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The effect of rehabilitation education on anxiety in knee replacement patients

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Abstract:

BACKGROUND: Total knee arthroplasty (TKA) can cause operational anxiety in patients. The purpose of this study was to determine the effects of a hospital rehabilitation program on operational anxiety in patients following TKA.

MATERIALS AND METHODS: A nonrandomized clinical trial was conducted on 96 patients who were total knee replacement (TKR) candidates in Milad Hospital, Tehran, Iran. The participants were allocated to two groups of control and experiment each with 48 participants. A rehabilitation training program was implemented in the experimental group and the routine care program was administered to the control group. The data collected through demographic form and Spielberger anxiety questionnaire. The collected data were analyzed using Fisher's exact test, covariance, independent *t*-test, and paired *t*-test ($P = 0.5$).

RESULTS: The results of the paired *t*-test indicated that the mean score of anxiety in both groups was decreased. Independent *t*-test showed that there was a significant difference between the two groups in terms of the mean scores of anxiety so that it was significantly higher in the control group compared to the experimental group ($P < 0.001$).

CONCLUSIONS: The implementation of the rehabilitation education by a rehab nurse can improve the surgical outcomes in patients under TKR. Despite the positive results in this study, the results should be interpreted and clinically used with caution given the small number of participants and the specific circumstances of this study.

Keywords:

Anxiety, arthroplasty, education, knee, replacement

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Introduction

Knee osteoarthritis is the second prevalent form of arthritis and a leading cause of disability worldwide. There are 27 million individuals in the United States affected by the complication and approximately 59% of the population aged over 65 years suffer from this disorder.[1,2] Total knee replacement (TKR) is an effective treatment for late-stage osteoarthritis.[3-5] Recent studies have shown that more than 130,000 knee surgeries are performed annually in the United States, and there were over 67,000 total knee arthroplastys (TKAs) in Canada in 2016–2017.[6] Preoperative period is a stressful experience that can cause emotional, cognitive, and physiological responses in the patient.[7] Preoperative anxiety has been reported in 60%–90% of patients undergoing various surgical procedures.[8] Almost 30% of patients undergoing a TKR surgery, experience psychological distresses.[9] It was reported by a study that patients with anxiety had less successful outcomes than those with a better psychosocial status. Preoperative anxiety level, in patients with anxiety, is associated with higher levels of knee disability and functional and pain limitations and consequently a lower quality of life during the 1st year after

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the surgery.[10] After the surgery, some of the patients report no pain relief, no improved functioning after the joint replacement, and no improvement in the quality of their lives. The point is that there are no technical errors, implant defects, or any effective disease in these patients to explain the poor results. Psychological factors can be the main cause of these patients.[11] According to studies, the functional consequences after TKR can be significantly influenced by psychological factors.[12] In 2010, Riddle *et al*. reported a negative impact of anxiety on pain and postoperative knee function. Moreover, other authors have expressed such a relationship about total hip replacement (THR). Patients with preoperative anxiety have a lower quality of life.[13] As a general rule, preoperative anxiety is related to postoperative anxiety and it is an important predictor of pain in patients with joint replacement.[14] Postoperative anxiety can affect the rehabilitation of the patient.[15] The increase of anxiety in patients may have serious outcomes such as difficult treatment process, surgery, and physical discomfort, which consequently necessitates a higher dose of medicine to control the pain and anxiety and leads to poor recovery and longer hospitalization.[16-18] Various studies have shown that the lack of awareness of the treatment process is an important factor in the anxiety of arthroplasty patients. On the other hand, improving the understanding about the disease plays an important role in a faster recovery.[19] Training is an effective tool to accelerate the recovery process and reduce the cost of arthroplasty. Therefore, considering the importance of providing education to patients by nurses, as an integral part of the health-care chain and the significant increase in the role of nurses as one of the main members of the health-care team; the current study investigated whether hospital rehabilitation program can influence anxiety in knee replacement patients.

Materials and Methods

Study design and registration

This randomized clinical trial study was performed on 96 patients who were candidates of knee replacement surgery in the orthopedic ward of a hospital in Tehran from July to December 2017. The CONSORT checklist was used for the study report.[20]

Participants and eligibility criteria

Participants were 50–70 years old men and women with osteoarthritis who were candidates of knee joint replacement. Inclusion criteria were as follows: (1) lack of anxiety disorder, depression and psychological problems, and no use of psychoactive drugs before and after the surgery (based on the patient's statements and medical records); (2) no history of joint replacement or surgery on the knee; (3) body mass index (BMI) <30 kg/m^2; and (4) reading and writing skills (in the case of illiteracy, one of the educated caregivers were asked to accompany the patient throughout the education process). Exclusion criteria included postsurgical infection, reaction to the prosthesis, transfer to the intensive care unit after surgery, refusing to cooperate in doing exercises, and reluctance to continue the study.

Intervention

The sample size in each group was estimated based on a similar study (level of confidence = 90% and probability = 80%). In the case of minimal clinically important differences, a decrease of eight units in the anxiety of patients with knee replacement due to rehabilitation training was considered as statistically significant. Assuming a 10% drop-out rate, 48 individuals were selected in each group. A total of 96 patients who were candidates for knee joint replacement were randomly and continuously selected and allocated to two intervention and control groups. The patients entered the study after giving their verbal and written informed consents. In the intervention group, the patients completed the questionnaires before the intervention. Then, they received educational intervention in four stages (1 day before surgery, 24 and 48 h after the surgery, and at the discharge point).

This educational content was devised based on a thorough literature review. The educational pamphlets were prepared using the standard educational guidelines. At first, the written training content was provided to three observers and then to two physicians skilled in TKR surgery and two nurses expert in the training of TKR patients. After confirmation of the training content, the comments and the requested modifications were implemented.

The educational intervention was presented as a combination of giving lecture, group and individual discussion, and answering questions. In the experimental group, the rehabilitation program was performed 1 day before surgery and during the hospitalization until discharge. In the control group, only the routine program of the hospital was performed. This means the routine program regarding the TKA general education, which was performed by a nurse after the surgery, including standard precautions, physical activity, exercise, and nutrition.

The content of each session was designed based on the patient's need at that stage. During the first 35-min session 1 day before the surgery, the content of the session included familiarization with knee joint replacement surgery, and pre/postoperative care. During the second session 24 h after the surgery and after leaving the bed, the session content included doing exercises and observing the correct way of doing

them by caregivers, using walker and correct walking techniques, and exercises on the range-of-motion in the joint. In the third session, 48 h after surgery, the way of doing exercises by the patient was evaluated and observed and in case of any mistake, the patient would be given feedback. Moreover, further explanations would be presented in this meeting regarding preparing the home for the patient. In the fourth session, which was at the discharge point, education and training were reviewed and feedbacks were observed. The control group only received routine training. The patients visited the clinic after 6 weeks and filled out the questionnaires once more.

Instruments

A demographic questionnaire (age, gender, marital status, occupation, BMI, education level, opiate, and nonsteroid anti-inflammatory drug dose), and the Spielberger State-Trait Anxiety Inventory questionnaire were used to collect data. Spielberger's questionnaire consists of 40 items, 20 of which are related to measuring hidden anxiety that are not considered in this study and the other 20 items are related to measuring the obvious anxiety and individual's emotions at the time of the responding. These 20 questions are measured based 4-point Likert scale ranging from 1 to 4 and total score ranges from 20 to 80. Questions 1, 2, 5, 8, 10, 11, 15, 16, 19, and 20 are scored inversely so that score 4 indicates a higher level of anxiety. In the case of other questions, the higher scores indicate less anxiousness.[21] The validity of this questionnaire was supported by Sahmoddini *et al*. (2014) and its reliability was verified and using Cronbach's alpha ($\alpha = 0.90$). In addition, the coefficients of the retest of apparent anxiety scale were obtained in the range 0.16–0.62.[22]

Data analysis

Descriptive tests (frequency, percentage, mean, and standard deviation) were used to describe the demographic characteristics and statistical tests including Chi-square test, independent *t*-test, paired *t*-test, Fisher's exact test, and covariance test in SPSS v22.0, (SPSS Inc., Chicago, Illinois, USA) were used to determine the relationship between the main variables.

Ethical considerations

This study was approved by the Ethics Committee in Medical Sciences University of Iran (Code of Ethics: IR.IUMS.FMD.REC 1396.9311689001), and the study was carried out at a hospital. The protocol of the study was registered at the Iranian Registry of Clinical Trials (IRCT), No. IRCT20091124002769N6. Verbal informed consent and written consent were provided, and the trial was conducted in accordance with the Declaration of Helsinki.

Results

There were no significant differences in demographic characteristics between the control and experimental groups. Although, both studied groups were significantly different in terms of marital status, according to the analysis of covariance, this has not been an intervening variable [Tables 1 and 2]. A significant difference existed between the two groups in terms of preoperative anxiety and the mean score of preoperative anxiety was higher in the experimental group compared to the control group ($P < 0.001$) [Table 3]. To analyze the anxiety in the control and experimental group 6 weeks after the intervention, the covariance analysis was used with controlling the anxiety scores. The mean anxiety

Table 1: Characteristics of patients in experimental and control group (*n*=48)

Variable	Control	Experimental	Test result (*P*)
Education, frequency (%)			
Illiterate	22 (45.8)	32 (66.7)	0.102*
Elementary	22 (45.8)	12 (25)	
Secondary	4 (8.4)	4 (8.3)	
Sex, frequency (%)			
Man	7 (14.6)	2 (4.2)	0.15*
Woman	41 (85.4)	46 (95.8)	
Job, frequency (%)			
Free	4 (8.3)	1 (2.1)	0.10*
Housewife	39 (81.3)	46 (95.8)	
Retired	5 (10.4)	1 (2.1)	
Marital status, frequency (%)			
Married	39 (81.3)	28 (58.3)	0.014*
Widow	9 (18.8)	20 (41.7)	
Age, mean±SD	63.83±5.14	65.39±5.08	0.13**
BMI, mean±SD	30.72±4.50	29.37±4.03	0.12**
Opiate dose, mean±SD	89.58±27.20	84.37±27.59	0.35**
NSAID dose, mean±SD	154.16±69.06	164.58±70.67	0.46**

*Chi-square test (Fisher's exact test), **Independent-samples T-test. BMI=Body mass index, SD=Standard deviation, NSAID=Nonsteroidal anti-inflammatory drug

in the control group decreased from 50.85 before the study to 44.46 after the study and in the experimental group decreased from 64.52 before the intervention to 20.20 after the intervention. Compared to the control group, the decrease in the experimental group was significant ($P < 0.001$(. The mean anxiety in the control and experimental groups decreased 6 weeks after the intervention and the decrease in score of the experimental group was significantly higher compared to the control group ($P < 0.001$).

Discussion

Rehabilitation training by increasing the knowledge of the patient undergoing knee arthroplasty can be effective in reducing the anxiety in these patients. In a review study by Edward *et al*. consistent with the above results, it was indicated that preoperative training classes prepared the patients mentally for rehabilitation purposes. Providing enough information for the patient also increased their sense of responsibility to have a successful surgery and promoted their belief that they can adapt to and cope with the surgery. Consequently, this decreased the anxiety before and after surgery. The study also showed that presurgery education attenuated anxiety in patients in follow-up surgery. Similarly, this study indicated that preoperative training could reduce the anxiety of patients in subsequent surgeries.[23] An evidence-based study by Soffin *et al*. consistent we our study, also indicated that preanesthesia training significantly reduced the anxiety and emotional stress before knee and hip arthroplasty.[24] Ryu *et al*. and Jasemi *et al*. also found similar results.[25,26] Findings of a study by Sjosted *et al*. also indicated that patients were more comfortable after receiving information about surgery, procedure, medications, and duration of the surgery, and thus, their anxiety decreased. In addition, after the surgery, they experienced less pain and complications. Strong relationships with and comprehensive support by nurses and respecting the patients' emotions cause more comfort in patients and reduce their anxiety before the operation.[27] In a clinical trial conducted by Giradet *et al*. (2003), the level of anxiety and pain in patients undergoing THR was compared after receiving information in standard preoperative classes versus oral and normal given information. It was indicated that the level of anxiety and pain in the test group significantly decreased before the operation compared to the control group; however, after the operation, there was not any difference between the two groups.[28] According to the findings of the present study, the mean anxiety in the control group decreased after the study. This can be explained by the fact that the patients in the control group also received the routine training of the hospital and it is a known fact that training at any level can affect the outcome of surgery such as anxiety. In addition, the main part of the anxiety in patients before the operation is related to the fear about the postoperative events. By successfully performing surgery (without mortality and immediate postoperative complications), the anxiety level of patients in this group decreases naturally. Regarding the providence of rehabilitation training, the anxiety reduction in the experimental group was significantly more than the control group. There were several limitations in the study, (a) the emotional state and accuracy of the research units' responses to the questions may have been influenced by the research environment. The researcher tried to control this restriction so that the time schedule of the classes was selected to the participants' convenience. (b) The environment and the position of completing the questionnaires could also have an impact on the results, so to avoid confounding factors, a quiet environment with sufficient light to complete the questionnaires was provided.

Limitations

One limitation of this study was the number of samples. Another limitation was that it was not possible to follow patients for a longer period due to the time limitation of the dissertation. Therefore, studies with larger sample sizes and longer follow-up time are recommended.

Conclusions

The effects of rehabilitation education on anxiety of TKR patients were examined. The results showed a significant effect of rehabilitation educational intervention on patients' anxiety. Therefore, this method is recommended to enhance health knowledge and decrease the anxiety of these patients. Despite the positive results, they should be interpreted and clinically used with caution given the low number of participants and the specific

Table 2: Comparison of mean anxiety changes before and 6 weeks after intervention in groups (*n*=48)

Anxiety	Group, mean±SD	
	Control	Experimental
Before	50.85±12.33	64.5±11.12
6 weeks after	44.46±7.32	33.20±7.45
Paired *t*-test result (*t*, df, *P*)	4.89, 47, <0.001	20.59, 47, <0.001

SD: Standard deviation

Table 3: Comparison of mean anxiety between groups

Source	Type III sum of squares	Df	Mean square	*F*	Significance	Partial η^2	Observed power
Before	1579.02	1	1579.029	41.31	<0.001	0.308	1.000
Group	4583.48	1	4583.485	119.91	<0.001	0.563	1.000

circumstances of this study. An advantage of this study could be the provision of rehabilitation education by rehabilitation and trained nurse. However, limiting this study to TKR patients referring to Milad Health Center in Tehran limits the generalizability of the findings.

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Conflicts of interest

There are no conflicts of interest.

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