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QUALITY OF LIFE OF PATIENTS WITH SEVERE KNEE OSTEOARTHRITIS IN HUNGARY: CROSS-SECTIONAL STUDY

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ABSTRACT. Introduction: Knee osteoarthritis (OA) is a chronic musculoskeletal disease that is associated with mortality, disability, and low quality of life. In Hungary, the number of patients diagnosed with severe knee osteoarthritis is dramatically increasing yearly. **Objective**: This study aims to assess the quality of life among patients with severe knee osteoarthritis who undergo knee replacement surgery after one month to assess their quality of life (QoL). **Material and Method**: Ten patients (6 female, 4 male, 70±4 years, 30.7±3.4 kg/m^2) with severe knee osteoarthritis were included from an orthopedic clinic in Pécs, Hungary. The SF-36 questionnaire (Hungarian version) was used to assess QoL of the patients one month prior to knee replacement surgery. **Results**: The participants with severe knee OA reported allow overall average of pain (40.95%), role limitations due to physical health (42.5%), and role limitations due to emotional problems (46.7%) that reduced their QoL. In addition, there are significant differences between women and men in some domains. Women had significantly lower physical functioning and role limitations due to emotional problems than men, by 42.8% (p=0.03) and 73.3% (P=0.005),

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respectively. Moreover, women had a higher feeling of pain than men; however, the differences was insignificant. **Conclusions**: Patients with severe knee osteoarthritis have low quality of life and severe pain during daily activities. Furthermore, women with severe knee OA had significantly higher pain and lower quality of life than men due to their emotional status. Further studies with large sample sizes are needed.

Keywords: *knee osteoarthritis, pain, quality of life, function.*

Introduction

Knee osteoarthritis (OA) is a very common chronic degenerative musculoskeletal disease (Felson et al., 2000; Midgley, 2021). The incidence of knee OA is increasing with age, obesity, occupation, gender (women are more affected than men) (Cui et al., 2020; Felson, 2006; Felson, Anderson, Naimark, Walker, & Meenan, 1988; Felson et al., 2000).Knee OAis characterized by cartilage breakdown, osteophyte formation, and joint space loss. Therefore, it increases the risk of knee pain, low quality of life (QoL), disability, and mortality (Felson, 2006; Felson et al., 2000). It has been found that 80% of patients with knee OA had movement limitation, and 25% of them were unable to achieve their daily life activities that negatively impacted their psychological status (Mahir et al., 2016).

It has been reported that the global prevalence of knee OA was 22.4% among the40 and over age group, while the global incidence of knee OA was 203 per 10,000 person-years among the 20 and over age group in 2020 (Cui et al., 2020). The prevalence and incidence were significantly higher among females than males (1.69 vs. 1.39, $p<0.001$, respectively) (Cui et al., 2020). In 2010, 185 of the examined knees in the southwestern part of Hungary had Kellgren-Lawrence ≥ 2(16.54%), and 20 of the examined knees had Kellgren-Lawrence ≥ 3 (2.9%) (Horváth et al., 2011). Another study found that the prevalence of knee OA in Hungary was 13.3% in 2010,where 2.9% of them had severe knee OA (Horváth et al., 2010).

Patients with severe knee OA have severe clinical and/or radiological symptoms, such as severe pain during activities and rest, depression, low activity level, low quality of life, stiffness, gait deformities, large osteophytes, joint enlargement, and joint space narrowing (Berger, Kean, Goela, & Doherty, 2012; Felson, 2006; Felson et al., 2000; Hall et al., 2017; Midgley, 2021; Rathbun, Yau, Shardell, Stuart, & Hochberg, 2017). For severe knee OA, knee replacement surgery is the optimal treatment to reduce pain and enhance the

quality of life (Biggs, Whatling, Wilson, Metcalfe, & Holt, 2019; Dieppe, Lim, & Lohmander, 2011; Escobar et al., 2017; Ferket et al., 2017; Nunez et al., 2009). In Hungary, the quality of life of patients with severe knee OA was not sufficiently investigated. One conference paper reported the quality of life (QoL) among Hungarian patients with severe knee OA before knee replacement surgery using four different questionnaires, including a homemade questionnaire, the Knee Society Score (KSS), the Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC), and the short form (SF-36) (Busa et al., 2019). However, the number of participants was not mentioned, and the reported results and methods were not well presented as it was a conference paper. As a result, insufficient data are available about the activity level of Hungarian patients with severe knee OA. Therefore, more information is required in this field to have clear information about their QoL, to identify the most challenging activities for patients with severe knee OA, and to identify if there are differences in QoL cross women and men.

Objectives

This cross-sectional study aimed to report QoL of patients with severe knee OA who undergoing knee replacement surgery after one month. Also, this study aimed to evaluate the gender differences in term of QoL. The results of this study could be important to therapist who work with patients with severe knee OA.

Materials and Methods

This is a cross-sectional study and part of a case serials study that was conducted between 2020 and 2021. The included participants had to continue the main study with one-year follow-up.

Participants

Ten-participants (four males, six females) on the waiting list for knee replacement surgery were included in this study, with an average age of 70±4 years and an average body mass index of 30.7±3.4 kg/m^2 (Table 1).

Table 1. Demographic data of the participants.

Domains	**Total N=10**
Age (year)	70.6 ±4.0
Body mass index (kg/m²)	30.7±3.4
Knee OA duration	More than four years
Using walking assistance	3 (1 male, 2 females)
Blood pressure	8 (2 males, 6 females)
Diabetes	3 (females)
Smoking	None
Employment	2 (1 male, 1female)
Marital-status	5 Married (3 males, 2 females) 5 Non-married (2 Divorced, 3 Widow)

The participants were recruited from the Department of Orthopedics (Clinical Center, University of Pécs, Hungary). The inclusion criteria were the presence of radiological and clinical symptoms of knee osteoarthritis, the Kellgren-Lawrence (K-L) scale ≥ 3 (Kohn, Sassoon, & Fernando, 2016),and pain during daily activities. Furthermore, the included participants had to be scheduled for knee replacement surgery within a month. The radiological symptoms were confirmed by the orthopedic surgeon at the orthopedic clinic. The exclusion criteria were to have one or more of the followings: an osteoarthritis in the hip or ankle, a knee replacement before, a knee surgery in the last five years, a hip and ankle injuries in the last five years, and cognitive problems. Ethical approval from the University of Pécs was granted and the consent form was signed from all participants before participation.

Procedure

The patients who met the inclusion criteria were contacted to participate in the study. Ten patients agreed to participate in this study. All the included participants were briefed about the study, and they were asked to sign the consent form. Then, each participant was asked to complete a Hungarian language SF-36 form one month before the surgery. The eight domains of the

short form (SF-36) were reported, including physical functioning, physical role, bodily pain, general health, vitality, social functioning, emotional role and mental health (Brazier et al., 1992; Hayes, Morris, Wolfe, & Morgan, 1995; Ko et al., 2013; Ware Jr, 2000). Each question is scored from zero to 100. A low score indicates poor health status, and a high score shows better health status (Brazier et al., 1992; Hayes et al., 1995; Ko et al., 2013; Ware Jr, 2000).

Statistical analysis

SPSS software SPSS(SPSS Inc., Chicago, IL, USA, version 24) was used to calculate descriptive statistics and the multivariate analysis of MANOVA. In the multivariate analysis, all eight domains were dependent variables, and gender was an independent variable. The results were considered significant if the P value was less than 0.05. The other factors such as using walking assistance, diabetes, blood pressure, smoking, employment, and marital-status were not recorded because the outcomes were insignificant. The scoring was performed online via the online software Orthotool-kit (https://www.orthotoolkit.com/sf-36/).

Results

Ten patients had severe knee OA with a minimum of four years of knee OA and were ready for knee replacement surgery and completed the SF-36 form. The average of eight domains with standard deviation were calculated (Table 2). Based on the mean of the eight domains of the SF-36, the results show that three domains were less than 50%, including pain, role limitation due to physical activity, and role limitation due to emotional problems. The average reported pain was 40.95%, which was the lowest among the domains. The role limitation due to physical activity was the second lowest domain, with an average of 42.5%. In contrast, the overall mean of social functioning and emotional well-being were the higher domains.

In addition, the comparison of the eight domains according to gender showed that there are significant differences between women and men in two domains: physical functioning and role limitations due to emotional problems. Women significantly had lower physical functioning and role limitations due to emotional problems than men by 42.8% (p=0.03) and 73.3%, respectively. (p=0.005). Other differences were seen between women and men but the differences were insignificant. For instance, women reported lower role limitations

due to physical activity than men by 53.44%. In addition, women had lower average energy and emotional well-being domains than men by 24.46% and 22.5%, respectively.

Table 2. Mean and standard deviation of SF-36 domains in the included participants with comparison between the eight domains according to gender.

Domains	Overall Outcomes, N=10 (±SD)	Outcomes of males, N=4 (±SD)	Outcomes of females, N=6 (±SD)	P value
1) Physical functioning	52 (22.75)	70 (15.8)	40 (17.5)	**0.03***
2) Role limitations due to physical health	42.5 (37.36)	62.5 (47.8)	29.1 (34.9)	0.180
3) Role limitations due to emotional problems	46.71 (39.11)	83.3 (33.2)	22.2 (33.3)	**0.005***
4) Energy/fatigue	55.5 (13.63)	65 (11.54)	49.1 (10.8)	0.067
5) Emotional well-being	69.2 (16.34)	80 (18.18)	62 (10.5)	0.086
6) Social functioning	71.25 (27.67)	75 (28.8)	68.7 (27.6)	0.74
7) Pain	40.95 (23.94)	47.3 (26.2)	36.6 (21.9)	0.62
8) General health	52.5 (13.18)	52.5 (13.2)	52.5 (13.18)	1.00

Note: * Significant results.

Discussion

This cross-sectional study aimed to report the quality of life among Hungarian patients with severe knee OA who were ready for knee replacement surgery and the gender differences in term of QoL. This study is part of another study that evaluated the activity level before and one year after knee replacement surgery. The outcomes of this study found that there were significant impairments in some of the sub-scores of QoL. The Hungarian patients had low physical function and a high pain level, which reduced their ability to freely achieve their daily activities. However, the overall scores of social functioning and emotional well-being among participants were the highest in domains with less struggle.

The results of this study are similar to those of another studies that reported OoL using the SF-36 since these articles showed that OoL is impaired due to knee OA and that functional and pain scores were the lowest(Alkan, Fidan, Tosun, & Ardıçoğlu, 2014; Mahir et al., 2016; Saeed, Zulfiqar, Kaleem, Hafeez, & Ghauri, 2021). The impairment of quality of life could be correlated with pain severity and radiological severity (Alkan et al., 2014; Hannan, Felson, & Pincus, 2000; Muraki et al., 2012).

Furthermore, this study found differences in pain and emotional status in term of gender. The Hungarian women with severe knee OA had more severe pain and more functional limitations due to emotional problems than Hungarian men patients. Similar results were found in other published articles that showed that women with knee OA had higher pain and lower QoL than men with knee OA (Alkan et al., 2014; Cui et al., 2020; Muhammad, Azam, & Salam, 2018; Muraki et al., 2012; Tonelli, Rakel, Cooper, Angstom, & Sluka, 2011). Therefore, sex was a risk factor for the incidence and severity of knee OA.

For emotional status, this study found that Hungarian women with severe knee OA had lower emotional well-being and lower functional activity due to emotional problems than men. Similarly, other studies found that women with knee OA were more likely to have negative mood, anxiety, and depression than men with knee OA (Cui et al., 2020; Keefe et al., 2004; Tonelli et al., 2011). This could be due to the higher pain intensity and low activity level of women with knee OA (Tonelli et al., 2011). Another study conducted in Pakistan found that the role limitation due to emotional problems had a poor score (with an average response of 30%), which could be due to participant characteristics since most of the participants were overweight (Saeed et al., 2021). It is suggested that obesity could reduce QoL by more than 70% (Cui et al., 2020; Saeed et al., 2021) and increase the risk of disabilities (Batsis, Zbehlik, Barre, Mackenzie, & Bartels, 2014). Hence, obesity among patients with severe knee OA should be controlled, as it also reduces the QoL and physical activity level.

The limitations of this study

This cross-sectional study is a part of a case-series study with a small sample size. The data collection process was performed through the COVID-19 pandemic corona, and it was difficult to get in touch with more elderly individuals due to difficulties in reaching the hospital and putting their lives at risk. Furthermore, the included participants had to continue the main study with one-year follow-up; hence, the number of participants was low. Nevertheless,

the outcomes of this study could help the therapists in Hungary to understand the OoL and the most challenging activities among patients with severe knee OA. In addition, the results could be a basic for further studies regarding knee OA to be conducted in Hungary with larger sample size.

Conclusion

Knee OA is a global disabling disease that is associated with pain and low OoL. Hungarian patients with severe knee OA complain mainly of pain and role limitations due to physical health and emotional problems. Additionally, Hungarian women with severe knee OA had significantly lower physical functioning and role limitations due to emotional problems than Hungarian men. Hence, it is necessary to include intensive emotional-health care in the treatment strategy for women with severe knee OA in Hungary. Further studies with larger sample sizes are needed.

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Declarations

Ethics approval and consent to participate: Ethical approval was obtained from the University of Pecs research ethics committee (8343/2020, date of approval is July 2020). All methods were carried out in accordance with relevant guidelines and regulations.

Consent for publication: Informed consent was obtained from all subjects involved in the study.

Availability of data and materials: Data sharing does not apply to this article as no datasets were generated or analyzed during the current study.

Competing interests: The authors declare that they have no competing interests (financial and nonfinancial).

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Authors' contributions: With the submission of this manuscript, I would like to confirm that all authors of this paper have directly participated in the planning, execution, and analysis of this study. All authors of this paper have read and approved the final version submitted, and they have no conflicts of interest.