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ASSESSMENT OF THE QUALITY OF LIFE IN PATIENTS WITH KNEE OSTEOARTHRITIS

PROCENA KVALITETA ŽIVOTA OSOBA OBOLELIH OD OSTEOARTROZE KOLENA

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Summary

Introduction. Osteoarthritis is a degenerative rheumatic disease of the peripheral joints. It mostly affects one joint, usually the hip and knee joints, as well as the distal interphalangeal joints of the wrist and thumb carpometacarpal joint. The clinical symptoms include pain, swelling, stiffness, crepitus, muscle atrophy, subluxation, as well as reduced joint mobility, greatly affecting the quality of life of patients. The aim of this study was to assess the quality of life of patients with knee osteoarthritis and determine whether there is a difference in the quality of life of patients with unilateral and patients with bilateral knee osteoarthritis. **Material and Methods.** The study was designed as a retrospective study including 60 patients, 30 patients with unilateral gonarthrosis and 30 patients with bilateral gonarthrosis. The EuroQoL five dimensions questionnaire was used to assess the quality of life. **Results.** There is no statistically significant difference in the quality of life between individuals with unilateral and bilateral knee osteoarthritis, but there is a significant positive correlation between the pain intensity and difficulties in the domains of quality of life. **Conclusion.** People with osteoarthritis of the knee mostly take painkillers and have a good or excellent response to therapy. There is no statistically significant difference in the quality of life among people with unilateral and bilateral knee osteoarthritis. There is a significant positive correlation between the pain intensity and difficulties in the domains of quality of life. There is a significant negative correlation between the perception of general health and all five domains of quality of life.

Key words: Quality of Life; Osteoarthritis, Knee; Pain; Knee; Correlation of Data; Surveys and Questionnaires

Sažetak

Osteoartroza predstavlja degenerativno reumatsko oboljenje perifernih zglobova. Uglavnom je zahvaćen jedan zglob, najčešće zglobovi kuka i kolena, kao i distalni interfalangealni zglobovi i karpometakarpalni zglob palca ruke. U kliničkoj slici dominira bol, otok, ukočenost, krepitacije pri pokretima, mišićna atrofija, subluksacije kao i smanjenje pokretljivosti zgloba, što veoma utiče na kvalitet života obolele osobe. Cilj ove studije je da se proceni kvalitet života osoba obolelih od osteoartroze kolena i utvrdi da li postoji razlika u kvalitetu života osoba koje imaju zahvaćen jedan zglob kolena u odnosu na osobe kod kojih su zahvaćena oba kolena zgloba. **Materijal i metode.** Studija je koncipirana kao retrospektivna studija u koju je uključeno 60 ispitanika starosti od 37 do 82 godine, od kojih 30 ispitanika ima jednostranu gonartrozu i 30 ispitanika obostranu gonartrozu. Za procenu kvaliteta života korišćen je *EuroQoL five dimensions* upitnik. **Rezultati.** Ne postoji statistički značajna razlika u proceni kvaliteta života između osoba sa jednostranom i obostranom osteoartrozom kolena, ali postoji značajna pozitivna korelacija procene intenziteta bola i teškoća u domenima kvaliteta života. **Zaključak.** Osobe sa osteoartrozom kolena u većini slučajeva piju lekove protiv bolova i imaju dobar ili odličan odgovor na terapiju. Ne postoji statistički značajna razlika u proceni kvaliteta života između osoba sa jednostranom i obostranom osteoartrozom kolena. Postoji značajna pozitivna korelacija procene intenziteta bola i teškoća u domenima kvaliteta života. Postoji značajna negativna korelacija percepcije opšteg zdravlja i svih pet domena kvaliteta života.

Ključne reči: kvalitet života; osteoartritis kolena; bol; koleno; korelacija; ankete i upitnici

Introduction

Osteoarthritis (OA) is a degenerative rheumatic disease of the peripheral joints. In addition to the fact that degenerative rheumatic diseases are primarily diseases affecting the cartilage, early symptoms of the disease also involve the synovium and subchondral part of the bone. It mostly affects one joint, usually the hip and knee joints, as well as the distal interphalangeal joints and the carpometacarpal joint of the thumb [1]. The incidence of hip OA

is higher in men, while hand and knee OA is more common in women. The etiology is not completely elucidated, but it is assumed that it causes damage to the cartilage and it mostly affects the weight-bearing joints. The clinical symptoms include pain, swelling, stiffness (lasting less than 20 minutes), and crepitus during movement, muscle atrophy (especially in the quadriceps region), subluxation and reduced joint mobility. The course of the disease is individual; it may stop at a certain stage, and regression of certain problems is possible [2].

Abbreviations

OA – osteoarthritis
EQ-5D – EuroQoL five dimensions
BMI – body mass index
NSAIDs – non-steroidal anti-inflammatory drugs

The diagnosis is based on a clinical examination which includes: palpation, measuring the joint range of motion, joint circumference, manual muscle testing, measuring the local temperature, and pain provocation tests. Laboratory findings are within normal limits [1].

The knee OA (gonarthrosis) may involve the medial or lateral tibiofemoral compartments of the knee joint and/or the patellofemoral compartment [3].

The OA can be divided into two categories: primary OA, often idiopathic, with abnormality of joint biomaterials and mechanical changes in the joint structure, while the external stimuli are normal; and secondary OA that results from superimposed risk factors (e.g., joint injury), while the cartilage is normal [4]. The most common way of developing OA is increased or irregular mechanical load on the joint. It is more common after surgical removal of the meniscus, as well as after previous knee disease or injury [5]. Severe trauma and repeated joint movements contribute to the development of OA. Also, obesity increases the risk of OA by two to three times compared to people of normal weight [6].

The OA is a slowly progressive disease. The main symptom is pain that is worse during activity and is relieved by rest [6]. Pain is located deep in the joint and since the cartilage of the joint is without nerve endings, pain in OA originates from periarticular structures (nerve endings in the periosteum, microfractures in the subchondral bone, medullary hypertension, joint capsule or muscle spasm) [7].

Patients with OA suffer from morning stiffness that lasts about 20 - 30 minutes, as well as stiffness at the beginning of the movement, e.g., during the first few steps after getting up [8].

Physical examination may reveal swelling and painful tenderness localized above the bone or in the soft tissue area. Crepitus during joint movements may be located by palpation [2]. It can also be felt when performing passive movements, sometimes it is heard during active movements of the joint.

Varus and valgus deformities of the knee joint mostly occur in advanced OA [8]. The OA of the medial space is responsible for the formation of varus deformities, while in the lateral section OA leads to valgus deformities [2].

Early-stage OA is rarely accompanied by symptoms, so radiologically advanced OA may exist without symptoms [8]. The course of the disease is individual and it may be stopped in certain cases.

The diagnosis of OA is made based on the symptoms, i.e., the clinical picture. The most common diagnostic procedures are radiography in the anteroposterior and lateral profile. The cartilage image shows cartilage loss and the cartilage damage is indicated by narrowing of the joint space, appearance of osteophytes and calcium deposits inside the

joint [9]. The severity of OA may be radiologically assessed by Kellgren and Lawrence score [10]:

Grade 0 - none;
Grade 1 - initial osteophytes;
Grade 2 - moderate joint space narrowing, moderate subchondral sclerosis;
Grade 3 - more than 50% joint space narrowing, round femoral condyles, advanced subchondral sclerosis, advanced osteophytes;

Grade 4 - joint destruction, joint space narrowing, subchondral cysts of the tibial and femoral condyles, subluxation of the joint.

There are no laboratory findings that are specific to OA. People with OA mostly have normal erythrocyte sedimentation rate, normal values of complete blood count, and synovial fluid shows very mild leukocytosis [2].

The three main goals for OA treatment are to reduce pain, maintain joint mobility and slow down the progression of the pathological process. Treatment of OA of the knee may be divided into pharmacological treatment, non-pharmacological conservative treatment, and surgical treatment.

The aim of this study was to assess the quality of life of people with OA of the knee and determine whether there is a difference in the quality of life of patients with unilateral and patients with bilateral knee OA.

Material and Methods

The retrospective study was conducted at the Special Hospital for Rheumatic Diseases in Novi Sad. It included 60 people with OA of the knee, of which 6 were male and 54 female, aged 37 to 82 years. The patients were divided into two groups. The first group included 30 patients with unilateral gonarthrosis, and the second included 30 patients with bilateral gonarthrosis. Participation was voluntary and all participants signed an informed consent.

EuroQoL five dimensions (EQ-5D), Likert scale, and numeric pain scale were used in the research and demographic data were also collected. The patients were interviewed and informed about the goal and protocol of the research. After signing the informed consent, they filled out the questionnaires. This research was approved by the Ethics Committee of the Special Hospital for Rheumatic Diseases in Novi Sad.

The EQ-5D quality of life scale, the Likert scale and the numeric rating scale were used to assess the patients' quality of life. The EQ-5D questionnaire is a questionnaire which evaluates the generic quality of life and measures health.

The EQ-5D quality of life questionnaire comprises the following 5 dimensions:

1. Mobility
2. Self-care
3. Everyday activities (e.g., work, study, household chores, family or leisure activities)
4. Pain/Discomfort
5. Anxiety/Depression.

Each dimension of the questionnaire has three response levels of severity: 1. no problems; 2. some problems; 3. extreme problems.

The questionnaire also has a vertical visual analogue scale for assessing one's own health condition, where patients grade their health status from 0 (worst conceivable health condition) to 100 (best conceivable health condition).

Patients also reported which non-steroidal anti-inflammatory drugs (NSAIDs) they were taking. Having in mind the effects of the drugs on the symptoms of OA, the responses on Likert scale were ranked: 0 (none), 1 (bad), 2 (weak), 3 (good), 4 (excellent).

Pain is more precisely rated using a numerical rating scale (from 0 to 10), where score of 0 means no pain, and score of 10 means the worst possible pain. Body mass index (BMI) was calculated for each participant.

Results

The average age of examinees was 66.45 years; the average age of participants with unilateral gonarthrosis was 66.47 years, and in those with bilateral gonarthrosis it was 66.43 years. Women predominated in the whole sample and in both subgroups, and there were only 6 men and 54 women. The largest number of participants (about 50%) completed secondary school education, while about 25% of participants completed primary school, college or university. The described differences were tested by χ^2 test. The obtained results

showed that there were no significant differences between the two groups of examinees in relation to sociodemographic characteristics.

Most of the examinees were taking painkillers, while 25 had hypertension, mostly those with bilateral gonarthrosis.

There was only one severely obese subject, while the number of malnourished and mildly obese subjects was equal ($N = 10$). Most of the examinees had an ideal or increased body weight (obesity).

Most of the examinees reported that they had a good or excellent response to therapy. The number of respondents with a poor response was equal to the number of those who had no response to therapy.

Regarding the pain intensity and the perception of general health, we found that patients with unilateral gonarthrosis perceived their health better and reported a lower degree of pain.

These differences were also tested by the χ^2 test. The results showed that there were no statistically significant differences in any of the observed medical aspects between subjects with unilateral and bilateral gonarthrosis.

The **Table 1** shows the scores of the examinees in the whole sample and in two subgroups on the quality-of-life scales. The results of the t-test showed that there were no significant differences in the estimated quality of life of patients with unilateral and bilateral gonarthrosis on any quality of life scales.

Table 1. Quality of life of patients
Tabela 1. Kvalitet života pacijenata

Quality of life scales <i>Skale kvaliteta života</i>	All <i>Svi</i>	Unilateral OA <i>Unilateralna OA</i>	Bilateral OA <i>Bilateralna OA</i>	Test <i>Test</i>	p <i>p</i>
Mobility/ <i>Mobilnost</i>	12 47 1	5 25 0	7 22 1	1.525	.465
Self-care/ <i>Briga o sebi</i>	38 19 3	21 9 0	17 10 3	3.474	.176
Everyday activities/ <i>Uobičajene aktivnosti</i>	22 31 7	12 15 3	10 16 4	.357	.837
Pain/Discomfort/ <i>Bol/nelagodnost</i>	3 38 19	2 20 8	1 18 11	.912	.634
Anxiety/Depression/ <i>Anksioznost/depresija</i>	26 15 19	14 9 7	12 6 12	2.070	.355

Legenda: OA – osteoartritoza

Table 2. Relationship between pain and quality of life
Tabela 2. Odnos bola i kvaliteta života

Quality-of-life scales/pain <i>Skale kvaliteta života/bol</i>	All <i>Svi</i>		Unilateral gonarthrosis <i>Unilateralna gonartroza</i>		Bilateral gonarthrosis <i>Bilateralna gonartroza</i>	
	r	p	r	p	r	p
Mobility/ <i>Mobilnost</i>	.443	.000	.248	.187	.565	.001
Self-care/ <i>Briga o sebi</i>	.483	.000	.509	.004	.464	.010
Everyday activities/ <i>Uobičajene aktivnosti</i>	.620	.000	.592	.001	.646	.000
Pain/Discomfort/ <i>Bol/nelagodnost</i>	.588	.000	.512	.004	.651	.000
Anxiety/Depression/ <i>Anksioznost/depresija</i>	.425	.000	.248	.186	.538	.002

Table 3. Relationship between age and quality of life
Tabela 3. Odnos starosti i kvaliteta života

Quality-of-life scales/Age <i>Skale kvaliteta života/Starost</i>	All <i>Sve</i>		Unilateral gonarthrosis <i>Unilateralna gonartroza</i>		Bilateral gonarthrosis <i>Bilateralna gonartroza</i>	
	r	p	r	p	r	p
Mobility/ <i>Mobilnost</i>	.242	.063	.323	.082	.184	.329
Self-care/ <i>Briga o sebi</i>	.186	.156	.300	.107	.123	.518
Everyday activities/ <i>Uobičajene aktivnosti</i>	.336	.009	.433	.017	.249	.184
Pain/Discomfort/ <i>Bol/nelagodnost</i>	.149	.256	.221	.240	.084	.658
Anxiety/Depression/ <i>Anksioznost/depresija</i>	.218	.094	.398	.029	.072	.706

The descriptive analysis showed that most of the respondents had no problems taking care of themselves, but pain and mobility were a problem in most of them. Half of the respondents had a problem with anxiety and depression.

The **Table 2** shows the relationship between the perception of pain intensity and the quality-of-life dimension. This correlation was tested by Pearson's correlation coefficient and the bolded values are significant.

In the overall sample, there was a significant positive correlation between the pain intensity and difficulties in the domains of quality of life. The respondents with a higher intensity of pain reported greater difficulties in the domains of mobility, self-care, normal activities, pain and care. The findings were the same in the examinees with bilateral gonarthrosis.

Subjects with unilateral gonarthrosis reported an association only between pain intensity and self-care, normal activities and pain, while mobility and care were not significantly correlated with pain in this subgroup of subjects.

The results of this study showed that there was a significant positive correlation between age and problems with everyday activities in the whole sample and the subgroup of examinees with unilateral gonarthrosis (**Table 3**). This subgroup presented with significant correlation between age and care and depression. Older examinees reported greater difficulties in this domain.

In the subgroup of examinees with bilateral gonarthrosis, age did not show a significant correlation with the quality of life.

In regard to the relationship between BMI and quality of life, analysis was performed in the whole sample and in two individual groups of examinees. The results showed that there was no significant correlation between BMI and any domain of quality of life (**Table 4**).

In regard to the relationship between the general health and quality of life, the results showed that there was a significant negative correlation between the perception of general health and all domains of quality of life in the overall sample. The examinees with better general health reported fewer difficulties in all five

Table 4. Relationship between body mass index (BMI) and quality of life
Tabela 4. Odnos indeksa telesne mase (ITM) i kvaliteta života

Quality of life/BMI <i>Kvalitet života/ITM</i>	All <i>Svi</i>		Unilateral gonarthrosis <i>Unilateralna gonartroza</i>		Bilateral gonarthrosis <i>Bilateralna gonartroza</i>	
	r	p	r	p	r	p
Mobility/ <i>Mobilnost</i>	.065	.621	.027	.888	.096	.614
Self-care/ <i>Briga o sebi</i>	.054	.681	-.132	.488	.064	.735
Everyday activities/ <i>Uobičajene aktivnosti</i>	.197	.130	.330	.075	.070	.713
Pain/Discomfort/ <i>Bol/nelagodnost</i>	.174	.183	.290	.063	-.047	.804
Anxiety/Depression/ <i>Anksioznost/depresija</i>	.224	.084	.175	.355	.341	.065

Table 5. Relationship between the general health and quality of life
Tabela 5. Odnos procene opšteg zdravlja i kvaliteta života

Quality of life/General health <i>Skale kvaliteta života/Opšte zdravlje</i>	All Svi		Unilateral gonarthrosis <i>Unilateralna gonartroza</i>		Bilateral gonarthrosis <i>Bilateralna gonartroza</i>	
	r	p	r	p	r	p
Mobility/ <i>Mobilnost</i>	-.350	.006	-.423	.020	-.331	.074
Self-care/ <i>Briga o sebi</i>	-.350	.006	-.326	.079	-.323	.082
Everyday activities/ <i>Uobičajene aktivnosti</i>	-.469	.000	-.500	.005	-.433	.017
Pain/Discomfort/ <i>Bol/nelagodnost</i>	-.271	.036	-.137	.470	-.358	.052
Anxiety/Depression/ <i>Anksioznost/depresija</i>	-.308	.017	-.326	.079	-.257	.170

domains of quality of life. A significant negative correlation between general health and quality of life was also found in the sample of examinees with unilateral gonarthrosis. Negative correlation was found in the dimensions of quality of life: mobility and everyday activities. Examinees with unilateral gonarthrosis with more problems with mobility and everyday activities assessed their general health as worse.

In the sample of examinees with bilateral gonarthrosis, the only significant correlation with general health were everyday activities and the examinees with greater difficulties in everyday activities rated their general health as worse (**Table 5**).

Discussion

The most common form of arthritis is OA that causes pain, functional limitations and disability. The prevalence is higher among women (25.4%) compared to men (17.6%). Older people (50% of people over the age of 65 and 29.3% of people between the ages of 45 - 64) are more likely to get OA than younger population (7.9% of people between the ages of 18 and 44) [11].

Our study included 60 patients, most of whom were women (90%). The average age was 66.45 years. Most patients completed secondary school education (about 50%), while an equal number completed primary and tertiary education. The largest number of examinees had ideal ($N = 21$) or increased body weight, i.e., pre-obesity ($N = 18$).

A study conducted by Seokhan et al. found that age (≥ 65 years), female gender, obesity, and lower education were among the most important risk factors for OA of the knee [12]. However, Lawrence et al. found that severe forms of OA are not related to old age, but that there is a significant increase after the age of 50 [13–15].

A study conducted by Grotle et al. followed 1,854 people aged 24 to 74 over 10 years and found that obesity significantly affects the development of OA of the knee [16]. Szoeke et al. found that every 5 kg increase in body weight doubles the risk for OA of the knee [17].

In our study, the majority of examinees (90%) was taking NSAIDs and reported good or excellent response to therapy.

Comparing two groups of patients with OA of the knee (unilateral and bilateral gonarthrosis), we found that there were no statistically significant differences in quality of life between these two groups

of patients, but many patients reported problems with pain and mobility, as well as anxiety and depression. Patients completed the recommended EQ-5D-3L questionnaire, although the EQ-5D-5L questionnaire is increasingly used as it offers the possibility of additional responses and exceeds the limits of the EQ-5D-3L questionnaire [18, 19].

In a study including 2,481 patients (1,130 with bilateral knee pain, 646 with unilateral knee pain, and 705 without knee pain) a short form-12 item questionnaire was used and showed that patients with bilateral knee pain had a lower quality of life and general health in relation to the other two groups of patients [20].

A significant correlation between age and problems with everyday activities was found in the whole sample of examinees and the subgroup with unilateral gonarthrosis. We may conclude that older examinees have greater difficulties in this domain. Also, in the sample of examinees with unilateral gonarthrosis, there is an association between age and anxiety and depression.

A study conducted by Bobić Lucić and Grazio found that older people with OA of the knee who lack security in performing daily activities have more physical difficulties and a greater impact of pain on everyday activities, so improving balance would lead to better functioning of the elderly and to improving of their quality of life in general [21].

The results of this study show that there is a significant negative correlation between the perception of general health and all domains of quality of life in the whole sample. This means that those examinees that have better general health report fewer difficulties in all five domains of quality of life. Examinees with unilateral gonarthrosis have more problems with mobility and everyday activities, while examinees with bilateral gonarthrosis only report issues with everyday activities.

Conclusion

People with osteoarthritis of the knee mostly take painkillers and have a good or excellent response to therapy. There is a significant positive correlation between the pain intensity and difficulties in the domains of quality of life. There is a significant negative correlation between the perception of general health and all five domains of quality of life.

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