Effects of Guided Imagery on Anxiety and Physiological Indicators in In-patients with Acute Coronary Syndrome

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Original Research Article

ABSTRACT

One of the most important complaints of patients with the acute coronary syndrome (ACS) is anxiety, whose control is particularly important. The purpose of this study was to determine the effects of guided imagery on state and trait anxiety and their physiological indicators in patients with ACS. At this clinical trial selected 50 patients by convenience sampling and randomly allocated to control and experimental groups using permutation blocks. Anxiety and physiological indicators in both groups were measured using the Anxiety Inventory (STAI), a monitoring device and a checklist respectively. In addition to the routine cares for the control group, the experimental group listened to a guided imagery CD for three days, twice a day (16 minutes). The data were analyzed using paired t-test and ANOVA. Only trait anxiety was significantly reduced in the experimental group. Furthermore, there was no significant statistical difference between the two groups in terms of the mean blood pressure, heart rate and SpO2; the respiratory rate in the experimental group was however significantly less than that in the control group after the intervention. Based on these findings, GI may be useful in reducing trait anxiety and some physiological indicators in ACS patients.

Keywords: Guided imagery; state anxiety; trait anxiety; acute coronary syndrome; empirical study.

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1. INTRODUCTION

At the moment, coronary artery disease is the leading cause of death in developed countries [1]. With a change in lifestyle, this disease has gradually turned into one of the most common causes of death in developing countries, as well [2]. Most patients get anxious upon hospitalization in cardiac intensive care units (CICU). This anxiety, which is normally more severe in the first 48 hours of hospitalization, may be related to stressors such as alienation of the environment, complex and noisy machines, potential problems facing the patient, resuscitation measures and death of other patients [1]. Anxiety, as a kind of internal fear of life-threatening situations, exacerbates cardiovascular reactions, and influences physiological indicators in patients, for example, respiratory rate, heart rate, blood pressure and myocardial oxygen consumption, putting them at risk [3]. Review studies show that anxiety in patients with coronary heart disease (CHD) ranks second among common diseases after depression with the prevalence of %10.4. Fear, anxiety and CHD risk factors such as hypertension lead to the pathogenesis mechanism of the heart, which might affect cardiovascular function [4].

Numerous studies mentioned anxiety as a comorbidity and perhaps the most important risk factor in coronary artery disease and recommended anxiety reduction as a preventive strategy in the development of this type of disorders [5]-[8]. Although some authors have referred to two types of anxiety, state anxiety and trait anxiety, the first one refers to situational anxiety, and the latter refers to hidden anxiety or personality anxiety. some authors have mentioned two types of anxiety, state and trait anxiety, positional anxiety and hidden anxiety or personality anxiety [9]. These types of anxiety may lead to different reactions to therapeutic interventions. It has been suggested that personal traits of patients (like trait anxiety) and state anxiety be considered effective factors in patients with coronary heart diseases in the next studies because patients with high levels of trait or state anxiety might be differently affected by the interventions [10]. Some studies have tried to answer the question of how much of heart-related anxiety in patients with coronary heart disease can be explained by the illness severity or trait anxiety and it is concluded that ways to overcome the subjective symptoms of the illness should be focused when treating anxiety in patients [11].

Several drugs have so far been used to treat cardiovascular disease anxiety. Using mild tranquilizers and anti-depressant pills may reduce anxiety, but they are accompanied by a variety of side effects [12]. Therefore, researchers have always highlighted non-pharmacological methods that affect the mind-body axis and enhance the prevention of adverse clinical events in patients especially patients with heart failure [13]. Guided imagery is a mind-body based complementary therapy by which people feel relaxed through focusing and using images, landscapes, sounds, music and words [14]. This method is easily accepted by the patient and does not need special equipment or extensive training [15].

Various studies have used complementary medicine to reduce anxiety in heart patients, particularly patients with coronary heart disease and other medical conditions. For example, a clinical trial conducted by Mizrahi, Reicher-Atir, Levy, Haramati, Wengrower, Israeli, Goldin [16] showed that meditation with an audio CD at home significantly reduced anxiety and improved mood in patients with inflammatory bowel disease [17]. Bradt, Dileo, and Potvin reported that listening to music reduced anxiety in patients with coronary heart disease [11]. Meanwhile, numerous researchers demonstrated the effect of music on a range of different outcomes in patients such as heart rate (Barnson, 1995), respiratory rate and blood pressure (Barnson, 1995), hormone levels (Vollert 2002), and anxiety (Barnason, 1995) [11].

Halpin, Speir, Capobianco, and Barnett [18] revealed that guided imagery reduced treatment costs, anxiety and duration of hospitalization [17]. Alam, Roongpisuthipong, Kim, Goyal, Swary, Brindise, Iyengar, Pace, West, Polavarapu, and Yoo. Alam et al. [19] showed that guided imagery reduced preoperative anxiety [18], while Thomas and Sethares [20] found no reduction in postoperative anxiety with this technique [19]. Antall and Kresevic [15] found it effective in reducing pain, anxiety and hospitalization duration, and recommended investigating both state and trait anxiety in future studies. Relevant studies consider only the whole anxiety and not state and trait anxiety separately, and are limited and focus on the in-person training. The present research aimed to investigate the effects of guided imagery on state and trait anxiety as well as physiological indicators in patients with acute coronary syndrome in CICUs using training CDs.

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2. MATERIALS AND METHODS

This clinical trial was conducted on patients with acute coronary syndrome hospitalized in the CICUs of 22-Bahman Hospital in Gonabad, Iran in 2015. Convenience sampling was used to select the samples, and permutation block random sampling was used to assign them to control and experimental groups. Given a test power of 90% and a confidence level of 95%, after conducting a pilot anxiety study on 10 people (five in each group), the sample size was calculated as 19 for each group based on the mean comparison formula for two independent populations. Considering possible sample loss, a total of 50 individual including 25 in each group were recruited. Inclusion criteria comprised patient's informed consent for experimentation, definite diagnosis of acute coronary syndrome based on clinical symptoms, electrocardiography (ECG) and cardiologist's discretion, having suffered a heart attack for the first time, 30-80 years old, not taking anti-arrhythmic drugs during the hospitalization, a history of a cardiovascular disease for 0.5-6 years, absence of severe mental illnesses with signs of delusions and hallucinations, no cardiopulmonary resuscitation (CPR) upon admission, full consciousness and their ability to answer the questions, no history of sudden death in the family due to cardiovascular diseases, not having other serious physical illnesses that reduce life expectancy and the doctor's approval for patient's participation. Exclusion criteria consisted of patient's unwillingness to continue, emergence of arrhythmia, initiating its treatment or receiving CPR during the intervention period.

The measurement tools comprised a personal information form, Spielberger's State-Trait Anxiety Inventory (STAI), a monitoring device and a checklist for recording physiological indicators. STAI consists of two parts; the first part (S) consists of 20 items, measures state anxiety and indicates how one feels currently about the present situation while the second part (T), consists of 20 items, measures trait anxiety and shows how one feels in general [20]. A study confirmed the reliability of the test with Cronbach's alpha, which was calculated as 0.90 and 0.94 for the normal and case groups, respectively. Moreover, its reliability was confirmed through the ratio of true score variance to the observed variance in the normal group, which was calculated as 0.94. The standard error was 4.64, while the correlation of the observed scores with true scores and error scores was respectively 0.97 and 0.23. The mean trait, state and total anxiety scores were separately calculated in order to determine STAI validity, which was significant at 0.95 and 0.99 confidence levels [21].

A standard monitoring device (Sadat Company, Iran) was used to measure physiological indicators in patients such as respiratory rate, blood pressure, heart rate and SpO2, and they were then recorded in the checklist. Equivalent reliability was used to assess reliability, as the accuracy of sphygmomanometer was checked with a mercury sphygmomanometer (Riester Company, Germany); respiratory rate and heart rate were checked with a wrist watch, and SpO2 was checked with another pulse oximeter every day before starting the work. A text was first developed for the audio CD under the supervision of psychology professors based on Persian and English resources. Then, soundbites were recorded in several stages and sound effects were added with the help of sound recording professionals. The entire process was conducted with the approval of the psychology professors. CD's text contained phrases to visualize beautiful scenery such as a beach, pleasant scenes and positive affirmation to reduce anxiety.

This study obtained the ethics committee approval from Gonabad University of Medical Sciences (GMU.REC.1392.58) and was registered in the Iranian Registry of Clinical Trials (IRCT2014031016919N1). After obtaining permission from the authorities of 22-Bahman Hospital in Gonabad, the researchers provided patients with the informed consent form and explanation on the purpose of the study. After obtaining a written informed consent, the demographic information form and the research subject selection checklist were completed. Both groups completed STAI before the intervention, which started at the beginning of hospitalization for the experimental group. In addition to routine cares, members in the experimental group listened to the guided imagery CD for 16 minutes in the first three days of hospitalization, twice a day (8-10 AM and 8-10 PM) using CD players and headphones, while the control group received only routine care. The researcher was present at all sessions to control confounding factors and proper use of the CD. Physiological indicators such as systolic and diastolic blood pressure, heart rate, respiratory rate and arterial blood oxygen saturation were measured with the monitoring device in the experimental group and

recorded in a checklist during the three days of intervention, in the morning and at night before and after guided imagery, while the same was performed in the control group without guided imagery. Both groups completed STAI again after the three-day intervention.

The data were analyzed at a significance level of less than .05 using SPSS-14.5 and statistical tests such as Chi-square, Fisher's exact test, paired difference t-tests and repeated measures ANOVA.

3. RESULTS

Males and females, who comprised 60% and 40% of the study population respectively, had a mean age of 58.16 years. Illiterate patients comprised 50% of the samples, 30% were high school dropouts while the rest had a diploma or higher. They were matched for age, gender, education level, income and the number of hospitalizations (p> .05) (Table 1).

According to the data in Table 2, trait anxiety scores in the experimental group significantly reduced after the intervention (p< .05), while the reduction in the state anxiety scores in this group was not significant compared to the control group (p> .05). Meanwhile, general anxiety scores in the experimental group were significantly reduced compared to the control group (p< .05).

Table 3 shows no significant difference between the control and experimental groups in terms of the mean systolic and diastolic blood pressure (p> .05).

Table 4 (repeated measures ANOVA) indicates no significant difference between the two groups in terms of heart rate and the mean SpO2 (p> .05), while there is a significant difference in terms of respiratory rate (p< .05) because the respiratory rate in the experimental group was less significant than that in the control group.

Table 1. Comparison of frequency and percentage of sample demographic information in both groups

Demographic variables		Control		Case		*P*
		N	**Percent**	***N***	**percent**	
Sex	Male	14	56	16	64	.56
	Female	11	44	9	36	
	Illiterate	15	60	10	40	.26
Education	Under Diploma	5	20	10	40	
	Diploma and higher	5	20	5	20	
	35-50	4	16	6	24	.35
Age	51-65	17	68	12	48	
	66-80	4	16	7	28	
Income	Adequate	10	41.7	14	58.3	.25
	Inadequate	15	57.7	11	42.3	
Number of Hospitalization	Once	24	96	23	92	1
	Twice	1	4	2	8	

Table 2. The difference between the mean score of pretest and posttest for trait and state anxiety in both groups

Variables	Groups	*N*	Mean of pretest	Mean of Post test	Differece of mean	*SD*	Std Error	*t*	*p*
Trait	Case	25	37.04	29.20	-7.84	8.69	1.74	2.30	.025
Anxiety	Control	25	37.60	34.92	-2.68	7.04	1.41		
State	Case	25	43.08	33.44	-9.64	6.93	1.38	1.22	.23
Anxiety	Control	25	43.56	36.88	-6.68	9.98	1.99		

Table 3. Comparison of the mean systolic and diastolic blood pressure in both groups during the study period

Days	Control		Case		*p*
	Mean	***SD***	**Mean**	***SD***	

			sys	**Dias**	**sys**	**Dias**	**sys**	**Dias**	**Sys**	**Dias**	**Sys**	**Dias**
		Pre	143	84.68	24.32	10.74	129.24	81.76	24.37	10.74	.97	.93
	M	Post	127.64	78.16	27.15	13.92	130.52	83.48	23.85	16.01		
FIRST		Pre	123.24	76.60	18.12	13.92	123.12	78.36	24.13	15.72		
	E	Post	123	76.56	13.77	10.84	121.24	77.52	20.65	12.99		
		Pre	123.68	79.88	13.67	11.10	127.20	81.04	24.53	13.02		
Second	M	Post	123	80	12.99	9.89	121.32	74.12	22.79	14.61		
		Pre	120	76	11.08	8.16	126.68	76.48	28.06	10.26		
	E	Post	118.80	74.80	12.35	12.94	125.68	75.88	28.23	10.68		
	M	Pre	117.40	74.88	14.29	9.12	118.44	75.04	20.06	10.49		
Third		Post	115.60	74.68	14.23	9.40	114.76	74.80	12.60	10.15		
		Pre	114.44	73.12	13.96	9.01	114.80	73.20	14.10	9.98		
	E	Post	113.80	71.60	14.52	9.65	112.20	71.80	11.46	9.77		

M= Morning *E= Evening*

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4. DISCUSSION

Results of the present research demonstrated that guided imagery reduced trait anxiety in the experimental group, while it could not decrease state anxiety. This finding is compatible with that of various studies [10,14,17,18] but is not consistent with some others [9,19]. It seems guided imagery using CDs and headphones has helped patients focus on other subjects instead of focusing on the disease by visualizing relaxing places such as a beach and listening to the sound of sea gulls and waves. This change in focus from illness to relaxation has been able to alleviate the source of anxiety in cardiovascular patients, which might have arisen from disturbing thoughts caused by the disease. In line with the mind-body technique, this finding shows how patients' anxiety is reduced when they replace mental disturbances caused by an illness with pleasant thoughts and imagination. In addition, it seems that patients find fewer opportunities to activate and expand negative threatening thoughts as the origin of negative emotional responses such as anxiety in their mind. Some experts in the field express that guided imagery can change the transmission and perception of anxiety by distracting the patient's mind from anxiety-provoking stimuli, creating relaxation and affecting emotion and mood in patients [22]. From a physiological view, guided imagery affects the autonomous nervous system, limbic system and the release of endorphin through relaxation and reduces the feeling of stress and anxiety [23]. Furthermore, some hypotheses suggest that relaxation and positive imagery weaken hormonal and psychoneuroimmunology pathways that cause stress responses [15]. The inconsistency in the findings of this study and similar studies might originate from a difference in methodology such as lack of a pretest in the research design, the measurement tool and demographic differences. For instance, Jong, Pijl, de Gast, and Sjöling [10] expressed that guided imagery does not reduce preoperative anxiety [9], which might have been caused by the difference in methodology such as measures (Amsterdam Preoperative Anxiety Scale versus SpielBerger's inventory), the type of the disease and the research subject. Furthermore, the finding that guided imagery could not significantly reduce state anxiety in patients might be associated with

Table 4. Comparison of the mean heart rate, respiratory rate and SpO2 in both groups during the study period

Days			Control						Case					
			Mean			*SD*			Mean			*SD*		
			HP	**RR**	**SPO_2**	**HP**	**RR**	**SPO_2**	**HP**	**RRR**	**SPO_2**	**HP**	**RR**	**SPO_2**
		PRE	79.16	18.72	96.96	12.57	3.24	2.17	76.44	20.16	97.52	19.81	12.68	0.71
	M	Post	76.56	18.44	96.96	15.96	3.32	1.96	72.28	17.20	97.56	8.98	2.63	0.71
First		Pre	73.28	17.68	97.40	10.54	3.02	1.50	71.48	16.28	97.64	10.17	2.82	0.70
	E	Post	72.84	17.64	97.52	10.17	3.38	1.53	71.48	15.96	97.64	10.71	2.89	0.70
		Pre	72.40	17.28	97.56	9.98	2.88	1.44	72.60	15.32	97.76	11.12	2.21	0.72
Second	M	Post	72.68	17.32	97.52	9.41	2.91	1.63	71.32	15.44	97.80	9.67	2.25	0.70
		Pre	73.36	17.40	97.52	6.94	2.80	1.63	69.76	15.64	97.72	9.42	2.16	0.73
	E	Post	73.44	17.48	97.48	6.56	2.75	1.44	69.08	15.72	97.60	10.12	2.26	0.76
		Pre	74.72	17.76	97.52	7.11	2.47	0.71	71.32	15.84	97.72	13.27	2.41	0.84
Third	M	Post	75.68	17.84	97.48	6.43	2.28	0.71	73,68	15.76	97.84	11.83	2.54	0.74
		Pre	75.32	17.60	97.56	4.46	1.35	0.71	71.28	15.92	97.80	8.84	2.58	0.57
	E	Post	74.92	17.64	97.64	4.28	1.38	0.56	70.40	15.88	97.80	7.89	2.74	0.50
HP/F		*p*= .17	*F*=1.94											
RR/F		*p*= .02	*F*=5.44											
SPO_2/F		*p*= .31	*F*=1.07											

M=Morning E=Evening HP=heart pulse RR=respiratory rate SpO2=Peripheral oxygen saturation

the interference of the disease symptoms or state anxiety. In fact, imagery alleviates personal anxiety, but does not significantly reduce situational anxiety perhaps as a result of interference of physiological symptoms anxiety with the symptoms of acute coronary syndrome. This finding is in line with the opinion of some authors based on the possibility of different reactions of coronary heart patients with state and trait anxiety to therapeutic interventions [10].

Findings also indicate that guided imagery significantly reduced only respiratory rate and did not have a significant effect on systolic and diastolic blood pressure, heart rate and the mean SpO2 in patients. This finding is compatible with the study on the effect of music on the respiratory rate in coronary heart patients, but is not consistent with the same study in terms of heart rate and blood pressure [10] The finding of this study regarding the ineffectiveness of guided imagery on physiological indicators in patients seems to comply with the previous finding of the study. Guided imagery reduced trait anxiety in this study, but it had no effect on state anxiety and its physiological indicators especially those common with anxiety and acute coronary syndrome symptoms.

5. CONCLUTION

This study was limited by using self-report questionnaires and consequent possible response bias, the failure to assess patients' imagery capability, as well as probable confounding factors such as the severity of the disease, prognosis and psychological problems of the disease, such as psychological effects in assessing the physiological symptoms of the morning and evening as a circadian rhythm which are recommended as considerations in the next studies.

CONSENT

The researchers provided patients with the informed consent form and explanation on the purpose of the study.

ETHICAL APPROVAL

This study obtained the ethics committee approval from Gonabad University of Medical Sciences (GMU.REC.1392.58)

COMPETING INTERESTS

Authors have declared that no competing interests exist.

REFERENCES

1. Jariani M, Saki M, Momeni N, Ebrahimzade F, Seydian A. The effect of progressive muscle relaxation techniques on anxiety in Patients with myocardial infarction. Yafteh, 2011; 13(3):22–30.
2. Ghaleiha A, Emami F, Naghsh Tabrizi B, Ali Hassani R. A Survey on the Frequency of Depression and Anxiety in the Patients with Acute Coronary Syndrome, Ekbatan Hospital of Hamadan City. Scientific Journal of Hamadan University of Medical Sciences, 2011; 17(4): 43-49
3. Shiina Y, Funabashi N, Lee K, Toyoda T, Sekine T, Honjo S, Hasegawa R, Kawata, T, Wakatsuki Y, Hayashi S, Murakami S, Koike K, Daimon M, Komuro I. Relaxation effects of lavender aromatherapy improve coronary flow velocity reserve in healthy men evaluated by transthoracic Doppler echocardiography. International Journal of Cardiology, 2008; 129(2): 193–197.
4. Tully PJ, Cosh SM, Baune BT. A review of the affects of worry and generalized anxiety disorder upon cardiovascular health and coronary heart disease. Psychology, Health & Medicine, 2013; 18(6): 627–644.
5. Watkins LL, Koch G G, Sherwood A, Blumenthal JA, Davidson JRT, O'Connor C, Sketch MH. Association of anxiety and depression with all-cause mortality in individuals with coronary heart disease. Journal of the American Heart Association, 2013; 2(2): 1–11.
6. Thurston RC, Rewak M, Kubzansky L D. An Anxious Heart: Anxiety and the Onset of Cardiovascular Diseases. Progress in Cardiovascular Diseases, 2013; 55(6): 524–537.
7. Mathur R, Pérez-Pinar M, Foguet-Boreu Q, Ayis S, Ayerbe L. Risk of incident cardiovascular events amongst individuals with anxiety and depression: A prospective cohort study in the east London primary care database. Journal of Affective Disorders, 2016; 206: 41–47.
8. Allgulander C. Anxiety as a risk factor in cardiovascular disease. Current Opinion in Psychiatry. 2016; 29: 13-17.
9. https://doi.org/10.1016/j.jad.2016.07.046

10. Jong M, Pijl A, de Gast H, Sjöling M. The effects of guided imagery on preoperative anxiety and pain management in patients undergoing Laparoscopic Cholecystectomy in a multi-centre RCT study. BMC Complementary and Alternative Medicine, 2012; 12(1): 179-184.
11. Bradt J, Dileo C, Potvin N. Music for stress and anxiety reduction in coronary heart disease patients. In J. Bradt (Ed.), Cochrane Database of Systematic Reviews. Chichester, UK: John Wiley & Sons, Ltd. 2013.
12. Muschalla B, Glatz J, Linden M. Heart-related anxieties in relation to general anxiety and severity of illness in cardiology patients. Psychology, Health & Medicine, 2014; 19(1): 83–92.
13. Andrew H. Kemp A, Brunoni R, Itamar Santos Maria S, Nunes A, Eduardo M, Dantas De, Figueiredo R, Pereira AC, Ribeiro ALP, Mill JG, Andreão RV, Thayer JF, Bensenor I M, Paulo A. Effects of Depression, Anxiety, Comorbidity, and Antidepressants on Resting-State Heart Rate and Its Variability: An ELSA-Brasil Cohort Baseline Study. American Journal of Psychiatry, 2014; 171(12): 1328–1334.
14. Binkley PF. Mind-Body Approaches in Heart Failure Prevention. Current Cardiovascular Risk Reports, 2016; 10(1): 3-12.
15. Antall GF, Kresevic D. The use of guided imagery to manage pain in an elderly orthopaedic population. Orthopaedic Nursing. 2004; 23(5): 335-340.
16. Mizrahi MC, Reicher-Atir R, Levy S, Haramati S, Wengrower D, Israeli E, Goldin E. Effects of guided imagery with relaxation training on anxiety and quality of life among patients with inflammatory bowel disease. Psychology & health. 2012; 27(12):1463-79.
17. Hart J. Guided imagery. Alternative and Complementary Therapies, 2008; 14: 295-299.
18. Haipin LS, Speir AM, CapoBianco P, Barnett SD. Guided imagery in cardiac surgery. Outcomes management. 2002; 6:132-7.
19. Alam M, Roongpisuthipong W, Kim NA, Goyal A, Swary JH, Brindise RT, Iyengar S, Pace N, West D, Polavarapu M, Yoo S. Utility of recorded guided imagery and relaxing music in reducing patient pain and anxiety, and surgeon anxiety, during cutaneous surgical procedures: A single-blinded randomized controlled trial. Journal of the American Academy of Dermatology, 2016; 75(3): 585–589.
20. Thomas KM, Sethares KA.. Is guided imagery effective in reducing pain and anxiety in the postoperative total joint arthroplasty patient? Orthopedic Nursing. 2010.
21. Quek KF, Low WY, Razack AH, Loh CS, Chua CB. Reliability and validity of the Spielberger State-Trait Anxiety Inventory (STAI) among urological patients: a Malaysian study. The Medical Journal of Malaysia, 2004; 59(2): 258-267.
22. Zakerimoghadam M, Shaban M, Mehran A, Hashemi S. Effect of Muscle Relaxation on Anxiety of Patients Undergo Cardiac Catheterization. Journal of Hayat, 2010; 16(2): 64–71.
23. Gaylord C, Orme-Johnson D, Travis F. The Effects of the Transcendental Meditation Technique and Progressive Muscle Relaxation on Eeg Coherence, Stress Reactivity, and Mental Health in Black Adults. International Journal of Neuroscience, 1989; 46(1–2): 77–86.