



Research article

The effect of video training and intraoperative progress report on the anxiety of family caregivers waiting for relatives undergoing surgery

Majid Bagheri^a, Maryam Maleki^b, Abbas Mardani^c, Mohammad Hadi Momen-beromi^a, Salman Daliri^d, Somayeh Rezaie^{e,*}^a School of Allied Medical Sciences, Shahroud University of Medical Sciences, Shahroud, Iran^b Pediatric and Neonatal Intensive Care Nursing Education Department, School of Nursing and Midwifery, Tehran University of Medical Sciences, Tehran, Iran^c Nursing Care Research Center, Department of Medical Surgical Nursing, School of Nursing and Midwifery, Iran University of Medical Sciences, Tehran, Iran^d Clinical Research Development Unit, Imam Hossein Hospital, Shahroud University of Medical Sciences, Shahroud, Iran^e School of Nursing and Midwifery, Shahroud University of Medical Sciences, Shahroud, Iran

ARTICLE INFO

Keywords:

Video training
Intraoperative progress report
Anxiety
Family caregivers
Surgery

ABSTRACT

Purpose: This study aimed to examine the effect of video training and intraoperative progress report on the anxiety of family caregivers awaiting relatives undergoing surgery.**Methods:** A three-armed randomized controlled design was used. One hundred and two participants were enrolled and randomly assigned to three groups: the video training group (n = 34), the intraoperative progress report group (n = 34), and the control group (n = 34). Interventions were performed when the relatives of the participants were undergoing surgery. The participants in the video training group received video training containing images of the operating room environment and animations related to the patient's surgical procedure, post-operative care, and possible complications from the surgery. In the intraoperative progress report group, information regarding the patient's general condition, the percentage of surgical progress, and the approximate time of the patient's transfer from the operating room were provided. The control group received routine care. A demographic data questionnaire and the Spielberger State-Trait Anxiety Inventory (STAI) was used for data collection.**Results:** It was found a statistically significant decrease in the state anxiety in the video training ($p < 0.001$) and intraoperative progress report ($p < 0.001$) group after the intervention when compared to before the intervention. It was found no significant difference among the study groups in terms of the level of state and trait anxiety after the intervention ($p > 0.05$).**Conclusions:** This study found that both video training and intraoperative progress report are effective in reducing the state anxiety of family caregivers awaiting relatives undergoing surgery.

1. Introduction

Surgery is a critical event in humans' lives. The number of surgeries is growing with the development of medical technology [1]. Surgery can cause psychological and physical problems in patients undergoing surgery [2]. Anxiety is one of these problems [3], which is a common feeling in 60% of patients who are candidates for surgery [4]. Anxiety begins when the patient becomes aware of the need for surgical procedures and peaks at the time of hospitalization [5]. It occurs not only for the patients but also for their family caregivers [3]. Sometimes family caregivers experience anxiety as severe as the relatives undergoing surgery [6].

Anxiety contains two concepts including state (psychophysiological state) and trait anxiety (the personality trait). The state anxiety evaluates the current status of anxiety or temporary reaction related to adverse situations at a specific time. In contrast, the trait anxiety shows stable aspects of "anxiety proneness" [7]. Family caregivers' anxiety during surgery could be due to fear of their loved ones' death, the uncertain outcome of surgery, emotional turmoil, financial worries, disruption of daily affairs, and an unfamiliar hospital environment [8]. The family caregivers who have higher trait anxiety tend to have higher state anxiety. Therefore, measuring these two concepts of anxiety together can provide more valuable information regarding anxiety status.

* Corresponding author.

E-mail address: S.rezaie@shmu.ac.ir (S. Rezaie).<https://doi.org/10.1016/j.heliyon.2022.e10065>

Received 10 January 2022; Received in revised form 24 April 2022; Accepted 19 July 2022

2405-8440/© 2022 The Author(s). Published by Elsevier Ltd. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

Trimm and Sanford reported that stress and anxiety in family caregivers increase when their relatives are in the operation room and can lead to psychological and physical responses [9]. Anxiety can contribute to physical complications such as increased cardiac output, oxygen demand, water and sodium retention, tachypnea, chest pain, hypertension, hyperglycemia, tachycardia, and decreased urine output [10, 11]. Severe anxiety is also associated with decreased immune response and changes in cardiovascular function, such as endothelial dysfunction, irregular heartbeat, and vascular inflammation [12]. In addition, anxiety can impair the understanding of information and the ability of family caregivers to provide optimal postoperative care for their patients [9, 13].

The most anxious time for family caregivers is when their relatives are undergoing surgery and they are waiting in the waiting room to receive some information regarding their patient's condition [8, 14]. Therefore, they in the waiting room expect support and information from health professionals [14]. Receiving sufficient information regarding the relatives' condition is one of the most important needs and concerns of family caregivers [15]. However, what is neglected in some hospitals is the important role that nurses can play in reducing the anxiety among the family caregiver of patients who are in waiting rooms. Currently, the focus of nurses is on the patient, and the information and care needs of family caregivers usually are neglected during this anxious period [16]. Therefore, the family caregivers inadvertently transfer anxious feelings to their relatives after surgery if they are unable to cope with these feelings [17]. Supporting family caregivers in the waiting room can reduce their anxiety and help them continue to suitable care for their relatives after surgery [3]. In addition, family caregivers' involvement in hospital care, postoperative recovery, and discharge planning are critical, particularly where there is a nursing shortage [18].

A variety of interventions has been suggested to reduce anxiety in family caregivers in waiting rooms [8]. Ghadiri et al.'s study showed that a peer-led education program is useful in reducing the anxiety of family caregivers of patients undergoing coronary artery surgery [19]. Another study revealed the effect of providing information cards on family caregivers' anxiety awaiting relatives undergoing surgery [8]. In addition, reporting from the operating room to waiting families by a nurse liaison has been suggested [20]. Mojdeh et al. found that watching a 120-minute video of the surgical procedure reduced the anxiety of the patient's family members during surgery [21]. Furthermore, another study reported that structured communication was effective in reducing the anxiety of family caregivers waiting for relatives undergoing surgical procedures [22].

Some of the introduced interventions are not feasible and also difficult to implement because they are too time-consuming and not cost-effective [8]. Given that in the waiting room, there is no coherent and meaningful communication between family caregivers and health professionals, developing innovative communication strategies can be effective in increasing communication and reducing the anxiety of family caregivers [22].

Iranian health system faced a nursing shortage and family caregivers have a significant role in the relatives' care during hospitalization. It seems the support of family caregivers and reducing their anxiety can increase their participation in the relatives' care and facilitate their recovery after surgery [15]. Therefore, this study aimed to investigate the effect of video training and intraoperative progress report on the anxiety of family caregivers awaiting relatives undergoing surgery.

2. Methods

2.1. Study design

This study used a three-armed, parallel, randomized, and controlled trial design. It was performed on family caregivers waiting for relatives undergoing elective surgery in two hospitals in an urban area of Iran from January 2020 to September 2020.

2.2. Participants and sampling

Eligibility criteria for family caregivers were as follows: Eligibility criteria for family caregivers were as follows: aged 18 years and older, being their relative on the list of elective surgeries, being a first-class member of the patient's relatives (father or mother, spouse, child, sister or brother), planning to be attended on the day of surgery as a patient companion, ability to communicate verbally and read Persian, and willingness to participate in the study and complete the informed consent form. A history of mental disorder, anxiety due to the initial problem, employment in healthcare settings, and previous experience of being a caregiver for a relative undergoing surgery were the basis for exclusion.

The sample size was estimated at 34 subjects in each group with an 80% power and 95% confidence interval (95% CI). Family caregivers were selected using a convenience sampling method. Researchers approached them in surgical wards the day before surgery and assessed their eligibility criteria. Eligible participants were randomly assigned into study groups by using a multiple randomized block design as follows: code A was given to the video training group, code B was given to the intraoperative progress report group, and code C was given to the control group. Next, a random allocation sequence (17 sextuplet blocks) was created by the statistical advisor (SD) using SPSS software, version 25. Finally, the first author (MB) assigned eligible participants based on these blocks to the video training, the intraoperative progress report, and control groups. Numbered sealed opaque envelopes were applied for concealment, which included cards with letters A, B, and C informing the allocation sequence. To allocate each participant to the groups, an envelope was opened. Although masking was inconceivable due to the nature of the interventions, the study groups were concealed for the data analyzer (SD).

2.3. Intervention

Participants in the video training group received videos related to surgery planned for their relatives. Separate videos were developed by the research team for six surgery groups including ear, nose, and throat (ENT), eyes, general, orthopedics, gynecological, and urology surgeries. Each video was reviewed by three experts (surgeon, operation room nurse, and surgery ward nurse). After collecting their comments, the videos were finalized. The videos included images of the operating room environment and animations related to the surgical procedure, postoperative care, and possible general complications from the surgery. These videos were provided to the participants in the waiting room when their relatives were in the operation room. The videos lasted 30–40 min and the participants' questions and concerns were answered at the end of the training session.

Participants in the intraoperative progress report group received information in the waiting room regarding their relatives' status when they were in the operation room. The information encompassed the client's general condition, the percentage of surgical progress, and the approximate time of the transfer from the operating room. This information was provided by the researcher every 20 min from transferring the client to the operation room to transferring to the surgical wards.

Participants in the control group received no information regarding their relatives' condition when undergoing surgery unless they wanted to receive information about their condition. During the study, only four participants in the control group would like to receive information about the time of their relatives' surgery ending that merely the relevant information was provided to them.

2.4. Data collection

A demographic data questionnaire and the Spielberger State-Trait Anxiety Inventory (STAI) was used for data collection.

2.4.1. The demographic data questionnaire

The demographic data questionnaire included questions about the demographic characteristics of the participants such as age, gender, marital status, education level, type of family caregiver, and type of relative's surgery.

2.4.2. Spielberger State-Trait Anxiety Inventory (STAI)

Participants' anxiety level was measured using the STAI. This valid inventory consists of 40 questions. Twenty questions examine state anxiety and another 20 questions were designed to assess trait anxiety. All questions of the STAI have a 4-point Likert scale (1 = very low, 2 = low, 3 = high, and 4 = Very high) [23]. Scores from questions 1, 2, 5, 8, 10, 11, 15, 16, 19, and 20 in state anxiety and questions 21, 23, 26, 27, 30, 33, 34, 36, and 39 in trait anxiety should be reversed during data analysis. The state and trait anxiety scores ranged from 20 to 80, which do not add up. For each state and trait anxiety, a score of 20–30 indicates no anxiety, 31 to 42 shows mild anxiety, 43 to 53 indicates moderate anxiety, and 54 to 80 shows severe anxiety [24, 25, 26].

STAI is widely used in various international research and has been adapted into more than forty languages. Its internal consistency with Cronbach's alpha coefficients was reported at 0.93 and 0.90 for the state and trait scales, respectively [27]. The STAI has been translated and validated in the Iranian population with satisfactory psychometric properties [28, 29].

All participants completed the demographic data questionnaire and STAI the day before their relatives' surgery. In addition, the STAI was completed by them after the intervention and before knowing of the end of their relatives' surgery in the waiting room.

2.5. Ethical consideration

The Ethics Committee of Shahrood University of Medical Sciences provided ethical approval for this study under the code of IR.SH-MU.REC.1399.063. The study protocol was registered on the Iranian Registry of Clinical Trials website under the number IRCT20170816035741N3. Permission to enter the research area was obtained before the study from relevant authorities. Full Information was given to patients and their family caregivers about the study's purpose and process and the confidentiality of the data. Furthermore, written consent was acquired from patients and their family caregivers who consented to participate in the study.

2.6. Data analysis

Data were analyzed using descriptive and inferential statistics through SPSS software, version 25. The characteristics of the participants in the groups were compared using the chi-square test, Fisher's exact test, and one-way analysis of variance (ANOVA). In addition, a paired-samples t-test was performed to evaluate the mean anxiety scores before and after the intervention within the study groups. Moreover, one-way ANOVA and analysis of covariance (ANCOVA) were performed to compare the mean of the anxiety between three study groups before the intervention and after the intervention. The statistical significance level was considered p -value < 0.05 .

3. Results

Out of 148 participants that were reviewed for eligibility, 102 eligible participants were randomly allocated to the video training ($n = 34$), the intraoperative progress report ($n = 34$), and control ($n = 34$) groups. None of the participants were excluded from the study during the follow-up. Therefore, data collected from all participants were included in the final analysis (Figure 1).

3.1. Demographic characteristics and homogeneity comparison between groups

The mean (standard deviation (SD)) age of participants was 39.41 (1.88) years in the visual education group, 38.82 (1.51) years in the

intraoperative awareness, and 36.50 (1.83) years in the control group. 55.9% of the participants in the video training group, 52.9% in the intraoperative progress report group, and 41.2% in the control group were male. The other demographic characteristics of the participants are presented in Table 1. It was observed no statistically significant difference between the participants in the study groups in terms of demographic characteristics ($p > 0.05$).

3.2. Anxiety

3.2.1. Within-group comparison

The results of the within-group comparison in terms of the anxiety scores are shown in Table 2. There was a statistically significant decrease in the score of state anxiety in the video training group after the intervention compared to before the intervention ($p < 0.001$). However, the mean score of trait anxiety in this group was not statistically significant after the intervention compared to before the intervention ($p = 0.76$). In addition, in the intraoperative progress report group, a statistically significant decrease in the participants' state anxiety was observed after the intervention compared to before the intervention ($p < 0.001$). However, there was no statistically significant difference in the mean score of trait anxiety in this group after the intervention compared to before the intervention ($p = 0.32$). Moreover, in the control group, results showed that there was a statistically significant increase in the mean of the trait ($p = 0.01$) anxiety in the second measurement compared to the baseline.

3.2.2. Between groups comparison

The results of the comparison of anxiety scores between groups are presented in Table 2. It was observed a statistically significant difference in the mean score of state anxiety among the study groups before the intervention ($p = 0.002$). According to the post hoc test, a statistically significant difference was observed between the video education group and the control group before the intervention (Mean Difference (MD) = 5.41, $p < 0.001$). In addition, there was no statistically significant difference in the level of state anxiety between the study groups after the intervention ($p = 0.12$). Moreover, the results showed that there was a statistically significant difference in the mean score of trait anxiety between the study groups before the intervention ($p = 0.007$). Based on the post hoc test, a statistically significant difference was found in terms of the score of trait anxiety between the video training group and the control group before the intervention (MD = 3.19, $p = 0.007$). Furthermore, there was no statistically significant difference in the level of trait anxiety between the study groups after the intervention ($p = 0.68$).

4. Discussion

The study aimed to examine the effect of video training and intraoperative progress report on family caregivers' anxiety awaiting relatives undergoing surgery. It was found that video training and the intraoperative progress report decreased the state anxiety in family caregivers. However, the interventions did not affect the participants' trait anxiety.

Increased anxiety in family caregivers is an annoying feeling when their relatives undergo surgery. According to the findings of the present study, video training can be relieved family caregivers' state anxiety. The use of technology and media has become more cost-effective and enables healthcare providers to focus on the specific needs and concerns of clients [30]. Kynoch et al.'s study evaluated the effect of a structured communication program on the anxiety of family members when their relatives were undergoing surgery using a quasi-experimental design in a hospital in Australia. The findings showed that structural communication interventions by providing information cards before the patient's scheduled procedure reduced the state anxiety of the participants in the intervention group [22]. In addition, another study suggested that watching a movie can reduce the state anxiety of family members waiting for their relatives' surgery [21].

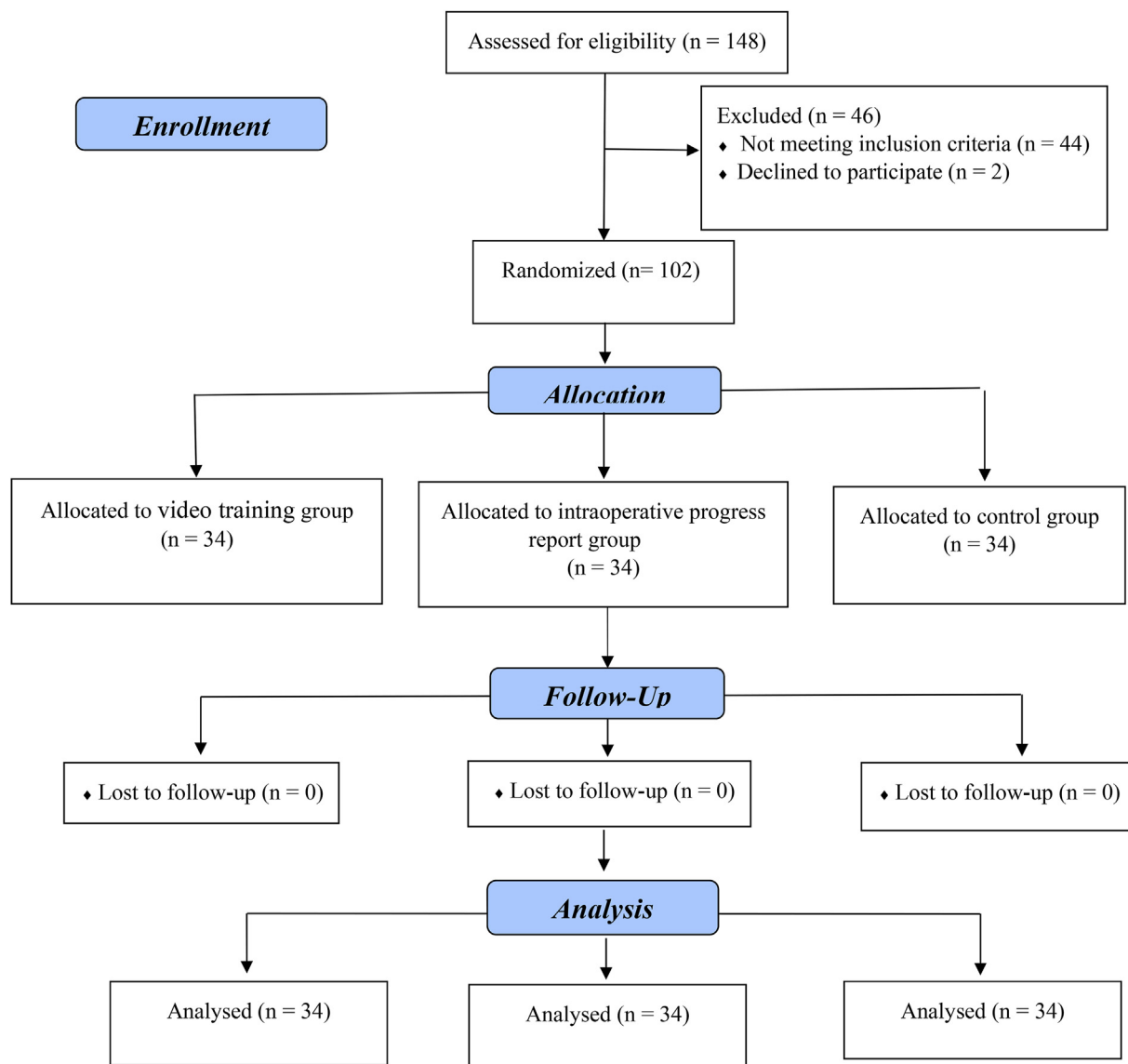


Figure 1. The process of the study according to the CONSORT flow diagram (2010).

The result of this study showed that the participants' state anxiety in the intraoperative progress report group decreased after the intervention. However, there was no difference in the level of trait anxiety in this group after the intervention. Some research confirms our results, for example, in a four-group quasi-experimental study, Leske examined the effect of intraoperative progress reports on anxiety in 200 family members. Groups one, two, three, and four received standard care, in-person progress reports from nurses, attention protocol, and telephone delivery progress reports, respectively. Anxiety scores were lower in the in-person intraoperative progress report group than in the other groups [31]. Likewise, Mi and Vasuki reported that surgical progress reports with Short Message Service (SMS) can reduce the anxiety of the family members during the intra-operative period [32]. In addition, the results of another study showed that providing a family care card can reduce the anxiety of family members while waiting for surgery on their loved ones. The card included information on surgical procedures and estimated time, instructions for relatives during the waiting period, instructions for interaction, and contact phone numbers [8]. Similarly, Joshi and Thatte conducted a quasi-experimental study that examined the effect of intra-operative status information on family members' anxiety using the STAI tool. The results of their study showed that there

was no significant difference between the scores of trait anxiety in the two groups, however, state anxiety in the intervention group was significantly reduced [26].

Our study suggested that both video training and intraoperative progress report for family caregivers help reduce their state anxiety in the waiting room. One of the main reasons for family caregivers' anxiety in the waiting room is their lack of knowledge and information about the surgical process [16]. Accordingly, video training and intraoperative progress report can provide relevant information to the family caregivers. Therefore, it seems that both types of interventions are effective in reducing the state anxiety of family caregivers.

4.1. Limitation

The present study had several limitations. First, the results of the current study cannot be generalized because this study was conducted in two hospitals in an urban area of Iran and participants were family caregivers of patients undergoing elective surgery. Therefore, to replicate the results of the present study, it is suggested to other studies conduct in different contexts and groups. Second, patients included in this study underwent different types of surgery; although there was no statistical

Table 1. Demographic characteristics of study groups.

Variables		Study groups, n (%)			p-value
		Video training (n = 34)	Intraoperative progress report (n = 34)	Control (n = 34)	
Age	Mean (SD)	39.41 (1.88)	38.82 (1.51)	36.50 (1.83)	0.46 ^a
Gender	Female	15 (44.1)	16 (47.1)	20 (58.8)	0.43 ^b
	Male	19 (55.9)	18 (52.9)	14 (41.2)	
Marital status	Single	7 (20.6)	10 (29.4)	11 (32.4)	0.52 ^b
	Married	27 (79.4)	24 (70.6)	23 (67.6)	
Educational level	Under diploma	8 (23.5)	8 (23.5)	7 (20.6)	0.20 ^b
	Diploma	11 (32.4)	8 (23.5)	17 (50)	
	Academic education	14 (44.1)	18 (52.9)	10 (29.4)	
Relationship with patient	Father	3 (8.8)	4 (11.8)	4 (11.8)	0.88 ^c
	Mother	6 (17.7)	5 (14.7)	7 (20.6)	
	Spouse	5 (14.7)	3 (8.8)	4 (11.8)	
	Child	5 (14.7)	9 (26.5)	6 (17.6)	
	Sister or brother	15 (44.1)	13 (38.2)	4 (11.8)	
Type of patient's surgery	ENT and eyes	8 (23.5)	3 (8.8)	6 (17.6)	0.21 ^b
	General surgery	10 (29.4)	14 (41.2)	18 (52.9)	
	Orthopedics	4 (11.8)	7 (20.6)	3 (8.8)	
	Gynecological surgery	8 (23.5)	9 (26.5)	6 (17.6)	
	Urology	4 (11.8)	1 (5.9)	1 (2.9)	

^a One-way ANOVA.^b Chi-squared test.^c Fisher's exact test.**Table 2.** Comparison of anxiety levels in study groups.

Variable	Time	Study groups						p-value
		Video training		Intraoperative progress report		Control		
		Mean (SD)	95% CI	Mean (SD)	95% CI	Mean (SD)	95% CI	
State Anxiety	Before intervention	47.96 (7.44)	45.32, 50.61	45.14 (4.58)	43.54, 46.74	42.41 (6.09)	40.36, 44.45	0.002 ^a
	After intervention	43.00 (4.16)	41.52, 44.47	42.47 (3.68)	41.18, 43.75	42.52 (5.50)	40.61, 44.44	0.12 ^b
	p-value ^c	<0.001		<0.001		0.85		
Trait Anxiety	Before intervention	44.72 (5.01)	42.94, 46.50	44.76 (4.24)	43.28, 46.24	41.52 (4.91)	39.81, 43.24	0.007 ^a
	After intervention	45.06 (6.09)	42.90, 47.22	44.29 (4.82)	42.60, 45.97	42.94 (4.43)	41.39, 44.48	0.68 ^b
	p-value ^c	0.76		0.32		0.01		

^a One-way ANOVA.^b Analysis of Covariance.^c Paired samples t-test.

difference between the three groups in terms of types of surgery, this issue might have a significant effect on the extent of anxiety in family caregivers. Third, due to the nature of the research, blinding was not possible which could lead to biases in the results. Nevertheless, the researchers tried to observe fairness in providing the interventions and during the research.

5. Conclusion

This study found that video training and intraoperative progress report were effective in reducing the state anxiety of family caregivers who awaiting relatives undergoing surgery. Therefore, such methods are recommended to incorporate as part of routine nursing care to reduce the anxiety of family caregivers. In the present study, only the anxiety of family caregivers of patients undergoing elective surgery was examined. Therefore, it is suggested that future research perform similar interventions for family caregivers under non-elective surgery. In addition, it is recommended that future studies focus only on one type of surgery because the types of surgery and severity of the disease have a significant effect on the extent of anxiety in family caregivers.

Declarations

Author contribution statement

Majid Bagheri, Somayeh Rezaie: Conceived and designed the experiments; Performed the experiments; Wrote the paper.

Maryam Maleki, Mohammad Hadi Momen-beromi, Salman Daliri: Analyzed and interpreted the data; Contributed reagents, materials, analysis tools or data; Wrote the paper.

Abbas Mardani: Conceived and designed the experiments; Contributed reagents, materials, analysis tools or data; Wrote the paper.

Funding statement

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

Data availability statement

Data will be made available on request.

Declaration of interest's statement

The authors declare no conflict of interest.

Additional information

The clinical trial described in this paper was registered at Iranian Registry of Clinical Trials website under the registration number IRCT20170816035741N3.

Acknowledgements

The authors appreciate the participants for their sincere cooperation with this study.

References

- [1] A. Mottram, Like a trip to McDonalds': a grounded theory study of patient experiences of day surgery, *Int. J. Nurs. Stud.* 48 (2) (2011) 165–174.
- [2] H. Bagheri, T. Salmani, J. Nourian, S.M. Mirrezaie, A. Abbasi, A. Mardani, et al., The effects of inhalation aromatherapy using lavender essential oil on postoperative pain of inguinal hernia: a randomized controlled trial, *J. PeriAnesthesia Nurs.* 35 (6) (2020) 642–648.
- [3] Y. Lerman, I. Kara, N. Porat, Nurse liaison: the bridge between the perioperative department and patient companions, *AORN J.* 94 (4) (2011) 385–392.
- [4] W.-S. Kim, G.-J. Byeon, B.-J. Song, H.J. Lee, Availability of preoperative anxiety scale as a predictive factor for hemodynamic changes during induction of anesthesia, *Korean J. Anesthesiol.* 58 (4) (2010) 328–333.
- [5] R.G. Ghanei, K. Rezaei, R. Mahmoodi, The relationship between preoperative anxiety and postoperative pain after cesarean section, *Iran. J. Obstet., Gynecol Infertility* 15 (39) (2013) 16–22.
- [6] H.K. Joseph, J. Whitcomb, W. Taylor, Effect of anxiety on individuals and caregivers after coronary artery bypass grafting surgery: a review of the literature, *Dimens. Crit. Care Nurs.* 34 (5) (2015) 285–288.
- [7] F. Legaki, F. Babatsikou, C. Koutis, M. Polikandrioti, State and trait anxiety in islander cardiac patients: associated factors and the impact of perceived social support, *Arch. Med. Sci. Atheroscler. Dis.* 5 (2020) e85–e97.
- [8] M. Muldoon, D. Cheng, N. Vish, S. Dejong, J. Adams, Implementation of an informational card to reduce family members' anxiety, *AORN J.* 94 (3) (2011) 246–253.
- [9] D.R. Trimm, J.T. Sanford, The process of family waiting during surgery, *J. Fam. Nurs.* 16 (4) (2010) 435–461.
- [10] W.A. Wetsch, I. Pircher, W. Lederer, J. Kinzl, C. Traweger, P. Heinz-Erian, et al., Preoperative stress and anxiety in day-care patients and inpatients undergoing fast-track surgery, *Br. J. Anaesth.* 103 (2) (2009) 199–205.
- [11] Z.K. Nekouei, A. Yousefi, G. Manshaee, S. Nikneshan, Comparing anxiety in cardiac patients candidate for angiography with normal population, *ARYA Atheroscler.* 7 (3) (2011) 93.
- [12] P.S. Munk, K. Isaksen, K. Brønneck, M.W. Kurz, N. Butt, A.I. Larsen, Symptoms of anxiety and depression after percutaneous coronary intervention are associated with decreased heart rate variability, impaired endothelial function and increased inflammation, *Int. J. Cardiol.* 158 (1) (2012) 173–176.
- [13] J.S. Leske, Interventions to decrease family anxiety, *Crit. Care Nurse* 22 (6) (2002) 61–65.
- [14] P. Corsano, M. Majorano, V. Vignola, L. Guidotti, G. Izzi, The waiting room as a relational space: young patients and their families' experience in a day hospital, *Child Care Health Dev.* 41 (6) (2015) 1066–1073.
- [15] T. Sadeghi, N. Dehghan Nayeri, A. Abbaszadeh, Iranian families' experience of receiving support during their patients' surgical process: qualitative study, *J. Nurs. Res.* 22 (4) (2014) 268–274.
- [16] R. Azarfarin, Z. Totonchi, M. Babaei, A. Alizadehasl, B. Ghadrdoost, M. Najafikhah, et al., Effectiveness of an "information card" in reducing family members' anxiety in the waiting room during heart surgery and angiographic procedures, *Iran. Heart J.* 19 (2) (2018) 65–70.
- [17] A. Patelarou, E. Melidoniotis, M. Sgouraki, M. Karatzi, X. Souvatzis, The effect of visiting surgical patients in the postanesthesia care unit on family members' anxiety: a prospective quasi-experimental study, *J. PeriAnesthesia Nurs.* 29 (3) (2014) 221–229.
- [18] J. Munday, K. Kynoch, S. Hines, The effectiveness of information-sharing interventions as a means to reduce anxiety in families waiting for surgical patients undergoing an elective surgical procedure: a systematic review protocol, *JBI Database Syst. Rev. Implementation Rep.* 11 (7) (2013) 283–298.
- [19] E. Ghadiri, M. Shahriari, J. Maghsoudi, The effects of peer-led education on anxiety of the family caregivers of patients undergoing coronary artery bypass surgery (CABG) in Shahid Chamran center Isfahan University of Medical Sciences, *Iran. J. Psychiatric Nurs.* 4 (2) (2016) 50–56.
- [20] K.A. Stefan, The nurse liaison in perioperative services: a family-centered approach, *AORN J.* 92 (2) (2010) 150–157.
- [21] S. Mojdeh, M. Zamani, A.M. Kooshki, N. Jafari, Effect of watching a movie on family members' anxiety level during their relatives' surgery, *Iran. J. Nurs. Midwifery Res.* 18 (4) (2013) 329.
- [22] K. Kynoch, L. Crowe, A. McArdle, J. Munday, C. Cabilan, S. Hines, Structured communication intervention to reduce anxiety of family members waiting for relatives undergoing surgical procedures, *ACORN* 30 (1) (2017) 29.
- [23] L. Hamester, ENd Souza, C. Cielo, M.A. Moraes, L.C. Pellanda, Effectiveness of a nursing intervention in decreasing the anxiety levels of family members of patients undergoing cardiac surgery: a randomized clinical trial, *Rev. Latino-Am. Enferm.* 24 (2016).
- [24] L.L. Barnes, D. Harp, W.S. Jung, Reliability generalization of scores on the Spielberger state-trait anxiety inventory, *Educ. Psychol. Meas.* 62 (4) (2002) 603–618.
- [25] R. Ferreira, J. Murray, Spielberger's State-Trait Anxiety Inventory: measuring anxiety with and without an audience during performance on a stabilometer, *Percept. Mot. Skills* 57 (1) (1983) 15–18.
- [26] B.S. Joshi, M.D. Thatte, Effect of Providing "Intra-operative Status Information" on Family Members' Anxiety, 2021, pp. 1–16.
- [27] T.M. Marteau, H. Bekker, The development of a six-item short-form of the state scale of the Spielberger State—trait Anxiety Inventory (STAI), *Br. J. Clin. Psychol.* 31 (3) (1992) 301–306.
- [28] N. Abdoli, V. Farnia, S. Salemi, O. Davarnejad, T.A. Jouybari, M. Khanegi, et al., Reliability and validity of Persian version of state-trait anxiety inventory among high school students, *East Asian Arch. Psychiatry* 30 (2) (2020) 44–47.
- [29] S.J. Mianaei, F.A. Karahroudy, M. Rassouli, M.Z. Tafreshi, The effect of Creating Opportunities for Parent Empowerment program on maternal stress, anxiety, and participation in NICU wards in Iran, *Iran. J. Nurs. Midwifery Res.* 19 (1) (2014) 94.
- [30] S. Tou, W. Tou, D. Mah, A. Karatassas, P. Hewett, Effect of preoperative two-dimensional animation information on perioperative anxiety and knowledge retention in patients undergoing bowel surgery: a randomized pilot study, *Colorectal Dis.* 15 (5) (2013) e256–e265.
- [31] J.S. Leske, Intraoperative progress reports decrease family members' anxiety, *AORN J.* 64 (3) (1996) 424–436.
- [32] K.J. Mi, R. Vasuki, The effects of providing surgical progress information using SMS on satisfaction of nursing needs and state anxiety of the patients' family, *IOSR J. Nurs. Health Sci.* VI 6 (2) (2017) 48–56.