

Studying the effect of guided relaxation on pain and physiological indices after coronary artery bypass grafting surgery

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Abstract

Aim: Pain and relieving it are of the major challenges of nursing in care after Coronary artery bypass graft (CABG) surgery. In this regard, the use of effective, simple, and cost-effective methods of pain relief with minimal side effects is considered. Thus, the present study has been conducted to determine the effect of guided relaxation on patients' pain after CABG surgery. Material and Method: In the present study, which is a preliminary experimental study of before and after, 90 patients undergoing CABG surgery at the educational hospital of Heshmat in Rasht with the characteristics of the units studied were randomly selected. After signing a written consent, the subjects were trained on how to implement Benson relaxation, which is a progressive relaxation, at the stage before the operation. Data collection tool in this study was a three-part questionnaire including 1) demographic data, 2) visual analog scale (VAS) of pain, and 3) sheet of recording values of physiological parameters (blood pressure, pulse, and respiration). Data were collected in the first 24 hours of the transfer of the patient from the intensive care unit (ICU) to the surgical ward two stages before intervention (with the announcement of pain by the patient) and after intervention. Data analysis was done using paired and independent t-tests and Pearson with SPSS version 12. Results: The findings related to demographic characteristics of the majority of units studied were composed of men (78.9%), in the age group 41-55 years (51.1%), with an average age of 55 years and a standard deviation of 9.56 years, with third grade guidance-school degree (37.8%), history of hospitalization (71.1%) and surgery record (50%). The findings showed a considerable reduction in pain and physiological parameters after intervention (p=0.0001). The mean and standard deviation of pain intensity before and after the intervention, and in terms of hospitalization history (p=0.04), and the mean and standard deviation of physiological parameters in terms of gender (p=0.05) and education level (p=0.36) were statistically insignificant. Discussion: The results showed that relaxation, as a complementary non-invasive therapeutic method, could cause a significant decrease in pain and physiological parameters in patients after CABG surgery.

Keywords

Coronary Artery Bypass Graft; Admitted Patients; Nursing Care; Post-Operative Pain; Relaxation

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Introduction

Surgery is a treatment for a variety of ailments. One of the major surgeries is Coronary artery bypass graft (CABG) surgery, where the nurse should try to prevent its complications with her rational considerations [1]. CABG is the most common cardiac surgery in America. Annually, per thousand people, almost one person in this country undergoes CABG surgery [2], and costly intensive care is a burden on the shoulders of funding of health services and gets about 1985 dollars per capita of health expenditure [3]. Therefore, in today's care conditions, the issue of cost is a very critical issue, and they have always sought ways in which health care and nursing of patients undergoing CABG surgery is not only safe and effective but also financially affordable [4]. Undoubtedly, cardiac surgery is one of the most vital and most sensitive operations and has exceptional circumstances compared to many other surgeries due to the need to stop the heart and establish extracorporeal circulation. There are many actual and potential side effects after heart surgery, and the patient is delivered with such conditions to nurse of intensive care unit (ICU) and then to the nurse in cardiac surgery ward [5]. Changes in physiological parameters such as tachycardia, shallow and rapid breathing, and increase in blood pressure are the common physiological protests accompanied by pain [6]. Phipps et al. (2004) stated that of the main goals of postoperative care are to improving cardiopulmonary function, adequate tissue perfusion, and stabilization of vital signs [7]. Increase in blood pressure is dangerous for patients who have had coronary surgery because it causes blood to leak from the newly transplanted site [8]. Diastolic blood pressure is also important and should be enough because myocardial muscle receives 70 percent of its blood at this stage of the heart cycle. Hypotension signs include cerebral ischemia, heart attack, shock, and kidney failure [9]. Changes in the rate after heart surgery are common that with the reduction in heart rate, cardiac output decreases and increases in heart rate, due to a decrease in fluid volume or over-stimulation of the sympathetic system, reduces stroke volume [10]. Rapid shallow breathing is of complications after heart surgery. Many of these complications can be identified and controlled by attention and interventions of nurses, and due to the side effects of medication and its high costs, it is recommended that, as far as possible, non-pharmacological methods be used [6]. Considering that in choosing a method, attention should be paid to its simplicity, low cost, and the possibility of more autonomy, the researcher has considered relaxation method and has studied its influence on the intensity of pain, physiological parameters due to pain in patients undergoing CABG surgery. Accordingly, the present study has been done to investigate the effect of guided relaxation on the severity of pain of patients after CABG surgery.

Material and Method

This study is a single-group clinical trial of before and after type, and its population is all patients undergoing CABG surgery admitted to Heart Surgery Unit of Heshmat Hospital in Rasht. The sample consisted of 90 patients who were selected randomly based on the characteristics of the subjects studied, and after written consent by convenient sampling. Data collection tool was a questionnaire with three parts: 1) demographic characteristics of the subjects (gender, age, education, history of hospitalization, surgery record, frequency of drug use in the 24 hours, and the time interval from the last painkiller used in ICU), 2) visual analog scale (VAS) of pain, and 3) values of physiological indicators due to pain (blood pressure in millimeters of mercury, pulse according to the number of per minute, respiratory rate according to the number per minute). Within the first 24 hours after the transfer of the patient from ICU to heart surgery unit and with expressions of pain by the patient, the researcher examined intensity values of pain and physiological parameters along with pain. Then relaxation tape was played for the patient using a voice recorder device and headphones, during which the patients were asked to slowly make comfortable position, slowly close their eyes, relax all muscles of the body deeply and in order from the feet until the face, maintain this relax state, then take a deep breath hold it for a few seconds, exhale it out, and take a slow and deep breath. Then the values of pain at the stage immediately after the end of intervention and physiological indicators due to pain were measured immediately, 5 minutes, and 15 minutes later and recorded on sheets.

In the end, mean values and standard deviation of pain intensity, before and after the intervention, and each of the physiological parameters before and after the intervention were measured and the results were used. Data analysis of this study was done with the help of computer software SPSS12. It should be noted that paired t-test was used to study whether there is a significant difference between the mean and standard deviation of pain before and immediately after the intervention, as well as mean and standard deviation of physiological parameters before and after (average of three stages after intervention). Evaluating the significance of the relationship between variables related to demographic characteristics and the average of the difference in intensity of pain and physiological parameters was done with t-test, ANOVA, and Pearson. To achieve the research objectives, the following hypotheses have been proposed and tested:

- Guided relaxation decreases the severity of pain of patients at the stage after CABG surgery.
- Guided relaxation affects blood pressure of patients at the stage after CABG surgery.
- Guided relaxation affects the pulse of patients at the stage after CABG surgery.
- Guided relaxation affects the respiratory rate of patients at the stage after CABG surgery.

In addition, the question of the type of the relationship between differences that exist in physiological parameters rates after CABG surgery before and after the intervention with some individual characteristics have been answered in this study.

Results

According to the findings related to demographic features, majority of the subjects were male (78.9%), in the age group 41-55 years (51.1%), with an average age of 55 years and a standard deviation of 9.56 years, with third grade guidance-school degree (37.8%), history of hospitalization (71.1%) and surgery record (50%). The majority of the subjects (84.4%) used analgesic (acetaminophen codeine) 1-2 times in the first

24 hours after being transferred from ICU to the surgery ward and the time interval between intervention with the last use of analgesic in ICU in the highest percent (37.7%) in the subjects studied was in the range of 5-8 hours.

The results of the paired t-test showed a significant difference between the pain intensity values and all physiological parameters effects due to pain at the stages before and after the intervention (p=0.0001) (Tables 1 and 2).

Table 1. Comparing means of pain intensity in subjects studied at stages before and after treatment

STAGE VARIABLE	Before intervention		After intervention		Paired t-test results
Pain	Mean	SD	Mean	SD	24.5 = T 89 = df P=0.0001
	5.7	1.3	3	1.1	

Table 2. Comparison of the means of physiological parameters before and after the intervention in the subjects units

Stage Index	Before intervention		After intervention		The average difference between before and after		Statistical test results T
	Mean	SD	Mean	SD	Mean	SD	
Systolic blood pressure	132.2	15.2	127.3	14.6	4.9	6.4	T=7.3 P=0.0001 Significant
Diastole blood pressure	81.6	10.6	78.8	8.8	2.8	4	T=73.6 P=0.0001 Significant
Heart rate	88	12.6	84.9	11.3	3.2	3.9	T=79.8 P=0.0001 Significant
Respiratory rate	19.2	1.3	18.2	0.9	0.9	0.7	T=12.2 P=0.0001 Significant

The results in Table 3 indicate that the mean and SD difference of pain intensity before and after the intervention in terms of demographic characteristics show a significant difference only in the history of hospitalization (p=0.04) (Table 2). The results of the independent t-test, Pearson, and ANOVA showed no significant difference between the mean difference in systolic blood pressure, diastolic blood pressure, and respiratory rate before and after the intervention with the demographic characteristics of the subjects. On the other hand, the results of ANOVA have shown a significant correlation between the mean difference in heart rate before and after the intervention with sex (p=0.05) and education (p=0.036).

Table 3. The relationship between the mean and the standard deviation of the difference in pain intensity and heart rate in terms of demographic characteristics

Demographic characteristics Physiological index	Gender	Education	Hospitalization record
Mean and SD of pain intensity difference	-	-	0.04=p
Mean and SD of the difference in heart rate	0.05=p	2.69=f	-

Discussion

The results of this study indicate that the intensity of pain after intervention compared to before that has significantly reduced. The results of the study by Good et al. also confirm this finding [11]. In their study, Hatan et al. (2002) found no significant differences in pain before and after relaxation [12]. According to the researcher, small sample size of relaxation in their research can be of the restrictions causing this result [9].

The systolic and diastolic blood pressures in the stage after relaxation, compared to before it, has significantly decreased, so the second hypothesis is confirmed. However, the average systolic blood pressure in the stage after the intervention, according to the classification of the Joint National Committee on Prevention, Detection, and Treatment of High Blood Pressure, is in pre-hypertensive range (120-139) [8]. In their investigation to determine the effect of relaxation on blood pressure, Sheila et al. (2003) found a significant difference in systolic and diastolic after and before intervention with systolic and diastolic blood pressure after it. The researchers consider this finding due to inhibition of sympathetic effect on blood vessels [13]. The important point in this study is that relaxation has not led to a severe decrease in diastolic blood pressure more than acceptable. Minimum normal diastolic blood pressure is 60 mm Hg in adults [14], and severe reduction of this pressure can disrupt the blood supply to the myocardium [3]. Therefore, the effect of this intervention has been adequate and with no special side effects.

On the other hand, results from these findings indicate that heart rate and respiratory rate after the intervention, compared to before, have significantly reduced, so the third and fourth hypotheses are recognized. In this regard, Jacobs (2001) and Benson and Clipper (2000) write that relaxation could reduce heart rate and respiratory rate by reducing sympathetic system performance [16, 17]. In their study to determine the effect of Benson relaxation therapy on hemodynamic status in patients undergoing coronary angiography, Hanifi et al. found a significant decrease in heart rate in the relaxation group compared to the control group [18].

Moreover, independent t-test revealed a significant difference (p=0.04) between the mean of pain intensity difference before and after the intervention was based on the history of hospitalization. In analyzing this, the researcher states that although hospitalization history increases pain in the subjects with this feature, this could increase the incentive to the effective relief of pain, so probably the subjects have done this intervention more accurately and as a result have experienced more pain reduction.

On the other hand, the average difference of values physiological indices of systolic and diastolic pressure and the respiratory rate had no statistically significant relationship with any of the demographic characteristics of the subjects. Peggy et al. confirmed this by evaluating and comparing two different rehabilitation programs to improve the quality of life of patients with heart disease [19].

Finally, the results of this study showed that the mean difference in heart rate before and after the intervention had a significant relationship only with gender (p=0.05) and education (p=0.036). The highest influence of relaxation was on heart rate in women and people with literacy to read and write. In their study to evaluate the effects of psychosocial factors and cardiovascular and respiratory indicators on the stress of employed men and

women, Chill et al., showed that women had more changes in heart rate than men [20]. These findings may be connected to more influence of heart rate compared to blood pressure to human states and more suggestibility of women than men may. Therefore, with knowledge of the purpose of this research and its possible impact on heart rate, women have had more control over their pulse rate than men have. More influence of relaxation on heart rate in patients with literacy to read and write is perhaps connected to the suggestibility of people with lower education levels and heart rate being influenced more compared to human states.

Thus, according to the above findings, it can be stated that all four hypotheses have been confirmed. Therefore, relaxation could be an effective non-pharmacological intervention, easy, fast, non-invasive, affordable and suitable for acceptable changes in physiological parameters and pain in patients after CABG surgery. Using this method not only reduces the consumption of drugs and their side effects in patients, but also improves good therapy relationship between hospitalized patients and nurses, and this can increase patient satisfaction with provided care and quality of care.

Competing interests

The authors declare that they have no competing interests.

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