

Comparison of the effectiveness of two Methods of mobile education and speech therapy on anxiety in cardiac surgery patients

ABSTRACT

Background and Objective: The purpose of this study was the Comparison of the effectiveness of two Methods of mobile education and speech therapy on anxiety in cardiac surgery patients in Seyyedol Shohada Hospital in Urmia in 2017.

Materials and Methods: The experimental design is a pre-test, post-test, and control group. The statistical population of this study was all patients undergoing cardiac surgery in Seyyed-Al-Shohada Hospital in Urmia in the years 2007-2012. Sixty patients were selected through random sampling and randomly divided into 3 groups, 2 experimental groups (each of 20) and 1 Control (20 people). Subjects in the experimental group 1 (mobile phone) were trained in a mobile way, and subjects in the experimental group 2 (lecture) were trained in lecture and received no training in front of the control group. Data were collected using Spielberger anxiety inventory. Data were analyzed using covariance analysis and post hoc test.

Results: The results of this study showed that mobile-based education and lecture had an effect on patients' anxiety and decreased anxiety in patients undergoing cardiac surgery. Also, the results of post hoc test showed that there was no significant difference between mobile education and lecture, and none of them was superior to the other.

Conclusion: Therefore, attention to mobile-based education and lecture has an important role in reducing anxiety in patients.

Paper Type: Research Article.

Keywords: Anxiety, mobile based education, speech training, heart surgery

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Introduction

Cardiovascular diseases are the most common causes of worldwide death (1). The World Health Organization (WHO) considers this disease as an epidemic of the modern age (2). Cardiac diseases are the first cause of death (39.3%) in Iran. The recent reports showed that 19.5% of cardiac deaths are related to myocardial infarction, 9.3% related to stroke, and 1.3% of them are related to hypertensive and the rest is related to other heart disease.

The number of deaths from heart disease in Iran is close to 138,000 (378 per day), and it is anticipated that the prevalence of this disease will increase over the coming years, causing a huge burden on all aspects, including social, economic and political influences on society (3). More than hundreds of millions people worldwide are undergoing surgery every year. Surgery is a significant and potential risk that endangers the health of the patient (4). Therefore, most patients awaiting surgery experience have some degree of stress (5). Cardiac surgery is associated with anxiety in patients; however, patients who undergo this surgery are more frightened than other patients, because the heart is directly related to death and life (6). Although, anxiety is the most common psychological disorder, it is considered as a mental disorder that has been experienced by all humans many times. Its effects can also be expressed as physical and activity problems, thinking and perception disorder (7). Several studies have shown that if patient anxiety is not controlled before surgery, this can lead to prolonged recovery in the patient (8). Anxiety is a feeling of diffusion, unpleasantness and vagueness of unknown origin, which gives the person the insecurity, frustration and

arousal of physiology (9). Some consequences of anxiety may lead to increase in cardiac stimulation, blood pressure, and risk of infection (10) as well as patients with anxiety are affected by anesthesia kind and postoperative healing. This anxiety increases the need for more anesthetic doses, delayed waking, increased blood pressure and dysrhythmia in patients (11). In this regard, Krannich et al. (12) showed that 34% of the patients experienced anxiety before surgery and 24.7% experienced after the surgery. Also, Tsushima et al. (13) found that around 40.29% of patients undergoing cardiac surgery had symptoms of anxiety. Hong & Oh (14) also found that anxiety during the pre-operative period of cardiac surgery caused gastric ulcer and decreased satisfaction of patients with nursing care and treatment. Therefore, appropriate therapeutic strategies should be used to reduce the physical and psychological symptoms of anxiety, which include pharmaceutical and non-pharmacological methods. In order to treat anxiety, several pharmacological and non-pharmacological therapies are used. Common anxiolytic drugs include benzodiazepines, tri-ring antidepressants, and monoamine oxidase inhibitors. Anxiolytic drugs have many physiological and psychological complications, and also there is a risk of addiction and drug dependence. On the other hand, the side effects of drugs are notable such as: hypotension, weaken vital functions like poor breathing and heart rate, sleepiness, nausea, vomiting, constipation, and sometimes allergic reactions and even shock, and they impose high costs on the health system of the country. Therefore, considering the various side effects of drugs, it is necessary to provide a suitable non-pharmacological approach (15).

Using of mobile technology and speech therapy are the most common non-medical treatments that can be used. Among the method of teaching and lecture, which is one of the basic activities in improving health and play role as an activity to serve the community, so that people and society can lead to the preservation and promotion of health and ultimately individual adaptation in every condition. In teaching and lecturing to the patient, a combination of different teaching methods and behavior modification techniques are used that can affect the patient's health behaviors (16). Several studies indicated the effect of speech therapy on reducing anxiety, and fear of patients before surgery is confirmed in many studies (17).

Since, patients are often unable to attend a formal training program, therefore, mobile based training has created opportunities to provide essential information in patient's place of residence (18). Different communication methods are used to teach the patient, which includes providing written, oral, photo, film, telephone, internet and other methods of instruction. The upward trend in mobile phone use in human societies has raised this tool as a new tool in tele-care for communication between patients and health care providers (19). Several studies have pointed to the beneficial effects of preoperative training on reducing the incidence of postoperative complications and hospital stay. Therefore, it is necessary to individually assess the educational needs of the patient, the level of anxiety and his fears of surgery. The results of one study showed that teaching through lectures would make information available to patients and reduce their anxiety (20). In addition, Ajorpaz, Izadi and Heidari (21) also found that routine teaching and lecture reduced the

anxiety level of patients before surgery. Babazadeh kamangar et al. (22) concluded that mobile-based education significantly affects dental students' grades in oral pathology lesson and the average group scores that started with mobile were significantly higher than the average group scores that began with face-to-face training. The results of Hartnell-Young & Heym (23) showed that 69.2% of patients considered mobile as an effective tool in their learning, 72.2% considered mobile learning as a new opportunity and 66.2% of patients thought that mobile learning had quick feedback and could play an important role in anxiety due to surgery. On the other hand, Chanm et al. (24) found that teaching patients did not affect their anxiety level, and there was not a significant difference between a group that received preoperative training and the group that didn't receive education in the amount of anxiety and stress level. These situational and immediate interventions can be provided in the context of routine and natural conditions of life. The results of this study showed that these interventions are considered successful when they are accepted by patients and considered effective in treating a variety of behaviors with psychological and physical symptoms. Therefore, mobile-based therapies can incorporate interventions of widespread health behaviors.

Because of the physical, psychological and social problems that the cardiac patients face and they undergo surgery, mental health education of this group is of special importance. On the other hand, due to controversial studies on the effects of mobile phone teaching methods and lectures, as well as cultural, social and religious differences in Iran, the necessity of research is obvious (24). According to research findings, patient education in

lecture and mobile phone can reduce anxiety; however, this is not favorable in our country (23). Likewise, little research that has been done on mobile phone education and lecture and there is no research in this area that shows which method has a more effective influence on reducing anxiety in patients undergoing cardiac surgery. Therefore, the researchers decided to study the effect of lecture and cell phone training on the pre-operative anxiety of patients in a semi-experimental study.

Therefore, in view of the increasing number of cardiac surgeries in our country and the problems of the insurance system in paying current and actual costs of treatment, fast, efficient, low cost and low risk recovery of these patients through multiple follow-ups are of great importance. Hence, the purpose of the present study was to investigate the effect of mobile-based education and lecture on anxiety among patients undergoing cardiac surgery.

Materials and Methods

This study was a semi-experimental research with pre-test, post-test, and control group. In this study, participants include all patients' undergoing cardiac surgery at Seyyed-Al-Shohada Hospital in Urmia from 2017 to 2018. Sixty patients were randomly selected and divided into 3 groups: 2 experimental groups (20 patient in each group) and a control group (n=20). Subjects in the experimental group 1 (mobile phone based) were trained by a mobile way, and subjects in the experimental group 2 (lecture) were trained by speech therapy, while control group received no training.

The inclusion criteria in this study were candidates for cardiac surgery for the first time, lack of cognitive problems, physical dis-

abilities, non-use of anxiety and depression drugs. Patient excluded if they died during the study or who faced new physical problems or disorders. The following tools were used to collect data:

1- Anxiety questionnaire: The Situational Anxiety Questionnaire is a self-assessment tool, which developed by Spielberger in 1970 (26). In Situational anxiety questionnaire, an emotional situation causes a conscious and subjective perception of the tension, fear, unrest, anxiety, and over-activity (autonomy) of the autonomic nervous system. Situational anxiety scale consists of 20 sentences and people are asked to report their feelings at the time of the questionnaire implementation. The severity of sensory anxiety is characterized by a four-point Likert scale (very low, low, high, very high). In this scale, low scores represent a sense of tranquility, the mean scores represent the average levels of stress and worries, and high scores reflecting a sharp fear close to horror and panic. Scores of 20 to 31 indicate mild anxiety, scores 32 to 42 indicate mean to low anxiety, scores 43 to 53 indicate moderate to high anxiety, scores 54 to 64 anxiety show relatively high, scores 65 to 75 indicate severe anxiety and scores 76 to 80 indicate intense anxiety (26).

The questionnaire has a relatively high internal consistency and is generally a durable instrument with a desirable validity that can be used in different populations. According to Spielberger (26), the Cronbach's alpha coefficient of this scale is 0.90. The retest reliability for this scale is 0.76. According to Mahram (27), the internal consistency of this scale was obtained through a cronbach alpha on a sample of 600 individuals equal to 0.91. The coefficient reliability of this questionnaire was reported as 0.87. Also, the validity of this

test in a benchmark manner (by calculating the correlation coefficient with Minnesota's multi-faceted personality test) shows a coefficient of 0.81.

2- Mobile based education: The purpose of the mobile-based approach in this study was to provide training sessions that were made by Gherati et al. (18) and took place on the patients in 6 cell-phone calls of 15 to 18 minutes. Mobile-based education includes photos, videos, animations and slides that contain content from medical books, valid articles and medical and nursing sites approved by anesthesiologists. They include materials on how to get to know the operating room, anesthesia type and its care, heart surgery, postoperative measures, surgical procedure and its consequences, patient's actions during and after surgery, possible complications, rehabilitation program and follow-up therapy.

3- Booklet based education: This is a lecture-based method in which patients undergoing cardiac surgery study booklet on surgery, anesthesia and its complications, duration of hospitalization and information retrieval in one room face to face. This training method was carried out by staff in 5 sessions of 2 hours. Patients were also assured that the information received would be confidential. To analyze the data, descriptive statistics (mean and standard deviation) were used. Also for analyzing the research hypotheses, inferential statistics, covariance analysis and post hoc tests were used.

Results

The central tendency of mobile-based education and lectures in during pre-test and post-test are shown in Table 1 and 2. Our finding showed that the study groups do not differ significantly from the statistical indicators

before the educational interventions, and there is no significant difference between the groups in terms of available variances. Although, this conclusion is expressed without statistical support, there will be no significant difference in the variance of the studied groups in the pre-test, based on the precise investigations that will present later. Also, looking at the contents of this table shows that in experimental groups, educational interventions have led to changes in the dependent variable index (anxiety). On the other hand, the control group that was not exposed to educational intervention, didn't make any significant change in the dependent variable. Comparing the indicators of this group with the pre-test indicators show that over time and without applying educational interventions, there are no change in statistical indicators of this group.

Another assumption of the analysis of covariance is homogeneity of variance using Levene's Test for evaluating the experimental groups. Regarding the significance level of the groups, the anxiety variable is more than 0.05 and it can be said that the variance of the groups is consistent. With regard to the significance level which is greater than 0.05, the assumption is rejected and the zero assumption is accepted.

One of the other assumptions of covariance analysis is homogeneity of regression slopes, which has been investigated in experimental groups, where the F value is the independent variable interconnection, and it is 6.72 which is not significant. Therefore, it can be concluded that the assumption of homogeneity of regression slopes is observed. Therefore, due to the fact that the assumptions of the analysis of covariance were realized, then the analysis of variance was used.

The results of the analyze of covariance) ANCOVA (in Table 2 shows that there is a significant difference between the patients in the experimental and control groups in terms of mobile phone training scores ($P = 0.003$), ($F = 10.04$). It means that after adjusting the pre-test scores, there is a difference between the groups in the dependent variable (anxiety). Therefore, mobile-based education has reduced the anxiety scores of the experimental group, regarding the mean of anxiety scores in the intervention group (40.25) and in the control group (42.75). That is, mobile-based education has reduced anxiety in patients, but this education has not changed the control group.

The results of the Analyze of Covariance) ANCOVA (in Table 3 shows that there was a significant difference between the intervention and control group in terms of lecture training scores ($P = 0.04$), ($F = 4.40$). It means that after adjusting the pre-test scores, there is a difference between the groups in the dependent variable (anxiety). Therefore, lecture-based education has reduced the anxiety scores in the intervention group, regarding the mean of anxiety scores in the experimental group (41.10) and in the control group (42.75). Likewise, lecture-based education has reduced anxiety in patients, but this education has not changed the control group. Since the results of covariance analysis indicated that the effects of mobile and lecture education are meaningful, it is necessary to determine the sources of these effects. This means identifying which mobile phone education and lecture methods contribute to reducing anxiety. In this regard, Post Hoc tests were used and its results showed that mobile and lecture-based education is superior to the control group, but there is no significant

difference between the two lecture-based and mobile-based groups.

Table 1: Statistical description of patient Knowledge in pre-test and post-test stage

Stage	Variable	Groups	N	Mean	SD
Pre-Test	Anxiety	Mobile based education	20	42.55	2.50
		Lecture	20	43.30	2.65
		Control	20	43.60	1.81
Post-Test	Anxiety	Mobile based education	20	40.25	2.22
		Lecture	20	41.10	2.55
		Control	20	42.75	2.24

Table 2: Results of one-way covariance analysis on pre-test-post-test anxiety scores among mobile-based test group

Groups	Source of change	SS	F	MS	F	P
Anxiety	Pre-Test	7.23	1	7.23	1.46	0.23
	Post-Test	49.46	1	49.46	10.04	0.003
	Error	182.27	37	4.92		
	Sum	69142.01	40			

Table 3: Results of one-way covariance analysis on pre-test-post-test anxiety scores among Lecture group

Groups	Source of change	SS	F	MS	F	P
Anxiety	Pre-Test	7.10	1	7.10	1.23	0.27
	Post-Test	25.26	1	25.26	4.40	0.04
	Error	212.45	37	5.74		
	Sum	70555.01	40			

Table 4: Tracking the effects of mobile-based education and lecturing on anxiety

Comparisons between groups		difference in Mean	SD	P
Lecture	Mobile based education	0.85	0.74	0.25
Lecture	Control	1.65	0.74	0.03*
Mobile based education	Control	-2.50	0.74	0.001*

Conclusion

The purpose of this study was to compare the effectiveness of mobile education with the speech therapy on anxiety in cardiac surgery patients in Seyyedol Shohada Hospital in Urmia in 2017.

One finding of this study showed that mobile-based education has an effect on anxiety in patients undergoing cardiac surgery and can reduce the anxiety of these patients. This finding is consistent with the results of Heron & Smyth (25), Hartnell-Young & Heym (23) and Baba Zadeh Kamangar et al. (22). The results of this study showed that these interventions are considered successful when they are accepted by patients and considered effective in treating a variety of behaviors with psychological and physical symptoms. Therefore, mobile-based therapies can incorporate interventions of widespread health behaviors and also in physical and psychological symptoms. The results of Hartnell-Young & Heym (23) showed that 69.2% of patients considered mobile as an effective tool in their learning, 72.2% considered mobile learning as a new opportunity and 66.2% of patients thought that mobile learning had quick feedback and could play an important role in anxiety due to surgery. Babazadeh kamangar et al. (22) concluded that mobile-based education significantly affects dental students' grades in oral pathology lesson and the average group scores that started with mobile were significantly higher than the average group scores that began with face-to-face training.

Explaining this finding, it can be said that mobile-based learning is emerging as one of the solutions to the challenges faced by patients before surgery. With a variety of tools and resources that are always available, mobile learning provides many options for per-

sonal learning. In mobile-based learning, most learners can work in groups or individuals to solve problems, working on researches according to their needs. By accessing content at any time and place, there are many opportunities for formal and informal learning about the factors that will occur in the hospital and in patients. Successful mobile-based learning should emphasize user experiences, encourage communication between learner and trainer, develop interrelationships and collaboration among learners, and provide immediate feedback for self-sustaining improvement (25). Also, the use of mobile enhances morale, self-confidence and confronts difficult issues lead to increase the learners' motivation among patients. Bialo indicated that the use of information and communication technology lead to increase self-confidence, strengthen self-reliance and learning. The use of mobile phone as an instructor in combination with traditional education for patient education and training offers an increase in their learning before surgery, and lead patients learn faster (23).

Information technology considered as a powerful tool to increase the efficiency and effectiveness in different organizations. From this perspective, various industries have taken effective steps to maintain their survival in a highly competitive environment and to promote their implications in using these technologies. Different developed countries have identified information technology useful for the development of health information and the promotion of health system outcomes. Therefore, mobile phones could be considered as effective instrument in reducing anxiety among patients who are undergoing surgery (22).

Another finding showed that lecture-

based education has an effect on the anxiety of patients undergoing cardiac surgery and decreases the anxiety of these patients. This finding is consistent with the results of the research conducted by Vanderboom (17), Suzane & Smetzer (20) and Ajorpaz et al. (21). In another study, Vanderboom (17) showed that providing information for the patient using lecturing can reduce the anxiety, fear and increase tolerance of the patients before surgery and reduce their anxiety and their hospitalization time. Also, the results of Suzane & Smetzer's (20) showed that learning through lectures would help to obtain information in patients and reduce their anxiety. Likewise, Ajorpaz et al. (21) Found that routine instruction and lecture reduce the anxiety level of patients before surgery. In fact, lecture education can greatly reduce the anxiety of patients.

In other words, it can be said that cardiac surgery is a major source of stress for patients, and they consider this surgery to be a life-threatening one. On the other hand, such unpleasant feelings increase the complications of the postoperative period. Therefore, decreasing the level of anxiety seems necessary especially in patients who are in a special condition such as surgery and consider it as a crisis in their life and in this regard, pre-operative speech can play an important role in reducing anxiety. According to the results of this study, education in both special and life threatening conditions is capable of restoring calmness and decreasing patient anxiety. According to the results of other studies, in patients with anxiety associated with chronic and severe illness and even against routine tensions, it is considered as a useful and valuable intervention. This intervention, in addition to the mechanisms described, leads to

a positive relationship between the patient and the nurse, and subsequently the patient's anxiety decreases (17). Several studies have pointed to the beneficial effects of preoperative education on reducing the incidence of postoperative complications and hospital stay. Therefore, it is necessary to individually assess the educational needs of the patient, the level of anxiety and his fears of surgery. The results of one study showed that teaching through lectures can provide information in patients and reduce their anxiety (20).

The research also showed that lecture and mobile-based methods are superior to the control group; but there is no significant difference between lecture and mobile-based groups. This result suggested that both lecture and mobile methods have an effect on reducing patient anxiety and there is no difference between the two groups. Therefore, both methods could be used to reduce anxiety.

Also, the emergence of new phenomena and inventions affect all aspects of human life (economic, social and cultural). The emerging phenomenon of the internet has covered all the fields of educational activity in many countries. Given the massive amount of information and the rapid distribution, this phenomenon has evolved rapidly into educational and training systems and educational methods, and has introduced new approaches to educational systems in terms of the richness of information. Therefore, considering the age of technology, the use of mobile education and lecture methods plays an important role in reducing anxiety in patients and improving their health.

The study also had some limitations. This research has been conducted on patients undergoing cardiac surgery that should be cautious in generalizing results to other pa-

tients. Also, this study was conducted on patients in Seyyedol Shohada hospital in Urmia which should be cautious in generalizing results to hospitals and other cities. Considering the fact that the questionnaire and the self-assessment scale were used in this study which may affect the results of the research, the use of the questionnaire is considered as a limitation. Therefore, it is suggested that in the hospital, mobile phone learning and education be used to empower and reduce patients' anxiety for facilitating access. On the other hand, considering the time is useful for patients during surgery, telephone follow-up and the use of mobile-based education can be effective in this regard and it is essential to provide patients with the necessary training and information in the field of surgery.

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