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The effect of fall prevention education on fear of falling in patients with scheduled total knee arthroplasty: a quasi-experimental study

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ABSTRACT

The aim of this study is to determine the effect of fall prevention education given to patients with scheduled total knee arthroplasty (TKA) on their fear of falling in the postoperative period. The study had a quasi-experimental design. The study sample included 70 patients. Data were gathered with a patient characteristics form and the Falls Efficacy Scale-International (FES-I) at face to face interviews. The intervention group was given a brochure and face-to-face education about fall prevention before surgery. Activities such as the first mobilization, assisted walking, climbing stairs, getting out of bed and sitting in bed after the surgery were demonstrated and performed. Patients were followed up to 16 weeks after surgery. The mean age of the control and intervention groups, respectively; 62.26 ± 6.38 and 59.46 ± 7.33. The fear of falling scores before the operation and in the postoperative 6^{th}-8^{th} weeks were high in the intervention group (40.17 ± 8.32 and 31.71 ± 7.83 respectively) and the control group (44.14 ± 8.86 and 40.91 ± 8.43 respectively). The fear of falling scores in the postoperative 14^{th}-16^{th} weeks were high in the control group (37.2 ± 9.03) and moderate in the intervention group (26.42 ± 5.59). The scores for FES-I in the 6^{th}-8^{th} weeks and 14^{th}-16^{th} weeks after surgery were very significantly lower in the intervention group than in the control group($p < .001$). The results of the study showed that the patients experienced a great fear of falling before and after surgery. It can be said that the education given reduces the fear of falling significantly and in the early period.

Background

Fear of falling is common among older adults and causes serious physical and psychosocial problems. It is defined as a phobic reaction to standing or walking, loss of confidence in balance ability or only a worry about falling and is an important risk factor of falls (Choi & Ko, 2015; Litwin et al., 2018).

It is reported that mortality and disability due to falls are the most common among older adults and that even simple low-energy falls lead to injuries (fractures, traumatic brain injuries), deaths, and fear of falling, which has a negative impact on the quality of life in this group (Akdeniz et al., 2010; de Guzman et al., 2015; Koyuncu et al., 2017). Physiological and cognitive changes and health problems appearing in old age, surgical interventions and medications for these health problems create more fear of falling and falls (Ambrose et al., 2013; Arnold & Gyurcsik, 2012; Ayoubi et al., 2014). Risk factors for falls are often classified as intrinsic and extrinsic. Intrinsic factors include balance disorders, lower extremity muscle weakness, poor grip strength, functional and cognitive impairment, dizziness, visual deficits, use of assistive devices, impaired activities of daily living (ADLs), symptoms of

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depression, chronic medical conditions, increasing age and a prior history of falling. Extrinsic factors include polypharmacy and environmental hazards such poor lighting, loose rugs, and lack of bathroom safety equipment (Manlapaz et al., 2019; Marrero et al., 2019; Santhagunam et al., 2021).

Patients having total knee arthroplasty (TKA) have an increased risk of falling and severe fear of falling both before and after surgery due to pain and restricted mobility caused by osteoarthritis in the preoperative period and surgery in the postoperative period (Chen et al., 2019; Engström et al., 2017; Si et al., 2017; Turhan Damar et al., 2018). Reduction of the fear of falling allows earlier mobilization of patients and helps them do exercise regularly. As a result, their recovery is accelerated, the risk of complications decrease and the quality of life increases (Hoch, 2014; Matsumoto et al., 2012; Minafra et al., 2014). Muscle strength and balance gained through exercising reduce the rates of falls (Scuccato, 2018).

Hospitals offer various programs directed toward preventing falls. It is reported that education of patients and personnel, detection of risk factors, using alarm bracelets and appropriate floor covering and exercise programs considerably reduce rates of falls (Al-Aama, 2011; Johnson et al,, 2014; Kapas, 2014). Most of these measures are limited to hospital and necessary arrangements should be done in the home environment because the patients complete most of the recovery period at home after TKA. Therefore, patient education, which is one of the important roles of nurses, comes to the fore. Patient education is an important component of care, positively influences patient outcomes and an effective tool to reduce costs (Ronco et al., 2012; Stenberg et al., 2018; Zhang et al., 2012). Also, supports patient self-management and caregivers (Cutilli, 2020). A nurse-led education program is an applicable method in terms of increasing the awareness of the patient about the fear of falling and its causes, and raising awareness about precautions. In this study, concerning the education to be given for prevention of falling, it should be ensured that the patients know the points to be considered while performing their exercises and mobilization, recognize risk factors and do the necessary environmental arrangements in the home environment. In a safe environment where risk factors are kept under control, the fear of falling will decrease. An important aspect of our education program is that it is practical. Unlike other education programs, patients; some activities (initial mobilization, walking with auxiliary equipment, going up and down stairs, getting out of bed and sitting on the bed, etc.) were demonstrated and made.

There have not been any studies on the effect of education offered by nurses on the fear of falling in patients undergoing TKA although several studies have been performed to determine the fear of falling and rates of falls before and after TKA (Ackerman et al., 2010; Chen et al., 2019; Mandl et al., 2013; Turhan Damar et al., 2018; Unver et al., 2014). This study aims to determine the effect of fall prevention education given to patients with scheduled TKA for osteoarthritis on their fear of falling after surgery. The hypothesis of the research was as follows:

H1: Fall prevention education reduces the fear of falling after TKA in older adults with osteoarthritis.

Methods

Design

This is a quantitative study and has a quasi-experimental design with a control group. It was carried out in the orthopedics and traumatology clinics of an University Education and Research Hospital, between December 1, 2019 and 30 October in 2021.

Sample

The study population included all patients with osteoarthritis presenting to the orthopedics and traumatology clinics of the Hospital between 4 March in 2020 and 30 September in 2021. In Turkish culture, the interaction of patients with each other in the clinical environment is quite high.

Therefore, to prevent the patients in the control group from being affected by the intervention, randomization was not performed and 35 patients first presenting to the clinics, scheduled to have TKA and meeting the inclusion criteria were assigned into the control group. Eighty-four patients scheduled to undergo TKA in the orthopedics and traumatology clinics of the University and meeting the inclusion criteria were included in the study sample. Three patients were excluded from the study because they developed complications, six patients wanted to leave the study, and five patients were excluded from the study because they could not be interviewed during the follow-up time. The study was completed with a total of 70 patients, 35 in the control group and 35 in the intervention group.

Inclusion criteria were undergoing TKA for the first time, being scheduled to have unilateral TKA, having surgery for osteoarthritis, having no postoperative complications, fulfillment of discharge criteria after surgery, being aged 18 years or older, being conscious, orientation to place and time, having no hearing or speech problems, ability to understand and speak Turkish, being at least literate, not being diagnosed with any psychiatric diseases and not having a history of cancer.

Exclusion criteria were diagnoses of neurological (e.g. Alzheimer's disease) and psychiatric disorders (e.g. schizophrenia) likely to affect cognitive functions.

Outcome measures/variables

The independent variable of the study was education offered by nurses to patients scheduled to have TKA and the dependent variable was the mean scores for the Falling Efficacy Scale-International (FES-I).

Data collection tools

Data were collected with a patient characteristics form and the FES-I.

Patient characteristics form

The patient characteristics form was created by the researcher in light of the literature. The form was composed of questions about sociodemographic features including name, gender, age, telephone number, education, marital status, occupation and income and questions about health status including body mass index (BMI), presence of a chronic disease, taking medications, following a diet, prior surgeries and causes of surgeries.

The falling efficacy scale-international

The FES-I was developed by Yardley et al. to evaluate the fear of falling (Yardley et al., 2005). The validity and reliability of the scale in the Turkish population were achieved by Ulus et al. in 2012 and Cronbach's alpha for the Turkish version was reported to be 0.94 (Ulus et al., 2012). It is used to evaluate the level of concern about falling while some daily life activities are done. The fear of concern during 16-days activities (getting dressed/undressed, preparing simple meals and taking a bath or shower etc.) is scored on a four-point scale: one corresponding to never concerned, two somewhat concerned, three fairly concerned and four very concerned. The scores for the scale range from 16 (lack of concern about falling) to 64 (excessive concern about falling) (Si et al., 2017; Ulus et al., 2012).

Delbaere et al. categorized the cutoff values for fear of falling scores as in the following:

- 16-19: a low level of concern
- 20-27: a moderate level of concern
- 28-64: a high level of concern (Delbaere et al., 2010).

In the present study, the Turkish version of FES-I was used. Cronbach's alpha for the scale was found to be 0.86 before the intervention, 0.90 after the intervention and 0.92 during the follow-up.

Data collection

Data were collected at face-to-face interviews in the outpatient clinics or the clinics before surgery, in the 6^{th}-8^{th} weeks after surgery and in the 14^{th}-16^{th} weeks after surgery. The researcher both trained the patients and collected the data through face-to-face interviews. She asked the questions in the scale and the participants answered.

Routine care given to the control and intervention groups in the clinics

As part of routine clinical care, all the patients are briefly informed by the surgeon about why surgery is needed, the surgical process and possible surgery-related complications. The nurses in the clinics give education about preoperative preparations and postoperative care to patients and fill in the forms related to them. On discharge, the patients are offered information by the doctor verbally (about dates of follow-up visits, what patients must be careful with and exercises), but they are not given any written or visual educational material.

Intervention

The education brochure was prepared by the researcher in line with the literature. (Clarke et al., 2012; Galbraith et al., 2011; Johnson et al., 2014; Schwendimann et al., 2006). The content of the education brochure; it includes osteoarthritis, total knee replacement surgery, pre- and post-operative care (wound care, exercises to be done, initial mobilization, etc.), definition of falling, determination of risk factors and precautions to be taken. Opinions were received from five people (nurse, doctor, physiotherapist, academician) about the content and design of the brochure and necessary arrangements were made. The content of the brochure is shown in Figure 1.

The education was given face-to-face to each patient individually 1 day before the surgery. Visual materials were used in education. The activities including the first mobilization after surgery, walking with an aid, climbing up/down the stairs, getting out of the bed and sitting on the bed were shown in practice. Then, these activities were performed by the patients. They were informed about what they should be careful with during these activities. Questions asked by the patients were answered. In addition, one family member of each patient was involved in the education. The patients were also informed that the brochure contains the researcher's phone number and that they could phone the researcher to receive information.

Ethical considerations

The study protocol was approved by an University Ethical Committee for Noninvasive Research (Number 2020/01–19). The study was carried out in accordance with the 1964 Helsinki Declaration and the ethical standards of the National Research Committee. All the participants gave informed consent for the research, and their anonymity was preserved. Permission was obtained from the institution and clinic where the study was conducted.

Data analysis

Descriptive statistics of the obtained data were performed using numbers, percentages, mean and standard deviation. To determine homogeneity of the descriptive characteristics of the groups, Pearson Chi-square test, Yate's corrected Chi-square test, and Fisher's exact test were utilized for categorical variables and independent groups *t*-test was used for continuous variables. Skewness (from −1.70 to 2.0) and Kurtosis (from −1.22 to 1.97) were employed to analyze normality of the data and the analysis showed that the data were normally distributed. In the intervention group, two-factor variance analysis for repeated measures was made to determine differences in the scores for the

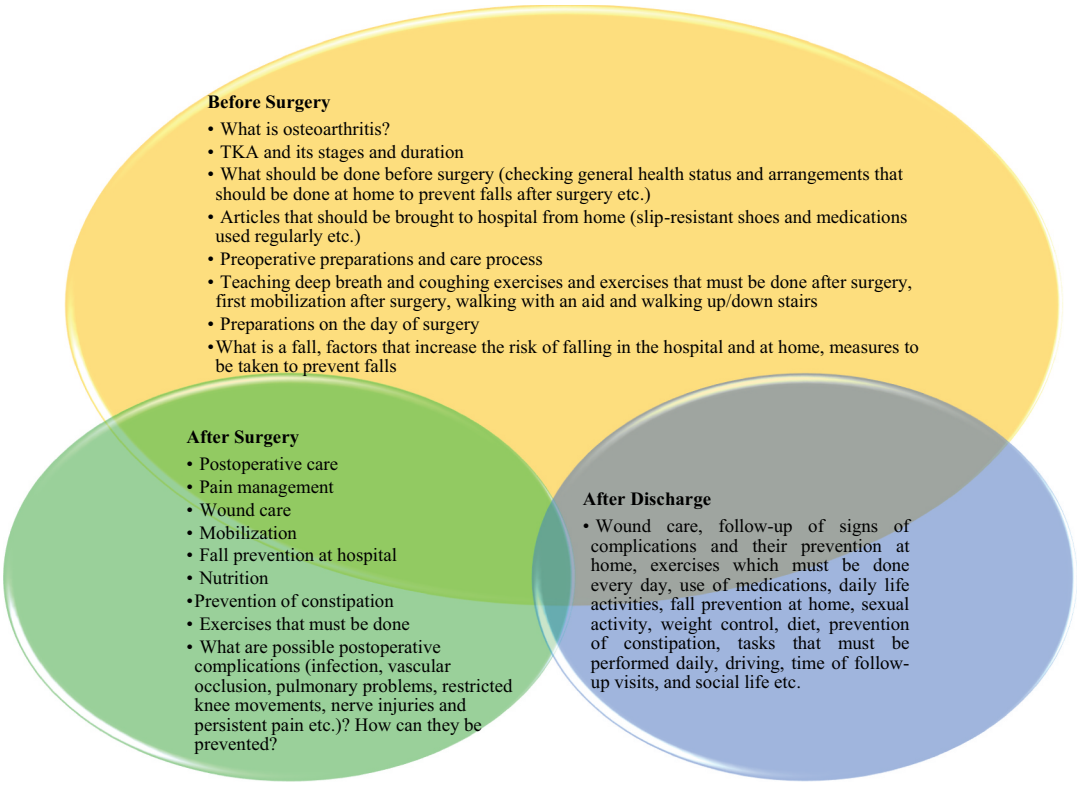


Figure 1. Content of the education brochure.

FES-I within-group and across time. Independent groups *t*-test was utilized to determine the difference in the scores for the FES-I between the groups and one-way variance analysis for repeated measures (post hoc analysis with Tukey test) was used to reveal the difference between intragroup changes across time (three repeated measures) for each group. The statistical significance was set at $p < .05$. The effect size and Cohen d value for *t*-test (G*power 3.1.9.2) and partial eta squared (SPSS 22.0) for the variance analysis were calculated.

Results

Data were collected from 70 participants undergoing TKA. Of the participants, 94.2% were woman, 70% had primary education or a higher level of education and the mean age of participants was 60.8 years. The mean Body Mass Index of the participants was 33.3 and 78.5% had chronic diseases.

There was no significant difference in gender, marital status, education, health insurance, employment, perceived income, the mean BMI, having prior surgery and causes of surgery between the control group, and the intervention group offered fall prevention education in the preoperative and postoperative periods ($p > .05$, Table 1). The groups were similar in these sociodemographic features (Table 1).

Examination of the presence of a chronic disease (48.6%), presence of a medication taken regularly (48.6%) and following a diet (48.6%) showed that significantly higher rates of the control group had a chronic disease (80%) and were on a treatment (80%) and a diet (80%) compared to the intervention group ($p < .05$, Table 1). The equal distribution of these three

variables results from the fact that the patients with a chronic disease were taking a medication and following a diet at the same time. In other words, the patients with a chronic disease, those on treatment and those on a diet were the same individuals.

The mean FES-I scores of the intervention and control groups before surgery and in the 6th–8th weeks and 14th–16th weeks after surgery were given in Table 2.

Before surgery, there was no significant difference in the mean FES-I scores between the control group (44.14 ± 8.86) and the intervention group (40.17 ± 8.32) ($p > .05$). However, in the postoperative 6^{th}-8^{th} weeks and 14^{th}-16^{th} weeks, the intervention group had significantly lower mean FES-I scores (31.71 ± 7.83; 26.42 ± 5.59) than the control group (40.91 ± 8.43; 37.2 ± 9.03) ($p < .001$) (Table 2).

In the control group, the mean FES-I score in the 14^{th}-16 weeks was significantly lower (37.2 ± 9.03) than the mean FES-I scores before surgery (44.14 ± 8.86) and in the postoperative 6^{th}-8^{th} weeks (40.91 ± 8.43) ($p < .05$), but there was no significant difference between the mean FES-I score before surgery (44.14 ± 8.86) and the mean FES-I score in the postoperative 6^{th}-8^{th} weeks (40.91 ± 8.43) ($p > .05$) (Table 2).

Table 1. The comparison of sociodemographic and health status features between the control and intervention groups.

	Control Group (n: 35)		Intervention Group (n: 35)			
Features	n	%	n	%	x^2	p
${\bf{Age}}\,({\bf{min}} - {\bf{max}}/\bar x\, \pm \,{\bf{SD}})$	47-75	62,26±6.38	47-79	59,46±7.33	t:1.703 (df:68)	.093
$BMI{\rm{ }}(\bar x\, \pm SD)$	35	32.60±5.15	35	34.18±4.06	t:-1.423 (df:64)	.159
Gender	34	97.1	32	91.4		.614 F
Female	1	2.9	3	8.6		
Male						
Marital status	30	85.7	35	100		.054 F
Married	5	14.3	0	0		
Single						
Education	10	28.6	11 24	31.4 68.6	.000	1.000Y
Literate	25	71.4			(df: 1)	
Primary education or a higher level of						
Health insurance	34	97.1	34	97.1		1.00 F
Yes	1	2.9	1	2.9		
No						
Employment status	1	2.9	3	8.6		.614 F
Employed	34	97.1	32	91.4		
Unemployed						
Perceived income	20	57.1	16	45.7	.515	.473Y
Lower than expenses	15	42.9	29	54.3	(df: 1)	
Equal to expenses						
Presence of chronic diseases	28	80	17	48.6	6.222	**.013**Y
Yes	7	20	18	51.4	(df: 1)	
No						
Use of medications	28	80	17	48.6	6.222	**.013**Y
Yes	7	20	18	51.4	(df: 1)	
No						
Being on a diet	28	80	17	48.6	6.222	**.013**Y
Yes	7	20	18	51.4	(df: 1)	
No						
Prior surgery	22	62.9	27	77.1	1.088	.297Y
Yes	13	37.1	8	22.9	(df: 1)	
No						
Causes of surgery	16	45.7	20	57.1	.515	.473Y
Knee pain	19	54.3	15	42.9	(df: 1)	
Knee pain and inability to walk						

Y: Yates-corrected chi-squared test, df: 1 (observed value <25)F:Fisher's exact test (low observed value and expected value <5)χ2: Pearson's chi-squared testt:Independent groups t test.

Table 2. The comparison of the mean FES-I scores between the control and intervention groups.

Groups	Before surgery [1] $\bar x\, \pm SD$	Postoperative 6th-8th weeks[2] $\bar x\, \pm SD$	Postoperative 14th-16th Weeks[3] $\bar x\, \pm SD$	Two-Factor Variance Analysis *	η^2/ power	F	p	Difference
Control (n: 35)	44.14±8.86 (high)	40.91±8.43 (high)	37.2 ±9.03 (high)		.20/ 1.00	8.838	.000	1, 2 >3
Intervention (n: 35)	40.17±8.32 (high)	31.71±7.83 (high)	26.42±.5.59 (moderate)		.61/ 1.00	53.640	.000	2>1,3; 3<1
T	*1.931*	*4.726*	*5.995*	Group	.29/ 1.00	28.414*	.000	
P	*.058*	***.000***	***.000***	Time	.41/ 1.00	47.567*	.000	
D	*.468*	*1.14*	*1.45*	Group*Time	.07/ 1.00	5.604*	.006	
Power	*.76*	*0.99*	*0.99*					

*F: Two-factor variance analysis for repeated measures, df: group: 1 / time: 1.7 / group*time:1.7F: Variance analysis for repeated measures (df: 2) Post hoc analysis: Tukeyt: Independent groups t test, df: 68d: The effect size and Cohen d value for *t*-test, power: post hoc power η2: partial eta squared, effect size for variance analysis.

In the intervention group, the mean FES-I score in the postoperative 14th-16th weeks (26.42 ± 5.59) was significantly lower than the mean FES-I scores before surgery (40.17 ± 8.32) and in the post-operative 6th-8th weeks (31.71 ± 7.83) ($p < .05$). In addition, the mean FES-I score in the postoperative 6th-8th weeks (31.71 ± 7.83) was significantly lower than the mean FES-I score before surgery (40.17 ± 8.32) (Table 2).

When the mean FES-I score of the individuals who underwent total knee replacement was compared with the two-factor analysis of variance in repeated measurements according to time and group, it was determined according to group characteristics (F: 28.414, p: .000, squared: 0.29), according to time (F: 47.567, p = . 000, squared: 0.41) and group*time interaction (F: 5.604, p: .006, squared: 0.07) statistically significant difference was found (Table 2).

Discussion

In this study, the effect of fall prevention education given to the patients with scheduled TKA on their fear of falling was evaluated. After the intervention, there was a significant decrease in the mean FES-I scores of the intervention group in the postoperative 6th-8th and 14th-16th weeks ($p < .001$).

Both the intervention and control groups had high FES-I scores before surgery and in the post-operative 6th-8th weeks. In the postoperative 14th-16th weeks, the control group had a high mean FES-I score, but the intervention group had a moderate FES-I score. Pain and restricted mobility due osteoarthritis in the preoperative period and due to surgical trauma in the postoperative period lead to fear of falling. In a study including 204 elderly patients who underwent knee and hip arthroplasty; it was determined that 42.2% of the patients had a serious fear of falling when they were first mobilized (Turhan Damar et al., 2018). Zhang et al. (2021) stated that 56.5% of patients reported being afraid of falling during the first mobilization after TKA surgery, In addition, after multivariate logistic regression analysis, they identified three independent risk factors that explained a total of 31% of the variance in the fear of falling: female sex, higher body mass index and higher anxiety. In a scoping review study (2019) stated that prevalence of falls in pre-operative TJA patients and post-operative TJA patients ranged from 23 to 63%, and 13 to 42%, respectively (Chen et al., 2019).

In the present study, both the intervention and control groups were found to experience a higher degree of fear of falling before surgery and the groups did not significantly differ in their pain ($p > .05$). Fear of falling is a phenomenon frequently appearing and negatively affecting the quality of life and physical activity in older adults (Schoene et al., 2019). It is reported that individuals experiencing fear

of falling have a higher risk of falling than those without this fear (Litwin et al., 2018). The present study included older patients diagnosed as osteoarthritis, experiencing pain and restricted physical activity and scheduled to have TKA due to failure of conservative treatment alternatives. In addition, most of the patients had more than one chronic disease (often diabetes and hypertension) and were receiving multiple medications (especially the use of antihypertensive and diuretic drugs) for the treatment of these diseases. In addition to abovementioned factors, physiological changes older adults (joint pain, eyesight problems and muscle weakness etc.) can explain the high mean FES-I scores of the patients in the preoperative period (Ambrose et al. 2013; Arnold & Gyurcsik, 2012; Ayoubi et al., 2014; Chen, et al., 2019; de Guzman et al., 2015). Osteoarthritis causes pain and restricts physical activity, which makes mobilization difficult, reduces the degree of activity and increases the fear and risk of falling (Chen et al., 2019; Wallis et al., 2019). Rates of falls in older adults with knee osteoarthritis have been reported to range from 50% to 63% (Minkara et al., 2019). It has been stated that individuals having TKA experience a greater fear of falling before surgery and that the rates of falling vary between 23% and 63% before surgery and between 13% and 42% after surgery. It has also been noted that fear of falling, joint range of motion and depression are preventable risk factors of falling (Chen et al., 2019).

The mean FES-I scores of both the intervention and control groups were significantly lower in the postoperative 14^{th}-16^{th} weeks than their scores before surgery and in the postoperative 6^{th}-8^{th} weeks. This finding shows that the fear of falling decreased as the patients healed later in the postoperative period. TKA is fairly successful in reduction of pain and elimination of osteoarthritis-related difficulty in walking and enhancement of the quality of life when conservative treatment methods are insufficient (Skou et al., 2015; Wylde et al., 2019). In a systematic review about the effects of TKA on balance and the incidence of falling, TKA was reported to improve the unilateral limb balance and dynamic balance until one year after surgery, eliminate falls in 54.2% of the patients falling before surgery and have a positive effect on fear and frequency of falling (Moutzouri et al., 2017). It has been shown in the literature that TKA decreases pain, improves mobility, mobilization and balance and reduces fear and rates of falling (Moutzouri et al., 2017; Tsonga et al., 2016; Unver et al., 2014).

In our study, time, group and group-time interactions were found to be effective on fear of falling. After the intervention, there was a significant decrease in the mean FES-I scores of the intervention group in the postoperative 6^{th}-8^{th} and 14^{th}-16^{th} weeks ($p < .001$). In addition, the FES-I score of the intervention group was significantly lower in the 6^{th}-8^{th} week than their score before the intervention ($p < .05$). However, the baseline FES-I score of the control group did not significantly differ from their score in the 6^{th}-8^{th} weeks ($p > .05$). These findings indicated that education given to the intervention group had a favorable influence on their fear of falling in the early postoperative period, which was maintained in the 14^{th}-16^{th} weeks. It has been shown in the literature that the fear of falling is too severe to delay mobilization in 79% of the patients after surgery (Brown et al., 2007). A study including 204 patients having knee and hip arthroplasties by Turhan Damar et al. revealed that 42.2% of the patients had a great fear of falling in their first mobilization after surgery. The study emphasized that pain and anxiety considerably affected the fear of falling during mobilization (Turhan Damar et al., 2018). In a study with 5154 patients having knee and hip arthroplasties and staying in hospital for three days, Jørgensen and Kehlet found that 1.6% of the patients were hospitalized for an injury due to falling in 90 days after discharge (Jørgensen & Kehlet, 2013). Mandl et al. showed in their study on falls occurring in hospital after elective orthopedic surgeries that 868 patients fell in ten years after surgery and that the highest rate of these patients had had TKA (38.2%) (Mandl et al., 2013). Forty-five-point-eight percent of the patients fell in the bathroom and most of the falls occurred in the early postoperative period; falling resulted in serious conditions in 28 patients (bleeding, reoperation, dislocation of the prosthesis, fracture and intracranial hemorrhage etc.) (Mandl et al., 2013). A study on 6912 patients treated in an orthopedics clinic by Akerman et al. revealed that 70 patients fell and that 64% of them ($n = 45$) were the ones having primary or revision knee arthroplasty (Ackerman et al., 2010). Based on these findings from different studies, it clear that TKA remarkably increases the fear and risk of falling in the patients in the early postoperative period. Being aware of the risk factors related to falling with the given education and taking measures to reduce the risk factors will reduce the fear of falling in the patients (Arnold & Faulkner, 2010; Ott, 2018).

TKA is major orthopedic surgery; healing after this surgery starts in the 2nd-6th weeks and accelerates after the third month, but complete healing can be achieved in one year (Ekşioğlu & Gürçay, 2013). The patients have severe pain and restricted mobility after surgery due to the affected bones and soft tissues. This causes them to experience fear of falling; they think they may damage their prosthesis if they fall. The fear of falling delays the first mobilization of patients and causes them to have difficulty in doing exercise (Damar & Bilik, 2017). Postoperative prolonged immobilization and inability to do exercise result in serious problems like deep vein thrombosis, pulmonary embolus, delayed wound healing, constipation and joint contractures (Hardy & Bevis, 2019; Hoch, 2014). Reduction of the fear of falling allows the patients to mobilize earlier and increases the level of their physical activity, which can decrease rates of falling and prevent additional problems due to falls (Chen et al., 2019; Unver et al., 2014).

Offering information about the preoperative and postoperative periods to the intervention group, supplying a brochure involving both preoperative and postoperative processes (preoperative preparations, postoperative period, pain management, what needs to be taken care of after surgery, arrangements which need to be made at home and in hospital, early detection of postoperative complications and their prevention etc.), explaining and demonstrating exercises which need to be done regularly, allowing the patients to do the exercises before surgery and inviting a family member to the education may have helped the intervention group get prepared for surgery better, manage the postoperative period better and considerably decrease their fear of falling.

Studies directed toward prevention of falls have provided a lot of recommendations to achieve this goal. First, risk factors of falls should be identified and kept under control. One of the most important risk factors, the fear of falling should be reduced. In addition, patient safety alarms should be utilized (bed alarms and ankle bracelets etc.) and the physical environment (at home and in hospital) should be arranged appropriately. Second, physical activity and muscle strength of patients should be increased. To this end, patients should be encouraged to do exercise and their pain should be managed. Finally, healthcare staff, patients and their families should be given education about prevention of falls and a multidisciplinary team approach should be adopted (Johnson et al., 2014; Kapas, 2014; Kendrick et al., 2014; Kim & Mariano, 2014; Scuccato, 2018; Turhan Damar et al., 2018). None of the studies reported in the literature has focused on the effect of education given by nurses to patients having TKA on their fear of falling. The present study is the first one about this issue and showed that the education offered to the patients undergoing TKA effectively decreased their fear of falling.

Limitations of the study

The limitations of the study were identified as the small sample size, conduction of the study in a single hospital, and differences between the control and intervention groups in terms of having a chronic disease, receiving treatment and following a diet. In addition, in this study, it was accepted as a limitation that the education content for fall prevention focused only on the physical dimensions and did not address the psychological dimension of the patients.

Conclusion

This study showed that the patients experienced an excessive fear of falling before and early after TKA. Due to the effect of total knee prosthesis, the fear of falling score decreased in the control group as well. However, the significant decrease in the intervention group started earlier and the fear of falling scores of the intervention group were significantly lower than the control group. It can be said that the education given reduces the fear of falling significantly and in the early period. However, larger studies in larger populations are needed to confirm the results of the study. Especially, it may be recommended to plan interventional studies that affect the cognitive level, such as psychotherapy, cognitive physical therapy, cognitive behavioral therapy and physical rehabilitation, in order to reduce the fear of falling.

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Ethics approval

The study protocol was approved by Dokuz Eylül University Ethical Committee for Noninvasive Research (approval date: 06.01.2020; approval number: 2020/01–19).

Consent to participate

All the participants gave informed consent for the research, and their anonymity was preserved. Permission was obtained from the institution and clinic where the study was conducted.

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