

Effects of Nurse-Led Intervention on Patients' Anxiety and Sleep Before Coronary Artery Bypass Grafting

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The aim of this study to examine the effects of supportive-educational nurse-led intervention on the patients' anxiety and sleep before the coronary artery bypass grafting. The current clinical trial recruited 160 patients (N = 160) waiting for the coronary artery bypass grafting by random block sampling and divided them into two 80-people experimental and control groups. Spielberger's State Anxiety Inventory was completed on the first day. The Groningen's Sleep Quality Index was also completed by the patients on the day of surgery. Data were analyzed in SPSS software version 16, using descriptive and inferential statistics tests. The mean anxiety score in the experimental group decreased to 48.39, whereas in the control group, the mean anxiety score saw a rise after the intervention (61.09). The comparison of the mean quality of sleep the night before the surgery for both groups showed that sleep in the control group compared with sleep in the experimental group had a lower quality, and statistically, it was significant ($P < .001$). Results showed that non-pharmacological and supportive interventions can reduce patients' anxiety and sleep disturbance before the coronary artery bypass grafting. According to the results, nonpharmacological therapies should be placed at the top of nurses' tasks. **Key words:** *anxiety, coronary artery bypass grafting, nursing, sleep*

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TODAY, coronary heart disease (CHD) is one of the major concerns of the World Health Organization and is considered the leading cause of death and disability in advanced countries.¹ According to a report by the World Health Organization in 2011, of the 17.3 million deaths in 2008, 7.3 million were due to CHD.²

Medical and surgical methods are used to treat CHD. In most cases, the coronary artery bypass grafting (CABG) is the option by the treatment team.³ Coronary artery bypass grafting is common in advanced countries as more than 5 150 000 cases^{4,5} of CABG are performed in the United States and 17 000 cases in Australia. In Iran, 60% of open-heart surgical procedures are CABG.⁶

In fact, CABG is known as a relatively common procedure for relieving from angina symptoms and has been proven to reduce mortality rate; however, despite these facts, fear and anxiety among patients waiting for CABG are undeniable.⁷ Fear, anxiety, and depression decrease the quality of life and health of patients undergoing CABG during the treatment period.⁸ Most patients experience various degrees of fear and anxiety before CABG.^{9,10}

Furthermore, hospitalization creates fear in patients because of leaving home and family, the nature of the hospital environment, communication with nurses, and nature of the disease and its threats.^{11,12} Anxiety is less focused in comparison to depression in patients with CHD. However, new findings reveal that anxiety is associated with increased risk of mortality and complications, regardless of the severity of the illness, depression, and health behaviors.^{13,14} Meantime, mood swings and stress disorder not only result in increased fatigue and boredom through affecting physiological conditions such as hypertension, arterial injury, arrhythmia, platelet response, increased proinflammatory factors, and exacerbation of pain but also lead to the social isolation of the individual.¹⁵

Arthur et al¹⁵ maintain that most patients experience uncertainty and fear from waiting

for the CABG more than chest pain. Anxiety has a direct impact on the immune system and the healing process after the surgery,¹⁶ thus affecting quality of life.¹⁷

Luttik et al¹⁷ reported that 26% of cardiac patients have degrees of depression and 42% of patients suffer from anxiety. Meanwhile, Heikkilä et al¹⁸ revealed that 20% of the patients experienced fear of the heart surgery. Fear of mistakes during the surgery,¹⁹ of consequences,²⁰ and poor control during the operation¹⁹ are factors affecting anxiety.²¹ Preoperative high anxiety can significantly raise mortality rate 4 years after the surgery.²²

Wolsko et al²³ investigated nonpharmacological methods in the United States. The results suggest that relaxation is often used as a common treatment for such issues as pains, hypertension, and fatigue. A review of relaxation interventions before the operation in patients indicates the efficacy of simple practices such as deep breathing²⁴ for improving postoperation outcomes. Mind-centered attitudes including adjusting lifestyle and reducing stress have been known as positive effects on cardiovascular diseases. Accordingly, the Columbia-Presbyterian Medical Center in the United States uses a range of techniques for reducing stress in patients awaiting surgery.²⁵ These methods consist of music therapy, hypnosis therapy, Yoga, and massage, and the results were found to be positive.

Based on the available studies and the researcher's experience in regard to high levels of anxiety and also inappropriate sleep on the night before CABG, and considering that only anxiety before the surgery has been addressed in Iran, little attention has been paid to the sleep on the night before the surgery; also, since most researchers have been concerned with the educational intervention and measurement of its effects on the patient's anxiety level and that the nurse's effective communication role, their supportive care, and the application of stress-reducing methods along with education have been less focused, the research team decided to investigate the supportive-educational

nurse-led interventions on the anxiety and sleep of patients waiting for the CABG.

METHODS

This randomized clinical trial recruited patients with CHD awaiting CABG in cardiac surgery and intensive care units of Imam Khomeini and Shariati hospitals affiliated to Tehran University of Medical Sciences in 2015.

The sample volume was calculated as 72 (71.2) people based on the findings of a similar article²⁶ and with confidence interval of 95% and test power of 80% and using the following formula, but it increased to 80 people taking into account a possible sample loss of 10% in each group. A total of 160 people were examined.

The subjects were selected by random block sampling. Then, the researcher went to the heart surgery and intensive care units of the respective hospitals, selected the samples based on study inclusion criteria using convenience sampling. The researcher introduced themselves, explained about the study, and if the subjects consented to participate, an informed consent form was obtained. Since there were experimental and control groups, the assignment of samples to each group was performed in a random block form. The starting block of the study was selected by drawing lots: the first block was considered the experimental group, and after 10 subjects were selected, the sampling continued for the control group, and this process continued alternately until reaching the sample size intended for each group. Simultaneously with sampling in hospital A, sampling in hospital B was conducted in reverse.

Inclusion criteria comprised presence in the nonemergency and elective CABG list, experiencing heart surgery for the first time, the ability to understand Persian, no history of sleep disorders before hospitalization, no diagnosed anxiety and psychological disorders, and nonsimultaneous CABG and valve replacement or other surgical proce-

dures. The patients who decided to withdraw, had acute hemodynamic problems, or their surgery was canceled were excluded from the study.

Spielberger's State Anxiety Inventory (SSAI) and Groningen's Sleep Quality Scale (GSQS) were used to collect data. A demographic form was used to record data about age, gender, education level, marital status, employment status, kind of insurance coverage, smoking, and its duration. Spielberger's State Anxiety Inventory was used to measure participants' situational anxiety in both experimental and control groups on the day of admission and on the night before the surgery. Spielberger's State Anxiety Inventory consists of 20 items and its score ranges from 20 to 80. Higher score indicates severer anxiety: 20 to 31 indicates mild anxiety, 32 to 42 mild to moderate anxiety, 43 to 53 moderate to high anxiety, 54 to 64 almost severe, 65 to 75 severe, and 75 extremely severe anxiety.

Sleep quality was also measured in both groups by GSQS on the second day of admission before the surgery. Groningen's Sleep Quality Scale is a self-administered instrument that measures sleep quality the night before the surgery. Its internal reliability was calculated as 0.88 using Cronbach α . Groningen's Sleep Quality Scale consists of 14 items in the form of 11 negative statements and 3 positive statements. Scoring is reverse such that positive answers score zero in statements 7, 9, and 11, and 1 in the remaining statements. Higher score indicates poorer sleep quality such that scores 0 to 2 indicate good sleep and scores more than 6 indicate disturbed and insufficient sleep.

The internal reliability of GSQS was calculated as 0.89 using Cronbach α in 30 Iranian samples. Kuder-Richardson method was used to determine the sample size. Kalhoran and Karimollahi reported the reliability and validity of the SSAI²⁷ 0.93 using Cronbach α in Iran.²⁸

Eligible samples were selected and briefed on the study objectives. If patients consented to take part in the study, they signed informed

consent forms and filled out demographic data form. Then, based on their placement in the experimental or control group via draw, SSAI was completed on their first day of admission. Given the fact that CABG patients are hospitalized at least 2 days before the surgery, the researcher performed the intervention for at least 2 consecutive days at 4 to 6 PM in the intervention group. The first day supportive-educational intervention included (1) the establishment of communication between the researcher nurse and the patients; (2) an overall explanation of the procedure; (3) encouragement of the patient to speak about anxiety, fear, and its causes and correcting patients' misconceptions, and (4) introduction of stress management methods of Benson's relaxation, deep breathing, guided imagery, repetition of prayers, and practicing of preferred stress management methods (to make sure that the patient has properly learnt).

On the second day, while reviewing the subjects in the first session, the patients were encouraged to introduce issues obsessing their mind; the researcher answered their questions. Then the selected stress management method was practiced by the patients, and they were advised to use this method before sleep. The duration of each intervention session was about 45 to 60 minutes, which was adjusted on the basis of the patient's needs. Both the experimental group and the control group received routine care including medications and controlling hemodynamic status of patients. Patients in both experimental and control groups filled SSAI the night before the surgery and GSQS on the day of surgery. The Figure shows the procedure.

Data were analyzed in SPSS version 16. Descriptive statistics such as absolute frequency distribution tables, relative frequency percentage, distribution of central indices and dispersion index were used to classify and summarize the findings. Inferential statistics such as *Mann-Whitney U*, χ^2 , *independent t*, and *paired t* tests were used to reach the research goals.

RESULTS

Patients' mean age was 64.79 ± 6.25 years in the experimental group and 64.25 ± 7.75 years in the control group. The 2 groups were matched in terms of demographic characteristics (Table 1).

The mean score of anxiety was 51.82 in the control group before the intervention, indicating high anxiety, while the mean score of anxiety was severe (58.22) in the experimental group. These findings showed that the mean score of anxiety was significantly higher in the experimental group than that in the control group ($P < .001$, percentage change = 12.5). Furthermore, the mean score of anxiety was 61.9 (severe) in the control group after the intervention, whereas the mean score of anxiety reduced to 48.39 (moderate) in the experimental group after the intervention. Therefore, there was a statistically significant difference between the control and experimental groups in terms of the mean anxiety after the intervention ($P < .001$, percentage change = -20.78). Paired *t* and χ^2 test results revealed a statistically significant difference in the control group in terms of the mean anxiety before and after the intervention, which increased by 17.88%. Furthermore, based on paired *t* and χ^2 test results, there was a statistically significant difference in the experimental group in terms of the mean anxiety before and after the intervention. This difference with a percentage change of -16.88 indicated reduced anxiety in the experimental group after the intervention.

Furthermore, 1.2% of people in the control group stated that they had a good sleep on the night before the surgery and 98.8% had a poor sleep. To the contrary, 68.8% of people in the experimental group reported a good sleep while 31.1% said that they had a poor sleep on the night before the surgery. Therefore, the mean score of sleep quality was 10.76 ± 1.27 in the control group and 4.6 ± 5.50 in the experimental group. According to the *Mann-Whitney U* and χ^2 tests, there was a

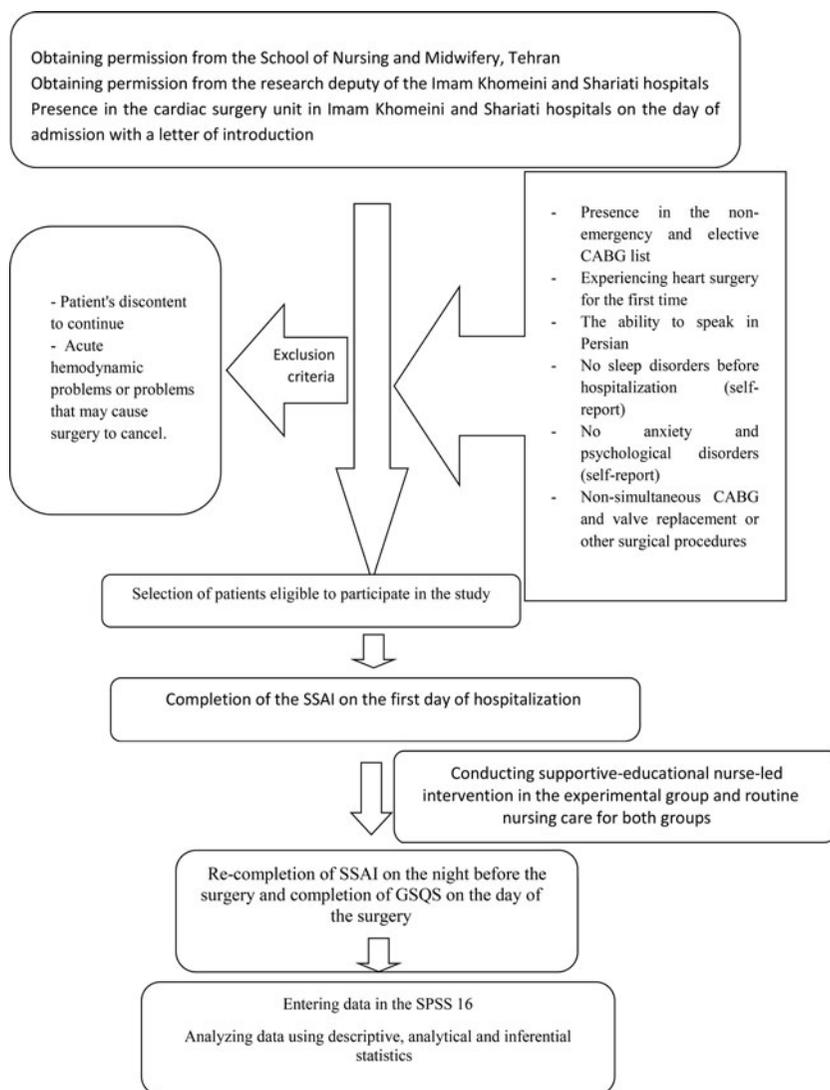


Figure. Procedure diagram. CABG indicates coronary artery bypass grafting.

statistically significant difference between the 2 groups ($P < .001$). Thus, the supportive-educational nurse-led intervention resulted in increased sleep quality the night before the CABG in the experimental group (Table 2).

DISCUSSION

The findings of this research were consistent with those of other studies. In a clinical trial, Zakerimoghadam et al²⁹ investigated the

effects of Benson's muscular relaxation on the anxiety of 140 patients awaiting CABG. Results suggested a statistically significant difference between the experimental and control groups ($P < .001$). Navvabi et al³⁰ examined the effects of training on anxiety level of patients undergoing CABG and showed that the level of anxiety in the experimental group declined after the intervention. Meanwhile, Asil-ioglu and Celik³¹ demonstrated contradictory results as they found that the anxiety level in

Table 1. Samples' Demographic Characteristics of the Experimental and Control Groups

Group Variable	Intervention Control	
	No. %	No. %
Sex		
Men	55	48.8
Women	45	51.2
Marital		
Single	2.5	6.2
Married	83.8	75
Divorced/widow	13.8	18.8
Education		
Illiterate	31.2	37.5
Elementary	56.2	56.2
High school diploma	12.5	6.2
Occupation		
Employee	11.2	12.5
Worker	18.8	15
Self-employed	1.2	1.2
Retired	27.5	20
Unemployed	7.5	5
Housewife	33.8	43.8
Others	0	2.5
Insurance coverage		
Social security	42.5	42.5
Health service	51.2	42.5
Others	6.2	15
Smoking		
Smoker	53.8	47.5
Nonsmoker	46.2	52.5

the experimental group did not show a significant difference after receiving training compared with the control group ($P > .05$). They attributed their finding to ineffective commu-

nication among members of the care team, inappropriate physical conditions of the patients' rooms, participants' relationship with other patients who had experienced surgery, and also the time the researcher had chosen to conduct the training.

Furthermore, in 2012, Guo et al³² investigated the effects of preoperative educational intervention on reducing anxiety and improving recovery among Chinese cardiac patients. Their findings are in line with those of the current research, such that a significant difference was found between the experimental and control groups. This study showed that preoperative training along with other preoperative care will reduce anxiety among patients. Studies by Varaei et al,³³ Brand et al,³⁴ Momeni et al,³⁵ and Mokhtari et al³⁶ all indicated the effects of using anxiety-reducing nonpharmacological methods on the anxiety level. Thus, this finding was in line with this study. Meanwhile, Shahmansouri et al²⁶ did not find a statistically significant difference in anxiety of the 2 groups ($P > .05$). Small sample size in the research by Shahmansouri et al can be a reason for this result.

Whitney-Mann U and χ^2 tests showed a statistically significant difference between the experimental and control groups in changes of the mean sleep quality score ($P < .001$). We did not find any studies that directly addressed the quality of sleep before the surgery. Mashayekhi et al³⁷ showed that using blindfold in patients hospitalized in the CCU considerably improved their sleep quality ($P < .05$). Zeighami and Jalilolghadr³⁸ revealed that using the Citrus Aurantium Aroma

Table 2. Comparison of the Mean and Standard Deviation of Anxiety Score in the Experimental and Control Groups

Time	Scale	Control Group		Experimental Group		Independent t Test
		Mean	SD	Mean	SD	
Before the intervention	Anxiety	51.82	4.11	58.22	2.63	$P < .001$
After the intervention	Anxiety	61.09	3.36	48.39	7.05	$P < .001$

Table 3. Comparison of the Mean and Standard Deviation of the Sleep Quality Score in the Experimental and Control Groups the Night Before the Coronary Artery Bypass Grafting

Sleep Quality Group	Mean	SD	Mann-Whitney <i>U</i> and χ^2 Tests
Control	10.78	1.27	$P < .001$
Intervention	4.6	5.50	$P < .001$

in patients hospitalized in CCU improves their sleep quality ($P < .05$).

Furthermore, Neyse et al³⁹ studied the effectiveness of earplugs on the patients' sleep quality diagnosed with acute coronary syndrome and reported that sleep quality in the experimental group saw a significant increase after the intervention compared with the preintervention ($P < .001$). Meanwhile, the sleep quality scores after the intervention in the control group saw a decline compared with the preintervention ($P < .001$), suggesting reduced sleep quality among hospitalized patients.

Paired *t* test results indicated a significant difference between the 2 groups ($P < .001$).³⁹ Nerbass et al⁴⁰ reported that massage therapy was an effective way for improving recovery after the CABG because it improved sleeping and reduced fatigue ($P = .019$). MacCune⁴¹ examined the effects of back massage on patients' sleeping after the CABG and found out that the mean sleep quality in the intervention group decreased compared with the control group ($P < .0001$). In line with the results of these studies, our findings suggest that using this method will improve patients' sleep quality (Table 3).

According to the findings of this study, non-pharmacological therapies should be placed at the top of nurses' tasks. Special attention

to sleep on the night before the surgery, given the increased anxiety and stress levels in these patients and their effects on their sleep, could contribute to their improvement, thus preventing from a vicious cycle of illness recurrence.

One of the limitations of our study is that the exact date of CABG was not clear and could disrupt the research. Another limitation was the delay of the surgery for reasons other than patients and their clinical conditions. The research findings showed that supportive-educational nurse-led intervention can reduce anxiety and improve the sleep quality of the patients the night before CABG. Meanwhile, it is suggested that the effects of this intervention in other surgical procedures be assessed using other techniques in longer time intervals in larger sample sizes and examining other variables.

What is known about this topic?

Various studies showed that patients who undergo surgery have high level of anxiety and poor quality of sleep. This may lead to failure to recovery process.

What this paper adds?

Nonpharmacological methods such as relaxation and deep breathing, along with education, can be an accessible, less costly, and less complicated approach for patients.

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