteoarthritis of the knee, where the ages of the patients ranged between (40 - 70) years, which collected from different hospitals in Iraq period between 15 July 2022 to 28 August 2023. Demographic and clinical data were determined before surgery, which included age, sex, body mass index, symptoms, comorbidities, ASA, smoking status, location of the knee injury on either side, the right knee or the left knee, and marital status. Also, this study identified the causes that lead to osteoporosis in the knee.

This study conducted a comprehensive assessment of patients in terms of health aspects and pain ratings, where pain scores were distributed through the VAS scale to all patients in the clinical follow-up for a period of three months. Moreover, this study contributed to assessing the quality of life of all patients with osteoarthritis of the knee before and after surgery, as the criteria included the questionnaire in the Quality of Health SF-36, which included all of the physical performance, general health, emotional role, social functioning, and mental health to an extent between (0 - 100), where 0 represents the worst quality of life and 100 represents the optimal quality of life.

To further examine the findings, this study determined the results of a multivariate analysis of risk factors affecting patients with knee osteoarthritis. This study evaluated association parameters between health variables and knee injury and osteoporosis

outcome domains. The methodology for analyzing and designing patient clinical data and distributing it to patients was done using the SPSS program, version 22.0. This study excluded some criteria that were not comprehensive in the pooled results, which included patients who were less than 40 years old or older than 70 years old, patients who had undergone other previous surgeries, or patients who had serious chronic diseases.

## 3. Results

**Table 1.** Demographic characteristics of patients with knee osteoarthritis in this study.

| Characteristics | Number of patients [80] | Percentage [%] |
|---|---|---|
| Age [years] | | |
| 40 – 49 | 16 | 20% |
| 50 – 59 | 24 | 30% |
| 60 – 70 | 40 | 50% |
| Sex | | |
| Male | 24 | 30% |
| Female | 56 | 70% |
| BMI [Kg/m2] | | |
| < 25 | 16 | 20% |
| 25 – 29.9 | 20 | 25% |
| > 30 | 44 | 55% |
| Symptoms | | |
| Knee pain | 24 | 30% |
| Swelling | 12 | 15% |
| Stiffness | 8 | 10% |
| Crepitus | 28 | 35% |
| Weakness | 8 | 10% |
| Comorbidities | | |
| Hypertension | 72 | 90% |
| Obesity | 68 | 85% |
| Cardiovascular diseases | 20 | 25% |
| Diabetes | 56 | 70% |
| Metabolic syndrome | 28 | 35% |
| Rheumatoid arthritis | 40 | 50% |
| ASA | | |
| I | 16 | 20% |
| II | 36 | 45% |
| III | 28 | 35% |
| Smoking status | | |

| | | |
|---|---|---|
| Yes | 20 | 25% |
| No | 60 | 75% |
| Knee involved | | |
| Right | 12 | 15% |
| Left | 20 | 25% |
| Both | 48 | 60% |
| Marital status | | |
| Single | 4 | 5% |
| Married | 48 | 60% |
| Divorced | 12 | 15% |
| Widow | 16 | 20% |

**Table 2.** Identify causes of patients with knee osteoarthritis

| Causes | Number of patients [80] | Percentage [%] |
|---|---|---|
| Trauma | 27 | 33.75% |
| Overuse or repetitive stress | 14 | 17.5% |
| Genetics | 21 | 26.25% |
| Joint deformities | 12 | 15% |
| Others | 6 | 7.5% |

**Table 3.** Assessment of pain scores outcomes of patients' knee osteoarthritis before and after surgery.

| Domains | Before surgery | After surgery |
|---|---|---|
| 24 hours | $6.85 \pm 0.86$ | $5.45 \pm 1.08$ |
| Two days | $8.22 \pm 0.87$ | $5.04 \pm 0.77$ |
| Ten days | $7.07 \pm 0.34$ | $4.60 \pm 0.90$ |
| 1st month | $9.70 \pm 0.005$ | $4.28 \pm 0.64$ |
| 2nd Month | $8.59 \pm 0.03$ | $4.15 \pm 0.78$ |
| 3rd month | $8.96 \pm 0.06$ | $3.15 \pm 0.65$ |

**Table 4.** Assessment of health quality of life outcomes of patients' knee osteoarthritis before and after surgery.

| Domains | Before surgery | After surgery |
|---|---|---|
| Physical functioning | $32.51 \pm 12.85$ | $65.46 \pm 10.09$ |
| General Health | $37.85 \pm 9.65$ | $74.75 \pm 9.98$ |
| Role emotional | $46.87 \pm 13.64$ | $72.48 \pm 11.52$ |

| | | |
|---|---|---|
| Social functioning | 52.78 ± 14.26 | 74.65 ± 9.48 |
| Mental health | 51.92 ± 8.52 | 78.63 ± 10.35 |

**Table 5.** Regression Multivariate analysis outcomes of risk factors affected on patients with knee osteoarthritis.

| Risk factors | OR [95% CI] | P – value |
|---|---|---|
| Age | 2.78 [0.84 – 4.86] | 0.024 |
| Diabetes | 1.64 [0.43 – 3.65] | 0.036 |
| Obesity | 2.06 [0.97 – 5.86] | 0.0365 |
| Knee involved | 4.09 [2.13 – 8.76] | 0.03 |
| Smoking | 2.97 [1.15 – 5.89] | 0.025 |
| Genetic factor | 3.76 [1.62 – 5.85] | 0.0413 |
| Pain role | 5.63 [3.77 – 12.42] | 0.028 |

**Table 6**. Correlation of health variables with knee injury and osteoarthritis outcome score domains

| Domains [KOOS] | R-value | p-value |
|---|---|---|
| Comorbidities | - 0.195 | 0.0212 |
| Pain | - 0.291 | 0.0031 |
| Symptoms | 0.208 | 0.012 |
| Daily activities | - 0.150 | 0.045 |
| Causes | - 0.201 | 0.036 |

### 4. Discussion

The clinical results of the patients were recorded, which showed that patients in the age group between (60 - 70) years were 50% of the total rate of patients, followed by patients in the age group between (50 - 59) years, which was 30%. Female patients had a higher rate of 70% than Males with a rate of 30%. The rates of BMI > 30 included 44 patients, a BMI between (25 - 29.9) was 20 patients, and the BMI was 16 patients. The symptom scores were Knee pain, which included 24 patients, and Crepitus, which included 28 patients, which were considered the most. According to the prevalence of clinical symptoms, the most common comorbidities were hypertension with 72 patients, obesity with 68 patients, diabetes with 56 patients, ASA II in 36 patients, and ASA III in 28 patients. The rate of smoking patients was 25%, and that of non-smoking patients was 75%. The knee was involved in the injury: the right side was 12 cases, the left side was 20 cases, and both sides were 48 cases. The clinical results showed that the most common causes of injury were trauma, which included 27 patients; heredity, which included 21 patients; and overuse or repetitive stress, which included 14 patients.

Clinical results showed the pain rates before and after surgery during the three-month follow-up, where during the first month, the pain rate before surgery was It was $9.70 \pm 0.005$, and after surgery, it was $4.28 \pm 0.64$, and the pain rate in the third month before surgery was $8.96 \pm 0.06$ and after surgery, it was $3.15 \pm 0.65$. This study showed patients' quality of life assessment rates before and after surgery, the most prominent of which was the physical aspect, which was $32.51 \pm 12.85$ before surgery and $65.46 \pm 10.09$ after surgery, and mental health, which was $51.92 \pm 8.52$ before surgery and $78.63 \pm 10.35$ after surgery. The clinical results of the patients showed age, diabetes, obesity, site of injury, smoking factor, genetic factor, and the role of pain.

A study conducted in the USA showed that the majority of individuals diagnosed with knee osteoarthritis suffer from persistent pain, which has a detrimental impact on their daily functioning and overall quality of life. The discomfort changes in intensity from slight to intense and may exacerbate with physical activity [16].

In addition, knee osteoarthritis results in rigidity, inflammation, and reduced mobility on the knee joint, leading to a restriction in walking, ascending stairs, and executing fundamental motions. Therefore, it has had a substantial impact on autonomy and everyday activities [17].

Furthermore, further study has shown that knee osteoarthritis causes pain and discomfort that disrupts sleep patterns, leading to a decline in sleep quality. This lack of sufficient rest subsequently increases tiredness and diminishes general health. [18], [19], [20].

## 5. Conclusion

Clinical results showed that smoking, obesity, age, and genetic factors negatively affect the quality of life of patients in the long term. Our results showed a high improvement in the rate of pain and quality of life before and after surgery within three months, as the physical aspect and psychological health aspects were the most prominent in the quality of health life for patients.

**References**

[1] White DK, Tudor-Locke C, Zhang Y, Fielding R, LaValley M, Felson DT, Gross KD, Nevitt MC, Lewis CE, Torner J, Neogi T. Daily walking and the risk of incident functional limitation in knee osteoarthritis: an observational study. Arthritis Care Res (Hoboken). 2014;66 (9);1328-1336.

[2] White DK, Lee J, Song J, Chang RW, Dunlop D. Potential functional benefit from light intensity physical activity in knee osteoarthritis. Am J Prev Med. 2017; 53 (5):289-296.

[3] Dunlop DD, Song J, Lee J, Gilbert AL, Semanik PA, Ehrlich-Jones L, Pellegrini CA, Pinto D, Ainsworth B, Chang RW. Physical Activity Minimum Threshold Predicting Improved Function in Adults with Lower-Extremity Symptoms. Arthritis Care Res (Hoboken). 2017; 69 (4): 475-483.

[4] Cross M, Smith E, Hoy D, Nolte S, Ackerman I, Fransen M, Bridgett L, Williams S, Guillemin F, Hill CL, Laslett LL, Jones G, Cicuttini F, Osborne R, Vos T, Buchbinder R, Woolf A, March L. The global burden of hip and knee osteoarthritis: estimates from the global burden of disease 2010 study. Ann Rheum Dis. 2014; 73 (7): 1323-1330.

[5] Pal CP, Singh P, Chaturvedi S, Pruthi KK, Vij A. Epidemiology of knee osteoarthritis in India and related factors. Indian J Orthop. 2016; 50 (5): 518-522.

[6] Evcik D, Sonel B. Effectiveness of a home-based exercise therapy and walking program on osteoarthritis of the knee. Rheumatol Int. 2002; 22 (3):103-106.

[7] Sabirli F, Paker N, Bugdayci D. The relationship between Knee Injury and Osteoarthritis Outcome Score (KOOS) and Timed Up and Go test in patients with symptomatic knee osteoarthritis. Rheumatol Int. 2013; 33 (10):2691-2694.

[8] Roos EM, Roos HP, Lohmander LS, Ekdahl C, Beynnon BD. Knee Injury and Osteoarthritis Outcome Score (KOOS)- development of a self-administered outcome measure. J Orthop Sports Phys Ther. 1998; 28 (2):88-96.

[9] The Basics of Osteoarthritis 2020. (accessed 11th April 2020).

[10] Burgos-Vargas R, Cardiel MH, Loyola-Sanchez A, De Abreu MM, Pons-Estel BA, Rossignol M, Avouac B, Ferraz MB, Halhol H. Characterization of knee osteoarthritis in Latin America. A comparative analysis of clinical and health care utilization in Argentina, Brazil, and Mexico. Reumatol Clin. 2014; 10 (3): 152-159.

[11] Cubukcu D, Sarsan A, Alkan H. Relationships between Pain, Function, and Radiographic Findings in Osteoarthritis of the knee: A cross-sectional study. Arthritis. 2012; 2012: 984060.

[12] Narayan RV, Thabah MM, Poduval M. Neuropathic pain among patients with primary knee osteoarthritis- results of a cross-sectional study from a tertiary care centre in Southern India. Indian J Rheumatol. 2017; 12 (3): 132-138.

[13] Bindawas S, Vishal V, Soham AS. Differences in Health-Related Quality of Life among Subjects with Frequent Bilateral or Unilateral Knee Pain: Data from the Osteoarthritis Initiative Study. J Orthop Sports Phys Ther. 2015; 45 (2): 128-136.

[14] Kulkarni K, Karssiens T, Kumar V, Pandit H. Obesity and osteoarthritis. Maturitas. 2016; 89: 22-28.

[15] Larsen P, Engberg AS, Motahar I, Ostgaard SE, Elsoe R. Obesity infleunces the Knee Injury and Osteoarthritis Outcome Score. Joints. 2019; 7:8-12.

[16] Edwards C, Rogers A, Lynch S, Pylawka T, Silvis M, Chinchilli V, Mosher T, Black K. The effects of bariatric surgery weight loss on knee pain in patients with osteoarthritis of the knee. Arthritis. 2012; 2012:504189.

[17] Peeler J, Christian M, Cooper J, Leiter J, MacDonald P. Managing Knee Osteoarthritis: The Effects of Body Weight Supported Physical Activity on Joint Pain, Function, and Thigh Muscle Strength. Clin J Sport Med. 2015; 25 (6):518- 523.

[18] Bowman EN, Hallock JD, Throckmorton TW, Azar FM. Hyaluronic acid injections for osteoarthritis of the knee: predictors of successful treatment. Int Orthop. 2018; 42 (4): 733-740.

[19] Ismael, K. I., Al-Salihi, A. A. J., AL-Saadi, R. R., & Saeed, B. T. Isolation of Hemolysin-Producing Bacteria That Cause Infection in Patients with Urinary Tract Infections by Molecular Detection. Journal of Pharmaceutical Negative Results.2022, 13 (3), pp. 263–268.

[20] Alfalluji, W. L., Radhi, A. K., Al-Salihi, A. A. J. Evaluation of the clinical conditions of patients with therapeutic cardiac angiography and In-stent restenosis risk factors for in cancer patients. Onkologia i Radioterapia. 2023, 17 (10), pp. 1–6.