Received: 28 October 2019 | Revised: 8 March 2020 | Accepted: 16 March 2020

DOI: 10.1111/jjns.12339

JAPAN JOURNAL OF NURSING SCIENCE WILEY

ORIGINAL ARTICLE

Effect of preoperative in-bed exercises and mobilization training on postoperative anxiety and mobilization level

Mahinur Durmus Iskender[1] | **Ozgur Bektas**[2] | **Handan Eren**[3]

[1]Department of Medical Services and Technique, Taskoprü Vocational School of Higher Education, Kastamonu University, Kastamonu, Turkey

[2]Kastamonu Public Hospital, Kastamonu, Turkey

[3]Department of Nursing, Faculty of Health Sciences, Yalova University, Yalova, Turkey

Correspondence
Handan Eren, Department of Nursing, Faculty of Health Sciences, Yalova University, Yalova 77200, Turkey.
Email: erennhandan@gmail.com

Abstract

Aim: This study examines the effect of preoperative training on postoperative mobility and anxiety levels in patients undergoing total knee arthroplasty.

Methods: This was a randomized controlled study. The sample of this study consisted of 60 (30 experimental group, 30 control group) total knee arthroplasty patients who were admitted to a public hospital's orthopedic department between January 2019 and May 2019. To collect data, a demographic information form, patient mobility scale, observer mobility scale, and state–trait anxiety inventory were used. The patients in the intervention group practiced bed exercise and mobilization training before total knee arthroplasty surgery. The control group had no intervention.

Results: It was determined that the patient mobility scale (2.0 ± 0.83) and observer mobility scale scores (6.93 ± 1.61) of the patients in the experimental group were significantly lower than the patients in the control group (respectively: 4.16 ± 1.31, 11.0 ± 1.74; $p < .05$). In the postoperative period, the mean scores of the state (38.86 ± 6.11) and trait anxiety scores (38.26 ± 3.85) of the patients in the experimental group were found to be significantly lower than the patients in the control group (respectively: 59.03 ± 9.10, 43.80 ± 4.38; $p < .05$).

Conclusion: Preoperative training reduced the postoperative anxiety and increased the level of patient mobility after total knee arthroplasty in this study.

KEYWORDS

anxiety, nursing, patient mobility, preoperative training

1 | INTRODUCTION

The incidence of musculoskeletal system diseases are increasing due to extension of life expectancy and also increases in obesity. Gonarthrosis is one of those diseases leading to severe pain and physical function disorders, and it is gradually becoming a critical problem (Jones et al., 2014; OECD, 2017; Ttn, Altın, Ozgonenel, & Cetin, 2010). Gonarthrosis is a common degenerative joint disease which is characterized by joint pain, morning stiffness and bone crepitation (Nikolova & Prakova, 2018). Total knee arthroplasty (TKA) is performed to reduce the pain and physical function disorders related to disease and to improve the quality of life of patients (Jones et al., 2014). TKA improves the quality of life of the patients by reducing pain and disability (OECD, 2017). However, it is a remarkable surgical intervention that causes physical and psychological stress for patients. After TKA, patients do not want to be mobilized because of anxiety and decreased physical adaptation. For this reason, patient mobilization should be provided in the early period with a multidisciplinary team approach (Eksioglu & Gurcay, 2013). It is considered that

preoperative training, which is given before major operations, may decrease the anxiety and positively effect postoperative pain, mobility and hospital stay (Deyirmenjian, Karam, & Salameh, 2006). It is argued that preoperative training decreases anxiety and lack of motivation, which positively affects patients and enables them to be ready for discharge (Garretson, 2004; Kruzik, 2009). Studies demonstrate that preoperative training effectively improves functional activity of patients, shortens the duration of hospital stay (Edward, Mears, & Barnes, 2017; Huang, Chen, & Chou, 2012; Yoon et al., 2010), reduces the rehabilitation period (Chen, Chen, & Lin, 2014; Moulton, Evans, Starks, & Smith, 2015), and encourages early mobilization (Hermann, Holsgaard-Larsen, Zerahn, & Mejdahl, 2016). Preoperative training provides patients with understanding of the significance of their surgery and postoperative care, and it improves their belief in their own capability to deal with the operation by increasing the sense of responsibility. In addition, it speeds the healing period by providing patients and their families with a role to play in deciding on preoperative and postoperative care (Hartley et al., 2012; Lucas, 2007). Preoperatively planned training increases the quality of nursing care by ensuring achievement of the above-mentioned targets (Crowe & Henderson, 2003; Edward et al., 2017; Moulton et al., 2015).

Patient training can be carried out under the leadership of a nurse, by an interactive, individual, group or multidisciplinary approach, and it can be planned before or after the surgery. Preoperative training issues include reducing anxiety, supporting pain management, postoperatively expected results, the ability to fulfill daily activities, prevention of complications and early ambulation, and providing expectations after surgery (Erdil & Ozhan Elbas, 2001; Louw, Diener, Butler, & Puentedura, 2013; Moulton et al., 2015). The preoperatively planned training under the leadership of a nurse provides an effective care for the patient. Patients' education levels and cultural differences are the points to be considered when planning training (Fitzpatrick & Hyde, 2006; Kruzik, 2009).

A multidisciplinary approach is required to achieve successful surgical outcomes in patients undergoing TKA. In this context, the orthopedic nurse and the physiotherapist, who are the important members of the team, are responsible for the training and maintenance of the patient in a multidisciplinary approach. In our study, it is considered that practical training aims to decrease postoperative anxiety and increase physical adaptation after TKA, and reduce inefficiencies about preparation and training processes for the patient, which are ongoing problems in our country, and it will also improve patient outcomes.

2 | AIM

This study is examines the effect of preoperative training on postoperative mobility and anxiety levels in patients undergoing TKA.

2.1 | Hypotheses

H_0: Preoperative training does not affect postoperative mobility and anxiety levels in patients undergoing TKA.
H_1: Preoperative training affects postoperative mobility and anxiety levels in patients undergoing TKA.

3 | METHODS

3.1 | Study design

This study is a randomized controlled trial having been conducted with the aim of examining the effect of preoperative training on postoperative mobility and anxiety levels in patients undergoing TKA.

3.2 | Participants and setting

We recruited patients in the orthopedic department of a public center in Turkey from January 2019 to May 2019, and there was no sample loss. Patients were randomly assigned to the experimental or control group. Inclusion criteria were as follows:

- patients who had not previously undergone TKA surgery due to kneeosteoarthritis, patients who had the ability to communicate in Turkish language, patients who had not received similar physiotherapy before.
- The exclusion criteria were; patients with cognitiveimpairment, patients with hearing loss or visual impairment, patients withunstable postoperative hemodynamics instability.

3.3 | Sample size and randomization

The sample size was calculated using G-Power version 3.1.9.2 software package to calculate the sample size ($\alpha = .05$, power = .8, and effect size = .25) based on previous research. Adding 20% loss rate for the study group the final sample size required about 30 individuals per group. A total of 60 participants per group were needed to achieve a power of 80% at a significance level of 5% of 80 patients having been recruited for this study;

12 did not fulfill the inclusion criteria and eight met exclusion criteria. Therefore, the study was completed with 60 patients. After the size of the sample was

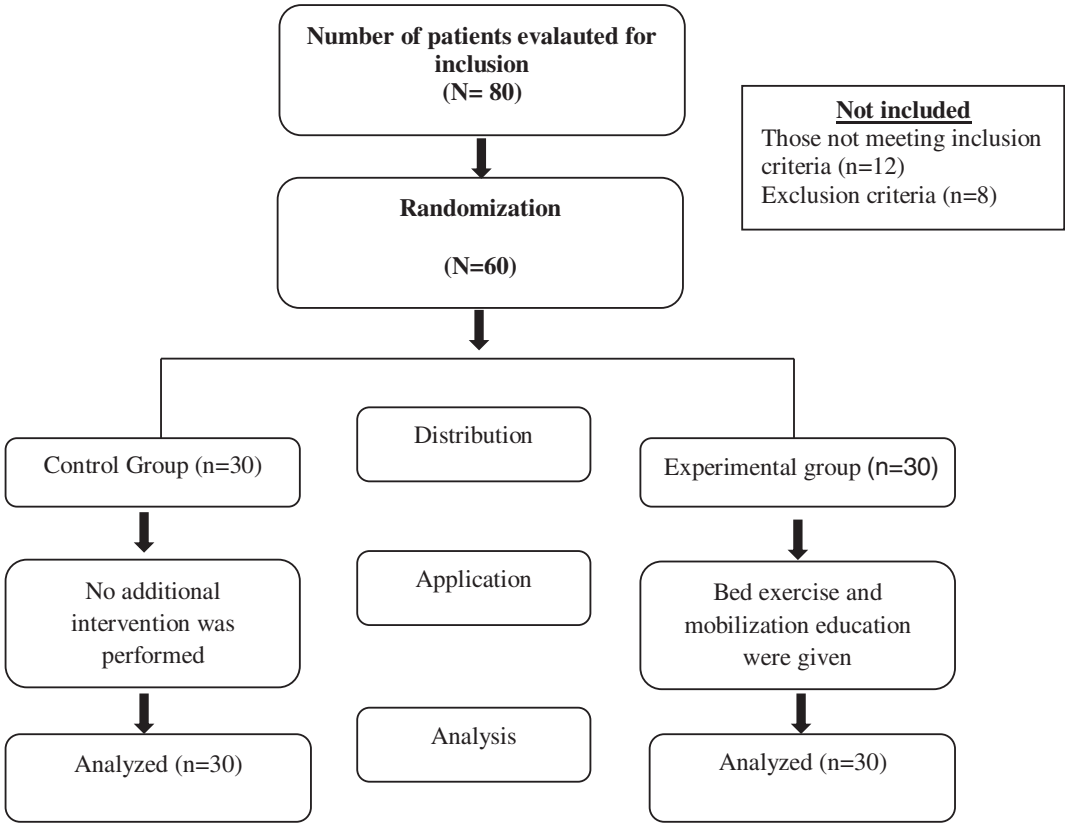

FIGURE 1 Research design (Consolidated Standards of Reporting Trials, 2010)

determined, in which groups the patients would be included was determined with a computer-based random number table program. Patients were randomly assigned by the researcher into two groups: experimental (n = 30) and control (n = 30) (Figure 1). The surgery days of the patients were determined by the doctor beforehand. Patients were informed to which group they belonged the day before the operation.

3.4 | Interventions

The researcher completed the demographic information form by asking questions of the patients the day before the operation. In the experimental group, demographic information form and state–trait anxiety inventory (STAI) were completed after receiving approval from the patients a day earlier than the operation, and mobilization and exercise trainings (physiotherapy) were given to each patient by the researchers. The experimental groups were provided with bed exercise and mobilization education through traditional face-to-face training. The content of the training included preoperative procedures, the actual steps in the surgical procedure, postoperative care, potential stressful scenarios associated with surgery, potential surgical and non-surgical complications, postoperative pain management, postoperative rehabilitation and the importance of early mobilization (Edward et al., 2017). After giving information about the operation, the mobilization protocol, which took place in seven steps after surgery, was mentioned. In the first, second and third steps, the patient is gradually settled in the bed. If these three steps are completed successfully, sitting at the bedside in the fourth step, standing up by the bed in the fifth step, sitting or stepping in the chair in the sixth step, and finally, independent mobilization in the seventh step is defined (King, 2012). All the steps in the protocol were shown to the patients and they were asked to perform the protocol. Psychotherapy was completed when the patients demonstrated the applications completely. The training period was about 30 min in for each patients. Following the first postoperative mobilization, patient mobility, observer mobility scale and STAI were applied. After receiving approval from the patients in

the control group, the demographic information form and STAI were filled in the day before the operation and no additional intervention was performed. After the first postoperative mobilization, patient mobility, observer mobility scale and STAI were applied.

3.5 | Measures

For collecting the data, demographical information form, patient mobility scale, observer mobility scale, and state–trait anxiety inventory were used. The demographical information form included questions concerning the identification of characteristics of patients (age, gender, height, weight, BMI, previously operated, information received prior to the operation etc.).

Patient mobility scale was developed by Heye, Foster, and Bartlett (2002) and was translated into Turkish language by Ayoglu (2011). The scale measures pain and difficulty level with four activities (turning from one side to another in the bed, sitting at the edge of the bed, standing up at the edge of the bed and walking in the room) after surgery. Two subgroup questions were directed to patients for each activity. The questions were about the severity of pain derived from a five-Likert scale. For each item in the scale, the participants were expected to choose among the following: 1, no pain; 2, a slight pain; 3, moderate pain; 4, extreme pain; and 5, the worst pain they could imagine. For the calculation of the points scored from the scale, points received for all activities are collected. The lowest score is 0 and the highest score is 120 for the entire scale. A higher total point scored from the scale indicates augmented pain and having difficulty associated with activity.

Observer mobility scale was developed by Heye et al. (2002) and was translated into the Turkish language by Ayoglu (2011). The scale measures the dependence/independence status with four activities (turning from one side to another in the bed, sitting at the edge of the bed, standing up at the edge of the bed and walking in the room) after surgery. The scale is scored from 1 to 5: 1, which indicates that the patient can independently fulfill the relevant activity without verbal warning or physical assistance; 5, shows that the patient is unable to perform the related activity despite verbal warning or physical help. For calculating the points scored from the scale, points for rotation, sitting, standing and walking are collected. The lowest score is four and the highest score is 20 for the entire scale. A higher total point scored from the scale indicates patients' inadequate mobility skills associated with activity.

STAI was developed by Spielberger (1970) and was translated into the Turkish language by Oner and Le Compte (1985). STAI is a self-administered questionnaire in Turkish, and consists of 40 items, which are grouped into two scales measuring baseline (trait; t-STAI) and situational (state; s-STAI) anxiety. The inventory has straight or reverse statements. For positive feelings, when the reverse statements are scored, those scored 1 are changed to 4 and those scored 4 are changed to 1. When negative feelings are stated, the score valued at 4 means that the anxiety level is high. As for the opposite statements, 4 expresses low, 1 expresses high level of anxiety. For the total scores obtained from straight statements are reduced from reverse statements' total values, and an unchanged amount is added to this number. The value came out of inventory changes between 20–80, wherein high numbers are an indication of high anxiety level, the lower points indicate low level of anxiety.

3.6 | Data analysis

To analyze the data, mean and standard deviation were used for the descriptive level. After using one-sample Kolmogorov–Smirnov test that determines conformity of data with normal distribution, conforming data were evaluated with independent t test being one of the parametric tests. Mann–Whitney U test was used for distribution of patients state–trait anxiety levels according to the groups. Data were evaluated at a meaningfulness level of $p < .05$ within confidence interval of 95% in SPSS for Windows version 24.0 (IBM Corp., Armonk, NY, USA).

3.7 | Ethical consideration

Ethics approval for the study was obtained from the Ethical Review Board of the authors' university in Turkey (January 22, 2019/3). Also, each patient who had the criteria for inclusion in the study was informed about the research and asked whether they would like to participate or not. Written consent was obtained from every patient only on the condition that they all had agreed to participate in the study.

4 | RESULTS

Descriptive features of the patients are given in Table 1. According to this, gender, age, height, weight, BMI, preoperative status, state–trait anxiety level before the operation, anxiety during the operation according to the situation of the distribution of patients in groups is similar.

Table 2 demonstrates the distribution of the mean patient mobility and observer mobility scale points according to the groups in this study. It was noticed that patients in the experimental group had significantly lower scale points than those of the patients in the control group ($p < .05$).

In the postoperative period, STAI scores of the patients in the experiment group were realized to be statistically significantly lower than those of the patients in the control group (Table 3) ($p < .05$).

Although not mentioned in the table, no relationship between gender, age, height, weight, BMI, having an operation before, receiving surgery-related training status, and mean patient mobility, observer mobility, STAI score were found ($p > .05$).

5 | DISCUSSION

Effective nursing care is required to prevent complications, to perform daily living activities and maintain pain and anxiety management at the highest level for patients undergoing TKA (Aktan, 2004; Astarcıoglu, 2002). With effective preoperative and postoperative nursing care, complications in the early stage of recovery are prevented, and the patients are provided with an opportunity to continue their daily activities. In addition to preventing further complications, encouragement for standing up in the early period plays an important role on patients' capabilities to become independent during this period.

Anxiety is the first response of an individual to any danger and is the first reaction experienced by the patients before and after surgery (Grieve, 2002; Kehlet & Wilmore, 2008). It was stated that preoperative training was the most effective method for reducing the anxiety of the patient before surgery (Edward et al., 2017). It is emphasized that the training given to the patients reduces the anxiety experienced subsequent to the operation, accelerates the recovery process, increases patient satisfaction, and decreases the pain level experienced by the patient 1 year later due to the surgery (Brander et al., 2003; Edward et al., 2017; Riddle, Wade, Jiranek, & Kong, 2010). In their study which was performed in patients with hip and knee arthroplasty, O'Connor, Brennan, Kazmerchak, and Pratt (2016) and Forshaw, Carey, Hall, Boyes, and Sanson-Fisher (2016) reported that therapy training given preoperatively significantly reduces anxiety levels (Forshaw et al., 2016; O'Connor et al., 2016). In this study, the mean

TABLE 1 Distribution of the patients' descriptive features according to the groups (N = 60)

	Control group n = 30	Experimental group n = 30	Statistical tests and *p* values
Gender, n (%)			
Female	26 (76.7%)	26 (86.7%)	$p = .325$
Male	4 (23.3%)	4 (13.3%)	$F = 4.117$
Age, years			
Mean ± *SD*	66.10 ± 7.09	63.6 ± 6.90	$p = .355$
Range	48–80	50–81	$t = -0.933$
Body mass index, kg/m^2			
Mean ± *SD*	33.41 ± 5.19	33.57 ± 5.5	$p = .908$
Range	25–43	24–47	$t = 0.116$
Previous operation			
Yes, n (%)	19 (63.3%)	20 (66.7%)	$p = .791$
No, n (%)	11 (36.7%)	10 (33.3%)	$t = -0.266$
Education status related to the operation			
Yes, n (%)	10 (33.3%)	8 (26.6%)	$p = .581$
No, n (%)	20 (66.7%)	22 (73.4%)	$t = 0.555$
Anxiety level before operation			
State anxiety			.06
Mean ± *SD*	59.20 ± 9.11	59.20 ± 9.11	$t = -1.916$
Trait anxiety			.069
Mean ± *SD*	43.83 ± 4.29	41.90 ± 3.75	$t = -1.855$

Note: $p > .05$. *SD*, standard deviation; independent *t* test is used.

TABLE 2 Distribution of mean patient mobility and observer mobility scale points according to the groups after training (N = 60)

Scale and sub-dimensions	Control group n = 30 Mean ± *SD*	Experimental group n = 30 Mean ± *SD*	Statistical test and *p* values
Patient mobility			
Turning from one side to another in bed	3.8 ± 1.12	1.7 ± 1.11	$p = .000$ $t = -8.575$
Sitting on the edge of the bed	3.8 ± 1.21	1.83 ± 0.69	
Standing at the edge of the bed	4.06 ± 1.28	1.96 ± 0.8	
Walking inside the patient room	4.16 ± 1.31	2.0 ± 0.83	
Total score of patient mobility	15.83 ± 4.50	7.5 ± 2.83	
Observer mobility			
Turning from one side to another in bed	2.83 ± 0.46	1.9 ± 0.54	$p = .000$ $t = -9.370$
Sitting on the edge of the bed	2.53 ± 0.57	1.33 ± 0.47	
Standing at the edge of the bed	2.8 ± 0.48	1.9 ± 0.48	
Walking inside the patient room	2.83 ± 0.46	1.8 ± 0.55	
Total score of observer mobility	11.0 ± 1.74	6.93 ± 1.61	

Note: *SD*, standard deviation; independent *t* test is used.

TABLE 3 Distribution of patient state–trait anxiety levels according to the groups (N = 60)

	Control group n = 30 Mean ± *SD*	Experiment group n = 30 Mean ± *SD*	z	*p*
State anxiety	59.03 ± 9.10	38.86 ± 6.11	−6.130	0.000
Trait anxiety	43.80 ± 4.38	38.26 ± 3.85	−4.396	0.000

Note: $p < .05$. z, Mann–Whitney *U* test value; *SD*, standard deviation.

STAI scores of the patients after the first mobilization were examined and the anxiety level of the experimental group was found to be significantly lower than the that of the control group ($p < .05$) (Table 3). Findings of this study are similar to those found in the literature.

Mobility is necessary for self-expression, self-defense, and satisfying daily life activities. Many functions of the body depend on mobility. The musculoskeletal system and the nervous system must function optimally to ensure mobility (Potter, Perry, Stockert, & Hall, 2013). Reduction of postoperative mobilization extends the duration of hospital stay, increases hospital costs and increases the workload of nurses by increasing the risk of complications. Nurses should be aware of the complications caused by inactivity and motivate the patients to move as much as they can tolerate. Early mobilization of patients, especially in the postoperative period, is an important nursing intervention to prevent complications (Aktan, 2004; Berman, Snyder, & Frandsen, 2016). There are studies suggesting that preoperative mobilization training reduces functional limitation. In the study performed by Ayoglu (2011), it was determined that the mean scores of the observer mobility scale of the patients in the experimental group on days 1 and 2 were significantly lower and the patients were more independent in terms of their mobility (Ayoglu, 2011). Therefore, our study shows similarities with Ayoglu's (2011) research. In their paper, Paterson and Warburton (2010) deduced that physical activity and exercise education reduce functional limitations for individuals. Moulton and colleagues (2015) reported that preoperative training affects mobilization in patients with hip arthroplasty (Moulton et al., 2015). Ozsoy (2018) found the mean score of the first day observer mobility scale and patients mobility scale of the training group was significantly lower than that of the control group in his study performed on hip and knee arthroplasty patients (Ozsoy, 2018). In this study, a statistically significant difference was found between the control group and the experimental group in terms of patient mobility scale, observer mobility scale mean scores mean scores of patient mobility scale, observer mobility scale ($p < .05$). This finding shows similarities with the available knowledge in the literature.

5.1 | Limitations of the study

The most important limitation of the current study was the small sample size. The results reached by this study are restricted to the individuals who have been diagnosed with a TKA in a state hospital.

6 | CONCLUSION

Preoperative training was found to reduce postoperative anxiety and increase the level of patient mobility after TKA in this study. In accordance with the findings of this study, the following suggestions can be made.

- In order to improve patient care outcomes, multidisciplinary studies should be made.
- The study should be conducted with a larger sample size.

ACKNOWLEDGMENTS

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

AUTHOR CONTRIBUTIONS

MDI: study conception, designed data analysis, wrote first draft of the manuscript, approved final version to be published. OB: conducted the trial, approved final version to be published. HE: designed data analysis, wrote first draft of the manuscript, approved final version to be published.

ORCID

Mahinur Durmus Iskender https://orcid.org/0000-0002-0050-6680

Handan Eren https://orcid.org/0000-0002-6507-5690

REFERENCES

Ayoglu, T. (2011). *The effect of preoperative training on self-efficacy perception and recovery process* (doctoral dissertation). Istanbul University, Health Science Institute, Istanbul, Turkey

Aktan, O. (2004). Postoperative care. In I. Sayek (Ed.), *Basic surgical* (pp. 121–124). Ankara, Turkey: Gunes.

Astarcıoglu, H. (2002). Postoperative care. In C. Terzi (Ed.), *Basic surgical sciences with problem based learning approach* (pp. 679–684). İzmir, Turkey: Dokuz Eylül.

Berman, A., Snyder, S., & Frandsen, G. (2016). *Kozier & Erb's Fundamentals of Nursing: Concepts, process and practice*. Boston, MA: Pearson.

Brander, V. A., Stulberg, S. D., Adams, A. D., Harden, R. N., Bruehl, S., Stanos, S. P., & Houle Timothy, T. (2003). Predicting total knee replacement pain: A prospective, observational study. *Clinical Orthopaedics and Related Research*, *416*, 27–36.

Chen, S. R., Chen, C. S., & Lin, P. C. (2014). The effect of educational intervention on the pain and rehabilitation performance of patients who undergo a total knee replacement. *Journal of Clinical Nursing*, *23*, 279–287.

Crowe, J., & Henderson, J. (2003). Pre-arthroplasty rehabilitation is effective in reducing hospital stay. *Canadian Journal of Occupational Therapy*, *70*, 88–96.

Deyirmenjian, M., Karam, N., & Salameh, P. (2006). Preoperative patient education for openhearth patients: A source of anxiety. *Patient Education and Counselling*, *62*, 111–117.

Edward, P. K., Mears, S. C., & Barnes, C. L. (2017). Preoperative education for hip and knee replacement: Never stop learning. *Current Reviews in Musculoskeletal Medicine*, *10*, 356–364.

Ekşıoglu, E, Gurcay, E. (2013). Rehabilitation After Total Knee Arthroplasty. *Journal of İstanbul Faculty of Medicine*, *76*(1), 16–21.

Erdil, F., & Ozhan Elbas, N. (2001). *Surgical nursing*. Ankara, Turkey: Aydogdu Ofset.

Fitzpatrick, E., & Hyde, A. (2006). Nurse-related factors in the delivery of preoperative patient education. *Journal of Clinical Nursing*, *15*, 671–677.

Garretson, S. (2004). Benefits of pre-operative information programmes. *Nursing Standard*, *18*, 33–40.

Grieve, R. J. (2002). Day surgery preoperative anxiety reduction and coping strategies. *British Journal of Nursing*, *11*, 670–678.

Hartley, R. A., Pichel, A. C., Grant, S. W., Hickey, G. L., Lancaster, P. S., Wisely, N. A., & Atkinson, D. (2012). Preoperative cardiopulmonary exercise testing and risk of early mortality following abdominal aortic aneurysm repair. *British Journal of Surgery*, *99*, 1539–1546.

Hermann, A., Holsgaard-Larsen, A., Zerahn, B., & Mejdahl, S. (2016). Preoperative progressive explosive-type resistance training is feasible and effective in patients with hip osteoarthritis scheduled for total hip arthroplasty–a randomized controlled trial. *Osteoarthritis and Cartilage*, *24*, 91–98.

Heye, M. L., Foster, L., Bartlett, M. K., & Adkins, S. A. (2002). Preoperative intervention for pain reduction, improved mobility and self-efficacy. *Applied Nursing Research*, *15*, 174–183.

Huang, S. W., Chen, P. H., & Chou, Y. H. (2012). Effects of a preoperative simplified home rehabilitation programme on length of stay of total knee arthroplasty patients. *Orthopaedics & Traumatology: Surgery & Research*, *98*, 259–264.

Jones, E. L., Wainwright, T. W., Foster, J. D., Smith, J. R. A., Middleton, R. K., & Francis, J. K. (2014). A systematic review of patient reported outcomes and patient experience in enhanced recovery after orthopaedic surgery. *Annals of the Royal College of Surgeons England*, *98*, 89–94.

Kehlet, H., & Wilmore, D. W. (2008). Evidence-based surgical care and the evolution of fasttrack surgery. *Annals of Surgery*, *248*, 189–198.

King, L. (2012). Developing a progressive mobility activity protocol. *Orthopaedic Nursing*, *31*(5), 253–262.

Kruzik, N. (2009). Benefits of preoperative education for adult elective surgery patients. *AORN Journal*, *90*, 381–387.

Forshaw, K. L., Carey, M. L., Hall, A. E., Boyes, A. W., & Sanson-Fisher, R. (2016). A systematic review of the psychometric qualities of published instruments. *Patient Education and Counseling*, *99*, 960–973.

Louw, A., Diener, I., Butler, D. S., & Puentedura, E. J. (2013). Preoperative education addressing postoperative pain in total joint arthroplasty: Review of contend and educational delivery methods. *Physiotherapy Theory and Practice*, *29*, 175–194.

Lucas, B. (2007). Preparing patients for hip and knee surgery. *Nursing Standard*, *22*, 50–58.

Moulton, L. S., Evans, P. A., Starks, I., & Smith, T. (2015). Preoperative education prior to elective hip arthroplasty surgery improves postoperative outcome. *International Orthopaedics*, *39*, 1483–1486.

Nikolova, V., & Prakova, G. (2018). Degenerative joint diseases (osteoartrtrosis) and quality of life. *Trakya University Journal of Natural Sciences*, *16*, 180–183.

OECD (2017). Hip and knee replacement. In *Health care activities health at a glance* (pp. 178–179). OECD Indicators: OECD Publishing.

O'Connor, M. I., Brennan, K., Kazmerchak, S., & Pratt, J. (2016). YouTube videos to create a "virtual hospital experience" for hip and knee replacement patients to decrease preoperative anxiety: A randomized trial. *Interactive Journal of Medical Research*, *5*, 10.

Oner, L., & Le Compte, A. (1985). *State-trait anxiety inventory handbook* (2nd ed.). Istanbul, Turkey: Bogazici University.

Ozsoy. M. (2018). *The effects of early physical adaptation and mobility on the hip or knee arthroplasty of preoperative education given in the direction of the physiological mode of the Roy adaptation model* (doctoral dissertation). Yeditepe University, Health Science Institue, Istanbul, Turkey.

Paterson, D. H., & Warburton, D. E. (2010). Physical activity and functional limitations in older adults: A systematic review related to Canada's physical activity guidelines. *International Journal of Behavioral Nutrition and Physical Activity*, *7*, 2–22.

Potter, P. A., Perry, A. G., Stockert, P., & Hall, A. (2013). *Fundamentals of nursing* (8th ed.). North York, Canada: Elsevier.

Riddle, L. D., Wade, J. B., Jiranek, W. A., & Kong, X. (2010). Preoperative pain catastrophizing predicts pain outcome after knee arthroplasty. *Clinical Orthopaedics and Related Research*, *468*, 798–806.

Spielberger, C. D. (1970). STAI manual for the state-trait anxiety inventory. *Self Evaluation Questionnaire*, *1*, 1–24.

Ttn, S., Altın, F., Ozgonenel, L., & Cetin, E. (2010). Demographic characteristics in patients with knee osteoarthritis and relationship with obesity, age, pain and gender. *Istanbul Medical Journal*, *11*, 109–112.

Yoon, R. S., Nellans, K. W., Geller, J. A., Kim, A. D., Jacobs, M. R., & Macaulay, W. (2010). Patient education before hip or knee arthroplasty lowers length of stay. *Journal of Arthroplasty*, *25*, 547–551.

How to cite this article: Iskender MD, Bektas O, Eren H. Effect of preoperative in-bed exercises and mobilization training on postoperative anxiety and mobilization level. *Jpn J Nurs Sci*. 2020;17:e12339. https://doi.org/10.1111/jjns.12339