Original Article

The Effect of Informing Patient Relatives with a Short Message on Anxiety Levels during Cardiovascular Surgery in Türkiye: A Randomized Controlled Trial

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Abstract

Background: Surgical procedures cause a certain level of anxiety in the relatives of the patients, it has been observed that heart surgeries cause more anxiety. **Aim:** To determine the effects of informing patients' relatives with short messages on anxiety levels during cardiovascular surgery. **Methods:** The study was conducted as a randomized controlled research investigation from October 1, 2015, to December 31, 2022, at the cardiovascular surgery operating room of a university hospital and included 84 patient relatives (42 experimental and 42 control group). The Patient Relatives Information Form and the State and Trait Anxiety Inventory were used to collect the study data. The patients' relatives in the experimental group were informed by short messages (preparations for surgery have begun, your relative's surgery has started, your relative's surgery is still ongoing, and your relative's surgery is completed) during the surgery. State Anxiety Inventory was re-administered to all patients' relatives after cardiovascular surgery. The study was registered with ClinicalTrials.gov (NCT05157789). **Results:** It was found that the postoperative State Anxiety Inventory score of the experimental group was significantly lower than that of the control group ($P < 0.001$). The difference between preoperative and postoperative state anxiety scores was significantly higher in the experimental group ($P < 0.001$). **Conclusion:** Informing the patients' relatives with a short message during cardiovascular surgery significantly reduced the level of anxiety.

Keywords: *Anxiety, cardiovascular surgery, information, relatives, short messages*

Received: 16-Aug-2023;
Revision: 25-Mar-2024;
Accepted: 15-Apr-2024;
Published: 29-Jun-2024

Introduction

Surgical interventions pose a significant concern for both patients and their relatives.[1] Relatives of patients experience anxiety during surgery because of the fear of losing their loved ones, the uncertainty of the result of the surgery, emotional turmoil, financial concerns, disruption of daily work, and the unusual hospital environment.[2]

Although all surgical procedures cause some certain level of anxiety in the relatives of patients, it has been reported in previous studies that cardiac surgeries cause more anxiety.[3] The fact that cardiovascular diseases are among the leading causes of mortality in every age group from fetal life to adulthood, anesthesia during surgery, the thought of intervention on the heart, the uncertainty experienced during surgery, and the possibility of losing the patient increase the anxiety of relatives.[2,4,5] During cardiac surgeries, prolonged surgery time increases mortality and morbidity, and therefore, the anxiety level of patient relatives is also affected.[6]

For patient relatives, the most anxious times are when their loved ones are in surgery and when they are

Access this article online

Quick Response Code:

Website: www.njcponline.com

DOI: 10.4103/njcp.njcp_607_23

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How to cite this article: Şişman Ç, Diğin F. The effect of informing patient relatives with a short message on anxiety levels during cardiovascular surgery in Türkiye: A randomized controlled trial. Niger J Clin Pract 2024;27:708-15.

waiting in the waiting room to receive information about their patient's condition. In this process, generally, patient relatives are not informed about the delays in the surgical process, the surgery process, the incision time, and the end time of the surgery.[2,7] Relatives of patients who are separated from their loved ones during surgery face distress, helplessness, restlessness, fear, anxiety, loneliness, and disappointment.[8] Trimm and Sanford reported that stress and anxiety increased in the relatives of patients while their patients were in the surgery room, which can cause psychological and physical reactions.[9] It is very important to inform the relatives of patients during the surgical intervention to maintain a reasonable level of anxiety (2,7). Providing information is part of healthcare. The purpose of providing information during surgery is to reduce the anxiety of patients' relatives and protect and improve their health.[10]

It is recommended to use different information methods to reduce the anxiety of patients' relatives in waiting rooms.[11-13] Previous studies show that using information screens and intraoperative progress reports during surgery and the use of information, telephone, or text messages reduced the uncertainty and anxiety of the relatives of patients during the surgery.[2,7,13-16] Sending short SMS over human interaction is inexpensive and less time-consuming, can be automated, and requires less human skills. Also, sending short SMS does not require face-to-face communication. Individuals can read the text messages they receive at any time. Quick access to large audiences can be achieved with a single short message.[7,12] The purpose of the present study was to determine the effects of informing patient relatives with short messages on anxiety levels during cardiovascular surgery.

Methods

Study design and sample

The randomized controlled study was conducted with the relatives of 84 patients who underwent surgery in the cardiovascular surgery room of a university hospital between October 2021 and December 2022. The population of the study consisted of the relatives of the patients who were hospitalized in the cardiovascular surgery clinic of the university hospital and who would undergo elective cardiac surgery. The relatives of patients, who volunteered to participate in the study, who accepted randomization, who were able to communicate in Turkish, who had cognitive proficiency, who had a personal mobile phone, who could read text messages, and who were waiting in the hospital before, during and after the surgery were included in the sample. One patient relative was included in the study for each patient. The relatives of patients who did not wait in the surgery room during the surgery were not included in the study.

G-power sample size software was used to calculate the sample. Considering the change in state anxiety scale scores in the experimental and control groups in Baydemir's[16] study, it was calculated that there was a large effect size difference. Based on this, to test a large effect size (d = 0.8) difference in anxiety scale scores of patient relatives between our experimental and control groups, with a 5% margin of error and 95% power, it was found that 84 patients' relatives (42 in each group) should be included in the study.

Randomization

The study was conducted with 84 patients' relatives (42 in the experimental group and 42 in the control group). A lottery method was used in the study for the random selection of the relatives of the patients in the experimental and control groups (heads or tails: those with heads to the experiment and those who came to the experiment) were used to ensure randomization. When one group attained the required number of participants (n = 42), the coin toss was repeated until the other group reached the predetermined size. The research was completed with 84 volunteer relatives.

Data collection tools

The Patient Relatives Information Form, the State and Trait Anxiety Inventory, and the Short Message Notification Tracking Form were used to collect the study data.

The Patient Relatives Information Form: There were 17 questions (age, gender, education level, working status, profession, marital status, place of residence, income status, relation to the patient, living with the patient, having another person who needs care at home while in the hospital, being adversely affected by the accompanying person, having a treated disease, previous surgery experience, previous experience of waiting for a patient in the surgery, having information about the surgery, and telephone number) concerning the patient relatives in the form developed by the researcher in accordance with the literature.[4,16-18]

State and Trait Anxiety Inventory: The scale was developed by Spielberger *et al*.[19] in 1970 and adapted into Turkish by Öner and Le Compte in 1983.[20] The State and Trait Anxiety Inventory consists of two separate scales with 20 questions each. The scale is a 4-point Likert type. The 20-item State Anxiety Inventory (SAI) is a very sensitive tool for evaluating sudden changes in emotional reactions and provides information only about what is felt at that moment. The

lowest score obtained on the SAI is 20 and the highest score is 80.[20] The Trait Anxiety Inventory (TAI), which consists of 20 items, aims to measure the continuity of the anxiety that the person tends to experience in general. The lowest score obtained on the TAI is 20 and the highest score is 80.[20] In the Turkish version, Cronbach's alpha value was found to be between 0.83 and 0.92 for SAI and between 0.83 and 0.87 for TAI.[21] In the present study, the preoperative trait anxiety scale, preoperative state anxiety scale, and postoperative state anxiety scale Cronbach's alpha values were found to be 0.879, 0.941, and 0.950, respectively.

Blinding procedure

In the study, the researcher who sent short messages to the relatives of the patients knew the group distribution of the relatives of the patients. The researcher and the relatives of the patients who were informed by short message could not be blinded due to the nature of the study. The data were encoded in the form of "Sample 1" and "Sample 2" by the researcher and passed to the computer. The encoded data were then evaluated by an independent statistician.

Data collection

The data were collected in the waiting room by the researcher (operating room nurse). The waiting room is closed. There is an electronic patient follow-up screen in the waiting room. An information text is shared on the patient follow-up screen only when the patient enters the operating room and when the patient leaves the operating room. There is no system for music, movies, or television. Patient relatives wait by sitting on the couches. Patient relatives do not get to interact with the hospital personnel. Coronary artery bypass graft surgeries, valve replacement surgeries, and valve stenosis surgeries are performed at the hospital. Heart surgery operations take an average of 3 to 4 h. Although the risk of surgery varies depending on the patient's physiological condition, no patients at high risk were encountered in the study.

When the patient's relatives and the patient were waiting together in the surgery waiting room before the surgery. The Patient Relatives Information Form was applied to the patient's relatives with the face-to-face interview method by the researcher.

The Preoperative State-Trait Anxiety Inventory was asked to be filled by patients' relatives (experimental and control groups) until the patients left the waiting room and arrived at the surgery room.

Intervention

The researcher went to the operating room and sent the first SMS according to the patient's surgery preparation status [Figure 1]. During the surgery, four short messages were sent to patients' relatives in the experimental group by the researcher (operating room nurse) at times appropriate to the content of the message [Figure 1]. It was stated that the short messages sent were one-way, and the relatives of the patients were asked not to reply and even if a message was sent back, it would not be answered by the researcher. SMS sending intervals were proportional to the duration of surgery. The third SMS was sent after the first half of the surgery period was completed, depending on the type and process of the surgery. To determine the effects of informing through short messages, the experimental group was asked to fill in the SAI again after the last message was sent to the patient's relatives, which was after the patient was taken to the recovery room [Figure 2]. Before the postoperative SAI was administered, it was verbally confirmed whether the patient's relatives had received the text messages.

No interventions were made to the relatives of the patients in the control group in the study other than the routine practice of the institution. There is a patient follow-up screen in the waiting room. As a routine practice, information text is shared on the patient follow-up screen only when the patient enters the operating room and when the patient leaves the operating room. When the patient was taken to the follow-up room after the surgery, the control group patient relatives were asked to fill in the SAI again [Figure 2].

The TAI scale was applied before surgery to determine whether the patient's relatives were generally anxious because of the possibility of affecting the effectiveness of SMS notification. In this way, it was determined that the trait anxiety levels of the patient relatives in the experimental and control groups were similar. Because trait anxiety was expected to be stable and not change, it was not measured again in the postoperative period. Data collection took an average of 15 min to fill out the data collection tools used in the study. Multiple surgeries were performed at the same time. There were two waiting rooms with the same physical conditions in the operating room. In the study, patients' relatives in the experimental and control groups were allowed to wait in separate waiting rooms to prevent them from communicating with each other.

Ethical considerations

The study was registered with ClinicalTrials.gov (NCT05157789). The Declaration of Helsinki, Good Clinical Practice Guidelines, and the local Ethics Committee requirements were taken into account during the study process. Written permission was obtained from the Ethics Committee 2021/PR0352R0 and 09/20) and

the university hospital management. Before the study, the relatives of the patients were informed about the study, and written, informed consent was obtained.

Statistical analysis

The results for quantitative data are presented as mean ± standard deviation and as number (%) for the categorical data. The conformity of the quantitative data to the normal distribution was examined with the Shapiro–Wilk test. The Chi-square tests (Pearson's Chi-square test, Yates Chi-square test) were used to compare the categorical data between the groups. Mann–Whitney *U* test was used to compare the average ages between groups. The Wilcoxon sign test was used to compare preoperative and postoperative SAI scores within groups. Mann–Whitney U test was used to compare preoperative and postoperative SAI scores between groups. Differences in SAI scores before and after the surgery were compared with the Mann–Whitney U test. Student's *t*-test was used for comparing between groups' preoperative TAI scores. The SPSS 20.0 Statistical Package Program was used in the analysis of the data. A value of $P < 0.05$ was accepted as the cut-off value of statistical significance.

Figure 1: Short Message Notification Tracking Form

	SMS Order
1. SMS	Dear patient relative, your relative has been taken to the surgery room. Preparations for surgery have begun.
2. SMS	Dear patient relative, your relative's surgery has started.
3. SMS	Dear patient relative, your relative's surgery is still ongoing.
4. SMS	Dear patient relative, your relative's surgery is completed. We wish him/her a speedy recovery and healthy days.

Results

Among the experimental and control group patients' relatives, no significant differences were detected in terms of age, gender, educational level, employment status, marital status, occupation, place of residence, income status, living with the patient, the person who was in need of care, being adversely affected by the accompanying person, the disease being treated, the experience of undergoing surgery, during the surgery, waiting experience, having information about the surgery, and relation to the patient ($P > 0.05$) [Table 1].

Although no differences were detected in the preoperative SAI scores between the experimental and control groups ($P = 0.084$), the SAI score of the postoperative experimental group was significantly lower than the control group ($P < 0.001$). The difference between preoperative SAI and postoperative SAI scores was significantly higher in the experimental group ($P < 0.001$). No significant differences were detected between the experimental and control groups in preoperative TAI scores ($P = 0.457$). Although a significant decrease was detected in the SAI score after the surgery in the experimental group compared to the preoperative period ($P < 0.001$), the postoperative change was not significant in the control group compared to the preoperative period ($P = 0.750$). It was determined that there was a clinically significant effect size between the groups' preoperative ($r = -0.182$), postoperative ($r = -0.485$), and preoperative and postoperative SAI score difference ($r = -0.485$) [Table 2].

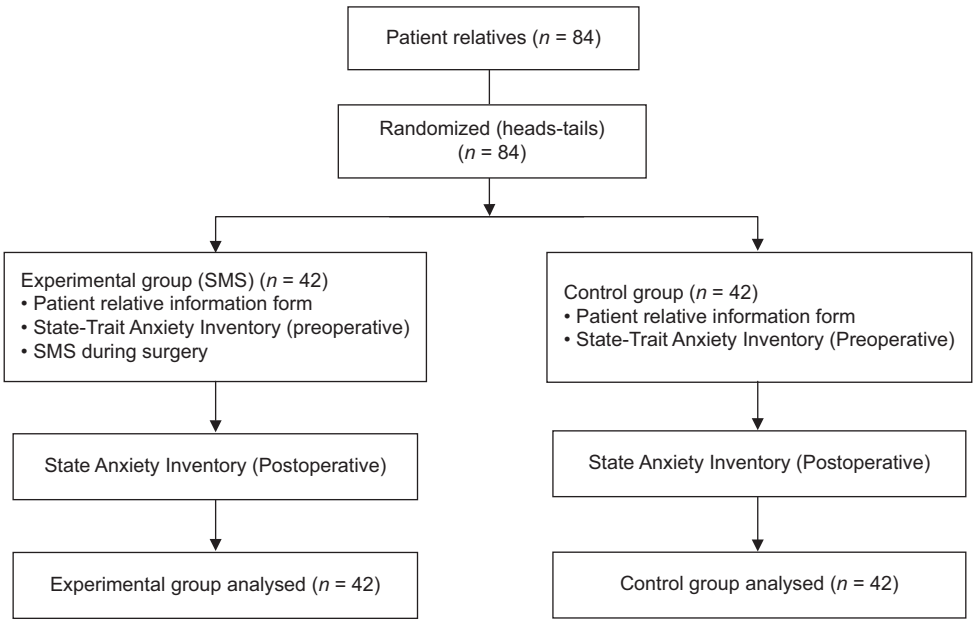

Figure 2: Diagram of study

Table 1: Comparison of descriptive characteristics of patients' relatives

	Experimental group (*n*=42)	Control Group (*n*=42)	*P*
Age	44.4±12.3	48.6±13.0	0.194[a]
Gender			
Female	33 (78.6%)	29 (69.0%)	0.457[b]
Male	9 (21.4%)	13 (31.0%)	
Educational status			
Primary school	16 (38.1%)	21 (50.0%)	0.469[c]
High school	14 (33.3%)	13 (31.0%)	
Undergraduate/Graduate	12 (28.6%)	8 (19.0%)	
Employment status			
Working	17 (40.5%)	9 (21.4%)	0.099[b]
Not working	25 (59.5%)	33 (78.6%)	
Marital status			
Married	36 (85.7%)	38 (90.5%)	0.738[b]
Single	6 (14.3%)	4 (9.5%)	
The profession of the patient's relatives			
Housewife	22 (52.4%)	23 (54.8%)	0.837[c]
Officer	4 (9.5%)	4 (9.5%)	
Employee	4 (9.5%)	6 (14.3%)	
Other	12 (28.6%)	9 (21.4%)	
The place where the patients' relatives live			
Province	30 (71.4%)	23 (54.8%)	
District	12 (28.6%)	18 (42.9%)	
village/town	0 (0%)	1 (2.4%)	
Income status			
Income less than expenses	6 (14.3%)	5 (11.9%)	0.840[c]
Income equals expense	33 (78.6%)	35 (83.3%)	
Income more than expenses	3 (7.1%)	2 (4.8%)	
Living with the patient			
Yes	30 (71.4%)	31 (73.8%)	1,000[b]
No	12 (28.6%)	11 (26.2%)	
The person who is in need of care			
Yes	19 (45.2%)	18 (42.9%)	1,000[b]
No	23 (54.8%)	24 (57.1%)	
The state of being adversely affected by companionship			
Yes	11 (26.2%)	9 (21.4%)	0.798[b]
No	31 (73.8%)	33 (78.6%)	
Presence of disease			
Yes	11 (26.2%)	12 (28.6%)	1,000[b]
No	31 (73.8%)	30 (71.4%)	
Surgery experience			
Yes	23 (54.8%)	23 (54.8%)	1,000[b]
No	19 (45.2%)	19 (45.2%)	
Experience of waiting during the surgery			
Yes	30 (71.4%)	31 (73.8%)	1,000[b]
No	12 (28.6%)	11 (26.2%)	
Having information about the surgery			
Yes	32 (76.2%)	25 (59.5%)	0.161[b]
No	10 (23.8%)	17 (40.5%)	
Relation to the patient			
Brother	1 (2.4%)	0 (0%)	
Mother	10 (23.8%)	9 (21.4%)	
Friend	0 (0%)	2 (4.8%)	
Father	0 (0%)	3 (7.1%)	

Contd...

Table 1: Contd...

	Experimental group (*n*=42)	Control Group (*n*=42)	*P*
Brother-in-law	0 (0%)	1 (2.4%)	
Partner	15 (35.7%)	17 (40.5%)	
Bride	1 (2.4%)	0 (0%)	
Brother	0 (0%)	2 (4.8%)	
Daughter	8 (19.0%)	3 (7.1%)	
Sitter	0 (0%)	1 (2.4%)	
Cousin	2 (4.8%)	0 (0%)	
Son	5 (11.9%)	3 (7.1%)	
Grandchild	0 (0%)	1 (2.4%)	

[a]Mann Whitney *U*-Test, [b]Yates Chi-Square Test, [c]Pearson's Chi-Square Test

Table 2: The comparison of State and Trait Anxiety Scale scores of the patient's relatives

	Experimental group (*n*=42)	Control Group (*n*=42)	*P*	*r*
SAI score				
Before the surgery	49.7±12.8	45.2±11.1	0.084[b]	-0.182
After the surgery	38.4±9.8	45.5±9.9	<0.001[b]	-0.485
P[c]	<0.001	0.750		
Difference in SAI score before and after the surgery	14.3±13.5	0.3±12.4	<0.001[b]	-0.485
Preoperative TAI score	39.6±7.4	38.2±9.4	0.457[a]	

r: effect size, [a]Student's *t*-test, [b]Mann Whitney *U*-test, [c]Wilcoxon's sign test

Discussion

Receiving information about their relatives' situation is reassuring and calming.[15,16] It is stated that information can be provided through different technological methods to reduce anxiety.[12]

In the present study, no significant differences were detected between the experimental and control groups in the preoperative TAI scores. Although no difference was detected in the preoperative SAI scores between the experimental and control groups, it was found that the postoperative SAI score of the experimental group was significantly lower than the control group. The difference between preoperative SAI and postoperative SAI scores was significantly higher in the experimental group.

Poudel *et al*.[18] investigated the effects of text messages sent to the relatives of patients undergoing major musculoskeletal tumor surgery during surgery on reducing the level of anxiety and found that anxiety was significantly less in the group that received short message service notifications, similar to this study. In the study conducted by Howe *et al*.,[17] information was given three times during the surgical intervention on the surgical incision, the information that the critical part of the surgery was over, and the information that the surgery was finally over. It was determined that information reduced the level of anxiety in the family members of the experimental group. In their study, in which Mignault *et al*.[8] informed the relatives of the loved ones of their patients who were in surgery by text messages, they found that the anxiety of the relatives of the patients who were informed about the process in the surgery room was greatly reduced. In a study conducted to evaluate the effectiveness of informing parents with text messages in reducing the level of parental anxiety during posterior spinal fusion surgery, Kwan *et al*.[13] determined that the anxiety levels of parents who received text messages were similarly lower than those of parents who did not receive text messages. In another study investigating the effects of informing by text message on the anxiety and satisfaction levels of patient's relatives in elective and emergency surgical procedures, similar to this study, it was found that the mean score of anxiety after messages was significantly lower in the intervention group than in the control group.[22] Baydemir[16] reported that informing the relatives of patients through text messages during orthopedic surgery reduced the anxiety levels of the patient relatives and increased the level of satisfaction.

Similar to previous studies,[13,16,18] this study also found that informing the relatives of the patients by text messages during surgery was effective in reducing anxiety. Short messages reduced uncertainty regarding the operation procedure and were successful in reducing the patients' relatives'anxiety.

In other studies conducted on the concerns of patients' relatives, video training and intraoperative progress reports were found to reduce the anxiety of the relatives of the patients who were waiting for their relatives who had surgery.[2] It was reported by

Azarfarin *et al*.[23] that informing family members with an information card in the waiting room during cardiac surgery and angiographic procedures reduced the level of anxiety. In another study, it was reported that the communication between the relatives of patients and the surgery room nurse during surgery reduced the anxiety levels of the relatives of patients.[11] The results of the study showed that information provision reduces anxiety, and informing the relatives of patients during surgery with different communication methods reduces anxiety.

Limitations

There are some limitations in the research. One of the limitations is the inability to control possible delays of messages. Another limitation is that the sample of the research consists only of volunteer patient relatives. Evaluating the preoperative anxiety levels after the patient was sent to the operating room was a limitation. Also using a lottery method of a coin for randomization of equal participants was another limitation of the research.

Conclusion and Recommendations

This study showed that informing the relatives of patients by text messages during cardiovascular surgery reduced the level of anxiety. Therefore, it is recommended to inform the relatives of patients with short messages during surgery, develop information content and methods, and inform the relatives of different surgical patients who are scheduled to undergo surgery. Surgical nurses should take an active role in initiatives to reduce the anxiety of patients' relatives in the waiting room during surgery.

Acknowledgments

The authors would like to thank the patients' relatives who participated in this study for their support.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

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