Original Article

Osteoarthritis Patients' Preoperative Perceptions about Total Knee Replacement

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Abstract

Objectives: Many patients with knee osteoarthritis refuse to undergo total knee replacement (TKR) and would rather tolerate the symptoms. This study aimed to collect information that described patients' perceptions of TKR and to identify factors that influenced decision-making about TKR and other available treatment options. **Methods:** This descriptive cross-sectional study was conducted in a hospital's orthopedic outpatient clinic. The study began in 2018 and used a self-administered questionnaire that comprised 16 questions and four domains, namely, activity expectations, current difficulties, expected complications, and general health. The questionnaire was completed by patients who had been advised to undergo TKR, who were aged ≥30 years, and who could read and understand Arabic. Patients with histories of orthopedic surgery were excluded. **Results:** A total of 362 patients participated in the study. The level of education was significantly associated with activity expectations ($P < 0.025$) and current difficulties ($P < 0.012$) negatively. The body mass index (BMI) was significantly associated with current difficulties ($P < 0.002$) and general health ($P < 0.001$). Age, gender, and marital status were not associated with the questionnaire's domains. **Conclusion:** The BMI and the level of education affected patients' perceptions of TKR. Low levels of expectation in relation to surgery impact upon patients' decision-making processes and could affect their quality of life.

Keywords: Arthroplasty, expectations, factor analysis, joint pain, osteoarthritis, quality of life, total knee replacement

Introduction

The therapies available for osteoarthritis (OA) provide temporary symptom relief only, and they do not restore the function of the cartilage, menisci, and ligaments.[1] Knee OA is the most common form of synovial joint arthritis,[2] and its treatment depends on a patient's condition and the severity of the disease. Treatment options include light exercises, nonsteroidal anti-inflammatory drugs, steroid injections, and surgery.[3] When conservative treatment fails, total knee replacement (TKR) becomes an option to improve a patient's pain and range of motion. TKR involves replacing the articular surfaces with a metal joint,[4] and despite some limitations, it is the best option available for long-term pain relief and quality of life improvements, because it enables patients to continue near-normal daily activities.[3] Although it is generally considered safe, TKR, like any procedure, is associated with complications, including infection, thromboembolic disease, and implant-related complications,[4] and it is usually an elective procedure; hence, patients decide whether or not to undergo surgery.[5] Patients have various opinions and fears about TKR, including their abilities to function normally after surgery, the pain and complications associated with the procedure, and the recovery duration. Some patients may have negative thoughts about the procedure that are influenced by past experiences,[5] financial problems, their abilities to trust surgeons, and their general health.[5]

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The prevalence of OA varies according to its definition and the joints evaluated. In 2005, more than 26 million people had some form of OA in the USA.[6] A cross-sectional study of radiographic findings showed that 53.3% of men and 60.9% of women appeared to have OA.[7] The authors of a retrospective study of 6270 patients concluded that the prevalence of OA was 24.9%,[8] and that the most important risk factors associated with OA were smoking, diabetes mellitus, and trauma.[8]

In the UK, one study's findings showed that one-third of TKR candidates refused surgery.[9] In North America, <10% of candidates undergo TKR.[10] The findings from a study in Kuwait showed that patients were fearful about TKR, leading them to refuse or delay the operation.[11] Patients' demographic characteristics also influence their expectations of TKR, and more women than men refuse surgery.[10,12] The findings from a study that analyzed patients' expectations of joint arthroplasty showed that older patients expected improvements in their daily activities, including walking and getting out of bed, whereas younger patients expected improvements in exercise, employment, and sexual activity.[13] Data are lacking to describe people's perceptions and expectations of TKR, especially in Saudi Arabia, and many factors highlight the need for a study to be conducted that measures these variables in the context of a community.

TKR is the gold standard treatment for end-stage knee OA, and it is highly successful. Relieving pain, restoring a range of motions, and improving function are the overarching goals of arthroplasty. Patient satisfaction rates of 90%–95% have been reported after TKR.[14,15] However, some patients adamantly refuse to undergo surgery and would rather tolerate the symptoms of OA. This study aimed to collect information that described patients' perceptions of TKR and to identify factors that influenced decision-making in relation to TKR and other available treatment options.

Subjects and Methods

Study design

A descriptive cross-sectional study was conducted over 8 months in a hospital's orthopedic outpatient clinic. The study used a self-administered questionnaire that was completed by all patients who met the study's inclusion criteria and gave informed consent, and it explored the patients' expectations of TKR.

Patients

The study participants were Saudi and non-Saudi patients of both genders who were aged >30 years, who were able to read and understand Arabic, and who had been advised to undergo TKR. Patients with histories of orthopedic surgery were excluded from the study. A total of 362 consecutive adult patients who attended a hospital's orthopedic outpatient clinic were enrolled during the study. The sample size was calculated using web-based software (Raosoft, Inc., Seattle, WA, USA). We determined that 377 patients should be recruited to achieve a 5% margin of error and a 95% confidence interval. We excluded 15 patients from the study because they did not complete all of the questions.

Self-administered questionnaire

The questionnaire gathered data describing the patients' demographic characteristics, and it included 16 questions that collected information in four domains, namely, activity expectations, current difficulties, expected complications, and general health, which were included in a previous study undertaken in Canada.[16] Each question had a five-point Likert scale that scored a participant's response from "strongly agree" to "strongly disagree;" the highest total score possible was 80 points, and the lowest score possible was 16 points. The lowest scores denoted low expectations, and the highest scores implied high expectations. In addition, the questionnaire included four statements with reverse scoring, as advised by our research center.

The patients' demographic data collected included their ages, genders, nationalities, marital statuses, heights, weights, and educational levels. The body mass indexes (BMIs) were calculated from the patients' heights and weights, and they were categorized according to the World Health Organization's criteria as underweight (<18.5 kg/m^2), normal weight (18.5–24.9 kg/m^2), overweight (25.0–29.9 kg/m^2), and obese (>30 kg/m^2).

The domain of current difficulties included questions about pain and disability when walking, difficulties in going up and downstairs, knee pain, interference with daily activities, and difficulties the patients encountered when taking care of themselves. The highest score possible for this domain was 30 points, and the lowest score possible was six points.

The domain of activity expectations included questions about sitting cross-legged, running and jumping, kneeling and lying, going up and downstairs, and walking long distances after the procedure. The highest score possible for this domain was 30 points, and the lowest score possible was six points.

The expected complications domain included three about fears of dangerous complications, postoperative pain, and waking up in pain after the procedure. The highest score possible for this domain was 15 points, and the lowest score possible was three points.

One question assessed a patient's general health, and the highest score possible was five points, and the lowest score possible was one point. A multiple-choice question was included that aimed to explore further reasons underlying a patient's refusal to undergo TKR, and this was followed by an opportunity for a patient to provide an open answer under the heading "Other: please specify."

Statistical analyses

Data from the questionnaires were entered into a Microsoft Excel spreadsheet (Microsoft Corporation, Redmond, WA, USA) for analysis. The data were coded and transformed for statistical analyses using SPSS software, version 16.0 (SPSS Inc., Chicago, Illinois, USA), and they are expressed as the means and the standard deviations (SDs). Frequencies and percentages were generated for the continuous and categorical variables, respectively. Analyses of variance were performed to compare the means from more than two groups, and the *t*-test was used to compare the means from two groups. Cronbach's coefficient alpha was used to estimate the questionnaire's reliability, and it was 0.78. $P < 0.05$ was considered statistically significant. Factor analysis was used to evaluate the validity of the tool, and this generated the four domains.

Results

A total of 362 patients were enrolled in the study, of whom 45.3% were men and 54.7% were women [Table 1]. Of these patients, 66.3% were aged 41–60 years, 14.1% were aged ≤40 years, 95% were married, 25.1% had less than high school education, 36.2% had bachelor's degrees or diplomas, and 74.5% were overweight or obese.

Table 2 summarizes the effects of the patients' demographic characteristics on the questionnaire's overall score. The patients' demographic characteristics did not affect the overall score, except for the education level, which had a significant effect on the overall score ($P \leq 0.006$); patients with less than a high school education (25.5%) had the lowest overall scores. The BMI had a near significant effect on the overall score ($P \leq 0.067$).

Table 3 shows the relationships between the patients' demographic characteristics and the questionnaire's four domains. The level of education was significantly associated with activity expectations ($P < 0.025$) and current difficulties ($P < 0.012$). The BMI was significantly associated with current difficulties ($P < 0.002$) and general health ($P < 0.001$). Age, gender, and marital status were not significantly associated with the questionnaire's domains.

Figure 1 presents the patients' combined agree/strongly agree responses to the statements in the questionnaire. It shows that 75% of the respondents agreed/strongly agreed that they experienced difficulties in taking care of themselves and that 18% of the patients agreed/strongly agreed that they would be able to sit crossed-legged after the procedure.

Descriptive statistics generated the mean ± SD highest and lowest response scores for each domain [Table 4]. The mean scores for activity expectations and expected operative complications were 17 and 9, respectively, which were mid-range scores.

Table 1: Patients' demographic characteristics

Characteristic	*n* (%)
Age group (years)	
≤40	51 (14.1)
41-50	124 (34.3)
51-60	116 (32.0)
61+	71 (19.6)
Gender	
Male	164 (45.3)
Female	198 (54.7)
Marital status	
Married	344 (95.0)
Single	18 (5)
Education	
Less than high school	91 (25.1)
High school	72 (19.9)
Bachelor's degree or diploma	131 (36.2)
Postgraduate study	68 (18.8)
BMI category	
Underweight	8 (2.2)
Normal weight	83 (23.2)
Overweight	138 (38.5)
Obese	129 (36.0)

BMI: Body mass index

Table 2: Effects of the patients' demographic characteristics on the responses to the questions

	Overall score (out of 80)	
	Mean±SD	*P*
Age group (years)		
≤40	49.31±7.33	0.585
41-50	49.28±8.84	
51-60	48.47±8.59	
61+	47.69±8.38	
Gender		
Man	49.07±7.78	0.465
Woman	48.42±8.99	
Marital status		
Married	48.76±8.56	0.63
Single	47.78±6.26	
Education		
Less than high school	46.14±8.67	0.006
High school	50.35±9.23	
Bachelor's degree or diploma	49.46±7.88	
Postgraduate study	49.00±7.80	
BMI category		
Underweight	47.00±6.85	0.067
Normal weight	50.27±8.90	
Overweight	49.14±8.23	
Obese	47.28±8.45	

SD: Standard deviation, BMI: Body mass index

Table 5 presents the factor analysis of the individual questions and the four domains that were generated during this process.

Table 3: Effects of patients' demographic characteristics on the questionnaire's domains

	Domains			
	Activity expectations, mean±SD score out of 30 points	Current difficulties, mean±SD score out of 30 points	Expected complications, mean±SD score out of 15 points	General health, mean±SD score out of 15 points
Age group (years)				
≤40	17±5.23	19.94±4.51	9.06±1.86	3.31±1.12
41-50	17.76±4.81	19.02±5.42	9.05±1.82	3.54±1.09
51-60	17.02±4.39	19.14±5.73	9.07±1.95	3.25±1.16
61+	17.69±4.66	17.89±5.66	8.85±1.55	3.27±1.15
P	0.549	0.211	0.851	0.522
Gender				
Male	17.12±4.66	19.49±5.09	9.13±1.75	3.33±1.15
Female	17.63±4.74	18.53±5.74	8.92±1.86	3.33±1.11
P	0.306	0.095	0.288	0.973
Marital status				
Married	17.44±4.68	18.97±5.52	9.02±1.84	3.33±1.12
Single	16.61±5.28	18.83±4.48	8.89±1.13	3.44±1.25
P	0.466	0.916	0.76	0.663
Education				
Less than high school	16.86±4.42	17.37±6.25	8.69±1.71	3.22±1.24
High school	18.79±4.47	19.11±5.25	9.21±2.01	3.24±1.12
Bachelor's degree or diploma	17.41±5.03	19.6±5.13	9.07±1.71	3.37±1.1
Postgraduate study	16.63±4.43	19.72±4.85	9.15±1.9	3.5±1.03
P	0.025	0.012	0.243	0.375
BMI category				
Underweight	17.25±6.02	18.5±5.15	8.25±1.67	3±1.31
Normal weight	17.93±5.21	20.17±5.6	9±1.83	3.17±1.21
Overweight	16.9±5.34	19.58±5.34	9.02±1.91	3.64±1.11
Obese	17.59±4.54	17.52±5.35	9.06±1.73	3.11±1.02
P	0.422	0.002	0.682	<0.001

SD: Standard deviation, BMI: Body mass index

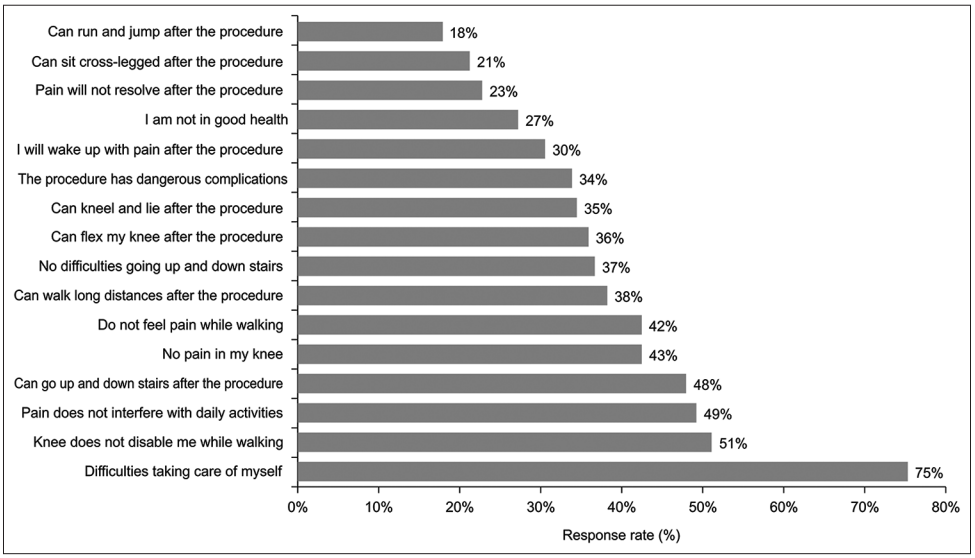

Figure 1: Combined agree/strongly agree responses to the statements attached

Most of the answers to the open question indicated that the respondents chose to undergo physiotherapy, were afraid of complications, or anticipated they would not be able to sit crossed-legged after TKR.

Table 4: Highest and lowest scores for each of the questionnaire's domains

	n	Minimum-maximum	Mean±SD
Overall score (out of 80)	362	25-74	48.7±8.5
Activities expectations score (out of 30)	362	6-30	17.4±4.7
Current difficulties score (out of 30)	362	6-30	19.0±5.5
Expected complications score (out of 15)	362	3-15	9.0±1.8
General health score (out of 5)	362	1-5	3.3±1.1

SD: Standard deviation

Table 5: Factor analysis of the questions

Question number	Question	Component			
		1	2	3	4
	Domain 1				
14	I think I can sit cross-legged position after the procedure	0.896			
15	I think I can run and jump after the procedure	0.867			
13	I think I can kneel and lie after the procedure	0.852			
12	I think I can go up and downstairs after the procedure	0.641			
10	I think I can flex my knee after the procedure	0.535			
11	I think I can walk long distances after the procedure	0.635			
	Domain 2				
4	I do not feel pain while walking		0.826		
5	My knee does not disable me while walking		0.801		
2	I do not face any difficulties going up and downstairs		0.764		
1	I do not have pain in my knee		0.697		
7	Pain does not interfere with my daily activities		0.673		
3	I do not face any difficulties taking care of myself, e.g., dressing, taking a shower		0.498		
	Domain 3				
16	I think the procedure has dangerous complications			0.78	
8	I do not think the pain will resolve after the procedure			0.677	
9	I do not think I will wake up with pain after the procedure				0.623
	Domain 4				
6	I think I am not in good health				0.593

Discussion

The responses to the questionnaire administered in this study indicated a major tendency for the patients to undergo physiotherapy as a concomitant therapy to manage OA. Hence, if the patients were unsure about undergoing surgery or were alarmed by its complications, they would resort to physiotherapy to manage their symptoms. This raises a controversial question about the clinical impact of preoperative physiotherapy on recovery after joint replacement.

The findings from a systematic review of randomized controlled trials that compared prehabilitation with no prehabilitation before joint replacement surgery showed that prehabilitation slightly reduced pain scores within 4 weeks of surgery, but the effect did not persist beyond 4 weeks postoperatively. Prehabilitation slightly improved function scores at 6–8 and 12 weeks postoperatively. The authors concluded that while prehabilitation may slightly improve early postoperative pain and function among patients undergoing joint replacement surgery, the effects were too minor and transitory to be important clinically, and they did not affect the key outcomes of interest, namely, the length of the hospital stay, quality of life, and costs.[17]

Regarding patients' expectations, one study's findings showed that a fear of complications was a key reason underlying patients' postponement of surgery and that the genders did not differ in this regard.[18] These findings concur with those from our study, because a fear of complications was one of the most common responses from the patients, and there were no differences between the genders regarding expectations. Despite women having greater functional limitations than men at the time of the surgery, they recover faster during the early postoperative period. After primary surgery, women's functional scores also show greater improvements than men's functional scores; however, the data in the literature are contradictory regarding gender-specific outcomes.[19] Furthermore, age has no effect on patients' expectations of surgery,[18] which concurs with our study's findings.

A high BMI places greater pressure on the knee, because it is a weight-bearing joint, and the joint's normal anatomy becomes disrupted over time. Ultimately, patients experience more pain and greater difficulties, which might affect their expectations of surgery. Hence, BMI could have a considerable effect on patients' perceptions of TKR. In the UK, one-third of TKR candidates refused to undergo the procedure, and <10% of North American candidates underwent TKR.[9,10] Another study in Kuwait addressed the reasons underlying symptomatic patients' refusals to undergo TKR despite clinicians' recommendations for them to undergo surgery, and a longer delay was attributed to the patients' fear of the procedure,[11] which aligns with this study's findings because most patients explicitly stated that they were fearful about the procedure and fear was a reason to refuse TKR.

This study's results should be interpreted in the context of its limitations. First, one of the study's inclusion criteria stipulated that the patients must be aged >30 years; however, primary OA generally begins after 40 years of age. Patients who have OA before 40 years of age, or early-onset arthritis, usually have secondary OA, the causes of which do not relate to the aging process.[20] Secondary OA can be caused by repeated joint trauma, rheumatoid arthritis, gout, athletic activity, metabolic disorders, and excessive growth hormone.[21] Second, we did not consider the patients' psychological statuses, and we did not assess their psychological expectations after the procedure. A patient's psychological status could significantly affect their responses to the questions, and this may have affected the results. In addition, the correlation between the patients' preoperative expectations and postoperative satisfaction was not analyzed, because this did not comprise the study's aim, and the regional literature lacks publications describing such studies. Furthermore, our study was conducted at a single hospital's outpatient orthopedic clinic, and most of the male patients were officers who had undergone military training; our study's findings showed that education levels affected patients' expectations of surgery, which concurs with the findings from a recently published study.[22] Patients who were educated beyond high school had different levels of expectation than those whose education levels were limited, because they were better at gathering information. Preoperative education aims to improve people's knowledge, health behaviors, and health outcomes, and it often comprises a discussion about presurgical procedures, the steps that comprise the surgical procedure, postoperative care, potential stressful scenarios associated with surgery, potential surgical and nonsurgical complications, postoperative pain management, and movements to avoid after surgery.[23] All candidates for TKR should be educated about the perioperative procedure to increase their awareness and alleviate their fears; however, limited data have been published that describe the above-mentioned aspects of preoperative planning for joint replacement, and we recommend that these issues are highlighted. This study addresses these aspects of preoperative planning for joint replacement, and future studies are warranted.

Conclusion

The findings from this study showed that the BMI and education level affected patients' expectations of TKR. A low level of expectation regarding surgery may impact the decision-making process and a patient's quality of life. Hence, it is important to increase awareness about such surgical procedures through educational programs, campaigns, and detailed discussions with treating physicians. Increasing awareness about the procedure may manage patients' expectations and help patients decide on the course of action that is in their best interests. Future regional studies are encouraged that assess patients' expectations and the effects of surgery on the quality of life.

Ethical consideration

This study was approved by our medical research center's institutional review board. Informed consent was obtained from all study participants in accordance with the Declaration of Helsinki of 1976, as revised in 2000.

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Conflicts of interest

There are no conflicts of interest.

Authors' contributions

WA and ANAQ participated in the concept and design of the study, helped in intellectual content and literature search, collected and organized data, helped in statistical analysis, participated in manuscript writing and editing. FSA designed the study, participated in intellectual content and literature search, collected data, helped in writing, editing and reviewing manuscript. All authors have critically reviewed and approved the final draft and are responsible for the content and similarity index of the manuscript.

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