The Role of Pre-operative Clinical Presentation and Quality of Life in Predicting Post-operative Satisfaction of the Elderly Patients Undergoing Knee Replacement Surgery in Hospitals Affiliated to Shiraz University of Medical Sciences-Iran

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Abstract

Background: Knee replacement surgery is often successful; however, a number of patients are not satisfied with the results of the operation. **Objectives:** This study was designed to determine whether clinical presentation and quality of life (QoL) before knee replacement surgery could predict patient satisfaction with surgery. **Materials and Methods:** A cross-sectional study was performed among 250 elderly patients with the age of 60 years or over who were candidate for a unilateral knee replacement surgery in hospitals affiliated to Shiraz University of Medical Sciences. To gather data, the QoL Questionnaire, knee evaluation form, demographic, and satisfaction questionnaire were used. The questionnaires were filled-in before and after surgery and in follow-up time (2 months later). **Results:** Most of the respondents were women (66.4%) with the mean age of 68. 9 (standard deviation = 6. 84). The results showed a significant positive correlation between patients' post-operative satisfaction and pre-operative clinical presentation ($r = 0.195$ $P = 0.003$) and QoL ($r =156$, $P = 0.023$). However, there was no significant association between post-operative satisfaction and pre-operative clinical presentation and QoL at follow-up time ($P > 0.05$). Linear regression analysis showed that pre-operation clinical presentations and QoL, respectively, explained 3.8% and 2.4% of the variance in post-operative satisfaction. **Conclusions:** The results showed that satisfaction after surgery in the elderly is partly influenced by the pre-operative QoL and clinical presentation. Therefore, for improvement of the patients' post-operative outcomes, it is necessary to pay more attention to these variables in future planning.

Key words: Arthroplasty, knee replacement, osteoarthritis, patient satisfaction, quality of life

INTRODUCTION

Osteoarthritis (OA) is one of the most common joint problems and a leading cause of disability among older adults, which is associated with a high degree of social and economic burden.[1,2] It affects the larger joints and more specifically the joints that bear the

bulk of the weight.[3] However, knee is the most common area of OA after the fingers and vertebrae.[4] OA, especially in the knee area, is known as one of the five leading causes of disability among the elderly people.[5] In a follow-up study, the prevalence rate of moderate-to-severe knee OA increased from 3.7% in the initial survey to 26.7% over the next 11 years.[6] Prevalence rate of OA is reported to be 16.6% in the urban area of Iran.[7] The most important characteristic of OA is a gradual degeneration of the joint cartilage, which is associated with bone hypertrophy (osteoporosis and subcutaneous bone sclerosis) and thickening of the joint capsule.[4] The American College of Rheumatology has identified the OA as a clinical syndrome which manifested with joint pain, morning stiffness, and joint crepitus.[8,9] Symptomatic knee OA is seen in about 13% of women and 10% of men at the age of 60 years or over. However, the percentage of people with this disease is increasing due to an increase in the aging population and obesity.[10] OA due to its chronic, painful, and disabling nature has a profound effect on the elderly people's quality of life (QoL), especially in terms of physical, mental, and social dimensions of health.[11-13] Some studies have shown that the QoL of patients with OA is low and undesirable.[14,15] The results of Malekzadeh *et al*. showed that 63% of people with OA have poor QoL.[16] Pain and functional limitation in patients with OA may reduce the QoL in these patients.[17] Over the past 20 years, the interest in evaluating and improving the QoL of the elderly with chronic diseases has increased dramatically.[18,19] There are several approaches for treating OA that often have a palliative effect and delayed the course of the illness. However, the ultimate development of the disease requires a final treatment, such as joint replacement.[20] Knee replacement is known as a convenient method for improving knee function, reducing pain, and restoring active lifestyle,[21] but some patients are still dissatisfied with its consequences during the first few days after surgery. Studies have shown that 19%–20% of patients are not satisfied with the results of knee replacement surgery.[22] Patient satisfaction is an important criterion for examining the surgery outcome, as there is adequate evidence which indicated difference between doctors and patients scoring of health condition[23,24] It is important for health-care providers to evaluate patient satisfaction with the complex process which is associated with these procedures.[25] Studies have suggested a variety of factors that may affect the satisfaction of arthroplasties, such as post-operative pain or joint stiffness, although studies are very limited in relation to why some patients are satisfied and others are still not satisfied.[24,26] Since there has been no report in this area in Iran, this study conducted to examine the predictive role of clinical presentation and

QoL before knee replacement surgery in post-operative satisfaction among elderly patients who were candidate for a unilateral knee replacement surgery in hospitals affiliated to Shiraz University of Medical Sciences in Shiraz, Iran at 2016.

MATERIALS AND METHODS

Study design and sampling

In this cross-sectional study, a convenience sample of 250 elderly patients with age of 60 years or over who were candidate for unilateral knee replacement surgery were studied during January to October of 2016. The study area was orthopedic wards of two main referral and teaching hospitals (Shahid Chamran and Namazi Hospitals) affiliated to Shiraz University of Medical Sciences in Shiraz, south of Iran. Chamran Hospital is one of the largest medical centers for trauma and orthopedic patients and Namazi hospital is an educational therapeutic center of Shiraz University of Medical Sciences. A sample size of 210 participants was determined based on the previous study[22] and by taking α = 0.05 and β = 20.0 and power = 80.0 using MedCalc software. MedCalc is a statistical software program intended for the biomedical research. However, with attrition rates of 20%, a total sample size of 250 was considered.

Inclusion and exclusion criteria

Inclusion criteria were patients with OA who were candidate for knee arthroplasty surgery with age of 60 or over, not having a history of other chronic disease or a history of mental illness and other cognitive disorders, not participated in any previous studies, and having normal function in the rest of their joints, willingness to participate in the study. Exclusion criteria were a history of previous joint replacement surgery and uncompleted or partially completed questionnaires.

Data collection

Approval was obtained from the Ethical Committee of Shiraz University of Medical Sciences (ethic code: IR.SUMS.REC.1394.S940). After obtaining permission from the Local Ethics Committee, a session was held before the surgery and a full explanation of the research objectives was given and written informed consent was signed by the participants. The volunteer subjects were asked to complete the pre-operative questionnaire. The information was collected in three stages before and after

the operation and at the time of follow-up or 2 months after surgery.

Measurements

The demographic data sheet was used to collect some information about patient's gender, age, education level, and marital status. The SF-36 QoL questionnaire[27] was applied to evaluate patient's pre-operative QoL. This questionnaire consists of 8 subscales. Two subscales of physical and mental health were achieved by the integration of these 8 subscales. The subscale of physical health is the sum of the subscales of physical functioning, physical role (PR), pain (P), and general health. The subscale of mental health is derived from the sum of role motional (RE), energy/fatigue, emotional well-being (EW), and social function. Each subscale score was between 0 and 100. The lower score indicates a lower QoL. Its reliability and validity have been confirmed by Nejat *et al.* (Cronbach's alpha = 0.9).[28] In addition, the Western Ontario and McMaster Universities Arthritis Index (WOMAC questionnaire)[29] was applied to evaluate the patient's pre-operative clinical presentation. The WOMAC questionnaire comprised 33 items and evaluated 4 dimensions. Part of the questionnaire examines the symptoms of OA (5 items), which includes swelling, grinding, and locking sensation in the knee when walking, and the ability to bend and straighten the knee fully. The three main dimensions considered in this study include pain (9 items), stiffness (2 items), and physical function or difficulty in performing physical activities (17 items). The score for each question ranges between 0 and 100; with scores above 50 indicate a low level of severity of the symptoms. Each subscale is summated to a maximum score of 900 (pain), 200 (stiffness), and 1700 (physical function), respectively. This questionnaire was validated in several studies, Cronbach's alpha = 0.74 to 0.8 was reported.[30-32] The patient satisfaction with the surgery was evaluated in two separate occasions: At the time of discharge and 2 months later during follow-up time. Satisfaction questionnaire included three items: (1) Overall, how satisfied are you with the results of your knee replacement surgery? (2) How satisfied are you with your most recent knee replacement surgery for reducing your pain (walking on a flat surface, going up or downstairs, sitting, or lying down)? (3) How satisfied are you with your most recent knee replacement surgery for improving your ability to perform five functions (going up stairs, getting in/out of a car or on/off a bus, rising from bed, lying in bed, performing light domestic duties)? These questions were developed by Jorn *et al.*[33] Patients were asked to grade their level of satisfaction for

each question (i.e., very dissatisfied = 1, dissatisfied = 2, neutral = 3, satisfied = 4, and very satisfied = 5). Patients' satisfaction scores of <27 were considered as dissatisfied and over that satisfied (score 9–45). The reliability of these questions was acceptable in the current study (Cronbach's alpha = 0.92).

Data analysis

For data analysis, SPSS software (version 21) was used and the significant level of 0.05 was determined. For inferential statistics, after Kolmogorov–Smirnov test, Pearson's correlation, and linear regression analysis were applied.

RESULTS

Participants characteristics

Among 250 participants, 166 were female (66.4%) and 81 were male (32.4%). The mean age of the participants was 68.9 with a standard deviation of 6.84. Most

Table 1: Descriptive data and measures of pre-operative clinical presentation and quality of life and post-operative satisfaction of the study participants

Variables	Minimum	Maximum	Mean±SD
Clinical presentation (total score)	0	3300	956±645
Knee swelling	0	100	31.7±23.2
Knee clicking	0	100	30.9±21.9
Knee catching	0	100	35.2±24.1
Knee straighten	0	100	34.1±23.3
Knee bend	0	100	32.9±22.9
Stiffness	0	200	59.5±40.1
Pain	0	900	252±172
Knee function	0	1700	485±341
Quality of life (total score)	48	756	288±116
Physical health	10	390	125±65
Emotional health	37	366	163±55.2
Satisfaction (discharge time)	9	45	22.8±8.75
Satisfaction (2 months later)	9	45	30.3±12

SD: Standard deviation

participants were widows (50%) and illiterate (35.2%). The Kolmogorov–Smirnov test showed that the data had normal distribution.

Outcomes

Health-related Quality of Life (SF-36)

According to Table 1, the mean score of QoL score was 228 (standard deviation [SD] = 116.1). This was less than the average score obtained from the questionnaire (400), which indicates poor QoL. All scores of QoL dimensions (except EW) were below 50 and, consequently, were at a weak level. According to Table 1, the highest score in QoL was related to emotional well-being (mean difference [MD] = 59/1, SD = 17/9) and the lowest score was related to physical health (MD = 11.1, SD = 30.3).

Western ontario and mcmaster universities arthritis index outcomes

Based on Table 1, the mean score of the joint stiffness was 59.5 with a standard deviation of 40.1, and since it was less than the average score (100), the joint stiffness was severe. The mean score of joint pain was 252 with a standard deviation of 172, and since it was less than average score (450), joint pain was also high and severe. The mean of the joint function score was 485 with a standard deviation of 341, and since it was less than average (850), the joint functional limitation was also high. Furthermore, the mean of the signs score is <50, which indicates the severity of the patients' clinical manifestation.

Patient's satisfaction with the surgery

Post-operative satisfaction score (before discharge) was weak and low (MD = 22.8, SD= 8/75), but satisfaction score 2 months after knee arthroplasty (follow-up time) was equal to 30.3 with a standard deviation of 12 that was appropriate.

The results of Pearson's correlation

The results of Pearson's correlation [Table 2] indicated that there was a significant positive correlation between pre-operative QoL and post-operative satisfaction (r [250] =0.156, P = 0.023), that is, people whose QoL was higher were more satisfied with the surgery. However, the results of Pearson's correlation indicated that there was no significant association between patients' pre-operative QoL and their satisfaction 2 months after surgery at follow-up time (r [250] = −0.057, P = 0.406).

Furthermore, the results of Pearson's correlation indicated that there was a significant positive association between pre-operative patients' clinical presentation with their satisfaction after surgery (r [250] = 0.195, P = 0.003). However, there was no significant association

Table 2: Correlation between pre-operative clinical presentation and quality of life with post-operative satisfaction (*n*=250)

Variables	Satisfaction	
	Discharge time	2 months later
Clinical picture (total score)	0.195**	−0.032
Knee swelling	0.174**	−0.018
Knee clicking	0.080	−0.057
Knee catching	0.083	−0.129*
Knee straighten	0.088	0.020
Knee bending	0.139*	−0.030
Knee stiffness	0.148*	−0.017
Knee pain	0.173**	−0.038
Knee function	0.210**	−0.036
Quality of life (total score)	0.156*	−0.057

*P<0.05; **P<0.01

Table 3: Linear regression models for the prediction role of pre-operative quality of life and clinical presentation in post-operative satisfaction at discharge time (*n*=250)

Variables	B	SE	β	P	R²
Model 1					
Post-operative satisfaction (discharge time)	20.3	1.04	-	0.000	0.038
Clinical presentation (total score)	0.003	0.001	0.195	0.003	
Model 2					
Post-operative satisfaction (discharge time)	19.4	1.64	-	0.000	0.024
Quality of life (total score)	0.012	0.005	0.156	0.023	

SE: Standard error

between patients' pre-operative clinical presentation and their satisfaction at follow-up time (r [250] = −0.032, $P = 0.635$). Variables that showed significant correlation were entered into the regression analysis to determine their predictive role.

Multiple linear regression analyses

Multiple regression analysis was done to test if pre-operative QoL and clinical presentations significantly predicted patients' post-operative satisfaction at discharge time [Table 3]. The results of the regression indicated that QoL explained 2.4% of the variance in the patients satisfaction ($R^2 = 0.024$, $F (1,250) = 5.24$, $P = 0.023$) and clinical presentation explained 3.8% of the variance in the patients' post-operative satisfaction ($R^2 = 0.038$, $F (1,250) = 8.76$ $P = 0.003$).

DISCUSSION

The results of the study showed that the patients' pre-operative QoL is undesirable in terms of both physical and emotional health. Consistently, other studies reported that the total score for QoL before knee surgery was poor.[15,34-36] Studies have shown that pain and functional limitation in patients with OA can lead to reduced QoL.[17,37,38] In the present study, the patients' clinical symptoms were severe and high that it may decline their QoL before surgery. Other studies also indicated that patients with OA suffer from severe pain and limitation in hip performance before knee replacement or hip arthroplasty surgery[39-41] which was consistent with the results of the current study. In terms of patients' satisfaction with the results of knee surgery, the results indicated that satisfaction from surgery was weak and patients were not satisfied. However, at follow-up time (2 months after the surgery), patient satisfaction was at its optimal level. In Koohestani's study (2014), satisfaction after surgery was also poor.[42] However, Klaassen and Pietrzak in a study indicated that satisfaction with the performance of lower extremity and hip joint after surgery was significantly high.[40] Patient dissatisfaction after knee replacement surgery may be related to the patient's expectations of surgery, pain control, and post-operative complications. Bourne *et al*. indicated that failure to meet patient expectations is one of the strongest predictors of patient's satisfaction with knee replacement surgery.[22] According to the Lau *et al*., in evaluating the patient's satisfaction from surgery, external and internal factors should be investigated.[43]

In addition, the present study found a positive and significant correlation between pre-operative clinical presentation and post-operative satisfaction. People who complained more from pre-operative clinical manifestation such as joint stiffness, joint pain, and limitations in the joint performance were more dissatisfied with their surgery. Consistently, Scott *et al*. demonstrated that pre-operative back pain or pain in other joints was significantly related with patient satisfaction of knee replacement surgery.[44] Bourne *et al*. reported that patients who had severe pain while sitting, sleeping, or lying in a bed before surgery reported less satisfaction from surgery.[22] Furthermore, Kim *et al*. indicated that patient's satisfaction with knee replacement surgery was correlated with low WOMAC score before surgery.[45] The results of this study suggested that total hip arthroplasty in short terms does not have a great impact on patient satisfaction; but in a long time, it can increase patients' satisfaction. In this regard, in a study, Rogmark *et al*. also showed that 1 year after surgery, the pain of patients decreased and their satisfaction increased.[39] Their results suggest that total knee replacement in the long term has a great impact on patient satisfaction.

The association between patient's QoL before surgery and patient's satisfaction from surgery was also investigated. According to the results of the present study, patient's post-operative satisfaction was significantly associated with pre-operative QoL. People who had higher QoL were more satisfied with knee replacement surgery and those with lower QoL were more dissatisfied. Based on the results, pre-operative QoL predicted post-operative satisfaction. Consistently, Quintana *et al*. showed that there was a significant association between patient's QoL before surgery and their satisfaction from surgery.[46] In addition, Clement and Burnett reported that general physical health is associated with patients' post-operative satisfaction.[47] In this regard, Vissers *et al*. demonstrated that patients who did not have adequate mental health before surgery showed greater pain and limitations in their performance.[48] However, John Fitzgerald's study in the United States (2004) showed that health-related QoL before surgery had little effect on patients' satisfaction from health care.[49] Perhaps, the reason for these contradictions may be that in Fitzgerald's study, satisfaction with health-care services has been investigated not surgery outcomes. Although this study increased the body of knowledge in the present area, it has several limitations that should be considered in further studies. The questions related to the post-operative satisfaction have been taken from other studies. In future, it is better to use more reliable tools. In addition, it is suggested that in the future studies, other predictive factors of post-operative satisfaction should also be examined.

CONCLUSIONS

The results of this study showed that patient's satisfaction with knee surgery was affected by severity of pre-operative clinical presentations and QoL. Meanwhile, teaching the skills by nurses to control knee pain and joint stiffness can be helpful in improving patient's post-operative satisfaction and also surgery outcomes. The results obtained from this study indicated that knee replacement surgery can have a long-lasting effect on patient satisfaction.

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