

Effect of Massage Therapy on the Mood and Pain of Post Cardiac Catheterization Patients

Hanan Elkafafi Hassan^{1,2,*}, Fatma Mahmoud Mokabel³, Noor Ali AL_Radwan³

¹Medical Surgical Nursing Department, Faculty of Nursing, Cairo University, Cairo, Egypt

²College of Nursing, King Saud bin Abdul-Aziz University for Health Sciences, Jeddah, Saudi Arabia

³Critical Care Nursing, College of Nursing, University of Dammam, Dammam, Saudi Arabia

*Corresponding author: hehe29@gmail.com

Received February 14, 2019; Revised April 08, 2019; Accepted April 25, 2019

Abstract Pain is the most important complaint experienced by patients undergoing cardiac catheterization. Many patients consider hospitalization and cardiac catheterization to be psychologically distressing. In recent years, there has been a focus on complimentary therapies to manage or alleviate pain and anxiety. Body massages is one of complimentary therapies and have been tested in different populations and found to have marked effect in decreasing pain and anxiety. **Aim:** The aim of the study is to examine the effect of massage intervention on the mood and pain of patient after cardiac catheter. **Design:** A randomized single blind clinical trial design was used. **Setting:** The study was conducted in in the Coronary Care Unit at King Fahd Hospital of the University in Al-Khobar, Kingdom of Saudi Arabia. **Sample:** A random sample of 40 adults post cardiac catheterization. **Tools:** Three tools were used to collect data: tool 1: Demographic and Medical data Sheet, tool 2: The Profile of Mood States (POMS). Tool 3: The McGill Pain Questionnaire. **Results:** There was a highly significant reduction in pain scores after the sessions of the massage therapy, and there were a highly significant difference between before and after message sessions intervention in relation to all components and total mean score of mood profile. **Conclusion:** integrating the massage therapy into nursing intervention can enhance the mood and ability state and decreased anxiety, depressions, confusion and pain of patients after cardiac catheterization., **Recommendations:** Based on the result of the present study, it can be recommended that further study should be applied in relation to increase the sample of the study in control and experimental group, examine the relationship between illness perceptions and mood across coronary artery disease patients.

Keywords: *pain, mood, message, cardiac catheterization*

Cite This Article: Hanan Elkafafi Hassan, Fatma Mahmoud Mokabel, and Noor Ali AL_Radwan, "Effect of Massage Therapy on the Mood and Pain of Post Cardiac Catheterization Patients." *American Journal of Nursing Research*, vol. 7, no. 3 (2019): 392-399. doi: 10.12691/ajnr-7-3-21.

1. Introduction

Pain is the most important complaint experienced by patients undergoing cardiac catheterization. in spite they were administered sedative drugs , they frequently report mild to moderate pain [1]. Physiological response to pain may cause harmful effects on the recovery of the body after cardiac catheter. Post cardiac catheter pain for the adult patients may be caused by tissue retraction and dissection, multiple intravascular cannulations, cardiac catheter insertion, and multiple invasive procedures that patients undergo as part of their therapeutic regimen [2].

Coronary angiography (CA) has been shown to cause anxiety, fear and emotional stress. More than 80% of patients reported anxiety before CA [3]. Patients being scheduled for CA have demonstrated an increased anxiety during the waiting period [4]. Fifty percent of patients have reported that their fears, anxiety and uncertainty were more distressing than their chest pain [3].

Interestingly, the anxiety before CA was reported more, than the anxiety before open heart surgery. The reason might be that the patients were less prepared for this procedure compared with open heart surgery. Furthermore, the increased anxiety prior to surgical intervention, leads to higher complication rates during and after the surgical procedures [3]. Different approaches have been used for reducing the stress and anxiety level prior to CA. Educational interventions, music therapy, massage, guided imagery, therapeutic touches and stress management techniques revealed positive effects on anxiety before CA [5]. One study demonstrated that a 20-minute back massage before CA was significantly reduced the systolic blood pressure [6]. Although a 10-minute massage before CA procedure, was not sufficient to decrease stress level [7].

There are several factors relating to cardiac catheter-induced anxiety, these including pain and consequent fatigue, fear of death, disability, and persistent symptoms despite surgery. If the anxiety stays at a high level for a prolonged period of time, it may have deleterious effects on body,

mind and interpersonal relationships. Long-term, severe anxiety is generally accompanied by physiological responses such as increased metabolism, impaired cardiovascular and gastrointestinal functions and a weakened immune system as well as delayed wound healing and increased plasma levels in corticosteroids [8,9]. These responses can consequently lead to muscle tension, exhaustion, rapid heartbeat, breathing difficulties, high blood pressure, rapid changes in body temperature and even death. Anxiety-induced hypertension, if left untreated, may increase the risk of oozing or bleeding from suture lines [10,11].

Many patients consider hospitalization and cardiac catheterization to be psychologically distressing [12,13]. There is no consensus about the definition of psychological distress, but for the purpose of this review, the focus is on anxiety and depression as markers of emotional status [14]. Anxiety, a common psychological response (60%) in patients with cardiovascular disease, can cause unwanted clinical responses such as arrhythmias and ischemia that can lead to poor cardiovascular patient outcomes during cardiac catheterization [15,16]. In addition, depression is a common symptom (20%) in patients with cardiovascular disease [17,18].

In recent years, there has been a focus on complimentary therapies to manage or alleviate pain and anxiety. These therapies have many noninvasive techniques that are cost effective and simple with fewer side effects when compared to drugs [19]. Complimentary therapies are used as adjuvant therapy alongside conventional medical treatments to enhance overall health and promote a faster recovery. Massage therapy is one type of complimentary therapy and is recognized as an essential part of health and wellness [20,21]. Body massages have been tested in different populations and found to have marked effect in decreasing pain and anxiety [22]. One of the most popular forms of complementary medicine is massage therapy which is in third place among the complementary therapies in terms of the prevalence of use by patients [23]. Massage is the most common of the CAM therapies in nursing. It is easy, safe, non-invasive, and relatively cheap [24].

Massage therapy has a long history in cultures around the world. Today, people use many different types of massage therapy for a variety of health-related purposes. Although scientific research on massage therapy - whether it works and, if so, how - is limited, there is evidence that massage may be beneficial for some patients. Conclusions generally cannot yet be drawn about its effectiveness for specific health conditions [25]. Some studies show that massage has useful effects on cardiac, respiratory, endocrinology and immunity systems, mentality, anxiety and stress [26]. Indeed, massage could potentially decrease pain perception through the stimulation of large diameter nerve fibers which contributes to inhibiting nociceptive stimuli transmitted by smaller nerve fibers in the spinal cord. Evidence is emerging that massage therapy may be an important component of the healing experience for patients after cardiovascular surgery. Nurses have used complementary therapies for many years to relieve anxiety, promote comfort, and reduce or alleviate pain [1]. Recently, several studies have focused on the role of massage therapy in the hospital setting.

Several non-pharmacological interventions can be delivered by health professionals to reduce psychological

distress. However, there is limited information about what intervention in clinical practice is considered effective in reducing pain and psychological distress for patients who are undergoing a cardiac catheterization. Nurses caring for patients during the post-operative period find it challenging to manage their pain and anxiety. Although analgesic drugs are helpful in reducing pain, the adverse effects lead to further discomfort. Therefore, there is a need for nurses to have scientifically tested, simple and effective interventions to manage the pain and anxiety. Therefore, we aimed to examine if massage intervention will reduce pain and psychological distress effectively in patient after cardiac catheterization.

2. The Study Aim

The aim of the study is to examine the effect of massage intervention on the mood and pain of patient after cardiac catheter.

2.1. Hypotheses

H1. Massage therapy session will improve patient's mood post cardiac catheter.

H2. Massage therapy session will decrease patient's pain post cardiac catheter.

3. Subjects and Methods

3.1. Design

A randomized single blind clinical trial design was used in this study

3.2. Setting

The study was conducted in the Coronary Care Unit at King Fahd Hospital of the University in Al-Khobar, Kingdom of Saudi Arabia.

3.3. Subjects

A random sample of 40 adults post cardiac catheterization patients present in previous mentioned setting, meeting the following inclusion criteria.

- Adults aged from 18 years to 75
- Fully Conscious
- Hemodynamically stable
- Intact areas of massaging
- Adult who didn't use any methods of complementary medicine in the period of the study.

The total of 40 patients was divided into two groups, each group contains 20 patients were selected randomly, odd numbers for the study group while the even numbers for control group.

3.4. Tools for Data Collection

Three tools were used to collect data pertinent to meet the study aim. Two standardized tools beside demographic and medical data sheet which was developed by the

researcher as follow. All tools were translated by the researchers into Arabic, tested and verified by bi-language persons. Face validity was tested by two expertise in nursing college.

(1): Demographic and Medical data Sheet:

It was developed by researchers to collect data from the patient's regarding age, gender, medical history diagnosis, education.

(2) The Profile of Mood States (POMS).

POMS was a self-rating standardized questionnaire developed by McNair et al (1971) [27] to assess transient distinct mood states rapidly and reliably. The questionnaire included 65 items in the following six groups: anxiety, depression, fatigue, confusion, anger, and ability. The questionnaire included: 14 cases of anxiety, 15 cases of depression, 12 cases of anger, 9 cases of the ability, 7 cases of fatigue and 8 cases of confusion. Each item will accounted by using the Likert scale from the score of zero (never) to four (very much). Thus, the variable scores as follows: 0-56 for the subgroup of anxiety, 0-60 for the depression subgroup, 0-48 for the subgroup of anger, 0-36 for the subgroup of the ability, 0-28 for the subgroup of fatigue and 0-32 for the subgroup of confusion. In order to calculate the total mood score, the score of the five negative factors (including anxiety, depression, anger, fatigue and confusion) were added together. The positive mood score (the ability) was deducted from the mentioned score. Thus, the total score was ranged between 0 and 168 and the lower scores indicate a better mood. Its validity and reliability have been determined in various studies Brezden et al. [28], Iwamitsu et al. [29] and Albert et al.[23]. The reliability of this questionnaire in nursing was studied by calculating the Cronbach's alpha by Targari et al. [30] and also Fazel et al. [31] by conducting the study on 20 patients. Moreover, the POMS questionnaire in both studies was confirmed with $\alpha=0.81$.

(3): The McGill Pain Questionnaire:

The McGill Pain Questionnaire consists primarily of 3 major classes of word descriptors sensory, affective and evaluative, that is used by patients to specify subjective pain experience. It also contains an intensity scale and other items to determine the properties of pain experience. The questionnaire was designed to provide quantitative measures of clinical pain that can be treated statistically [32].

3.5. Pilot Study

The study was conducted on 5 patients as a pilot to examine the applicability and clarity of the tool. Then those cases were not calculated in the actual study sample.

3.6. Ethical Consideration

The research protocol was approval from the Research Ethics Board of Dammam University prior to data collection. Prior collection of data the permission to perform the study was attained from the responsible authorities in KFHU. Accordingly informed consent was signed from the patients after explaining the purpose of the study.

3.7. Procedure

The study subjects were randomly divided into study and control groups, odd number was placed in the control group and an even number placed in the study group. The patient demographic questionnaire and the profile of the mood states were completed for both groups. The study group patients were managed with Swedish Massage Stroke Level after cardiac catheterization by the physiotherapist with Odorless bitter almond. The massage applied on hands from the palm to the shoulder, back and quadriceps muscles and legs, It was done from second to fourth day of post catheterization, one session every day for three consecutive days, each massage session lasted for 30 min. Massage therapy was provided to the patients in the afternoon between 15: 00 and 17: 00 in a quiet private room located at CCU. In order to improve relaxation and prevent sudden movements by the participants, the location was quite, pleasant, and offered suitable privacy. Then on fourth day after the massaging session, the questionnaire (POMS) was completed by the researcher. On the other hand; patients in the control group received only the routine care without any intervention. The pain intensity score was measured by the McGill Pain Questionnaire twice in third and fifth day post cardiac catheterization for both groups.

3.8. Statistical Analysis

After completing the data collection process, the data was entered in the personal computer, SPSS version 20 was used for data analysis. Data were coded and tabulated, descriptive and inferential analysis was performed. The paired t test was adequate to examine the differences among the mean scores of the mood profile and its components after each intervention. The t test was appropriate for the mean scores comparison of the mood profile ratings and pain scores between the control and the study group. The correlation between pain and mood profile in both groups was tested by Pearson correlation coefficient (r). The confident interval was set at 0.95 % and all results were considered to be significant when $p < 0.05$, highly significant when $p \text{ value} < 0.001$.

4. Result

Table 1 revealed that there is no significant difference between the demographic characteristics of the two groups. Among the two groups, (60%) of patients were male and (40%) female in the study group while (55%) were male and (45%) female in control group. The mean age was 55.8 ± 12.6 in study group and it was 54.4 ± 14.3 in control group. As regards medical diagnosis, it can also be seen that coronary artery disease account (50% and 45%), followed by unstable angina (20% and 30%) for study and control group respectively, Myocardial infarction was account (20%) in both groups. 10% of the study group and 5% of the control group was diagnosed by left ventricular disease, this is mean that both group have the same characteristics and randomized properly.

Table 2 illustrated that there was no statistically significant differences through overall the mood profile

and pain score by applying the paired t-test; this is mean that both group are homogenous.

Table 3 shows that comparison of means scores of pain before and after the massage interventions in the study group. By applying the paired t test, there was highly significant reduction in pain scores in relation to the sessions of the massage therapy. Regarding mood profile, it is obvious that there was a highly significant difference between before and after message sessions in relation to all components and total mean score of mood profile.

Table 4 reveals that, there was a highly significant reduction in pain scores after applying routine care in the control group; this is due to pharmacological intervention

(strong analgesic). Regarding mood profile, it is obvious that there were a highly significant difference between before and after routine care in relation to anger, ability state, confusion components and total mean score of mood profile $t= 9.822, p < 0.000$, and $t= 8.643, p < 0.000$, $t= 6.343, p < 0.000$, and $t= 18.321, p < 0.000$ respectively.

Figure 1. As shown above, there is no significant correlation between the mood ratings and the pain level after the intervention of massage in the study group by applying the Pearson correlation test.

Figure 2. As shown above, there is no statistically significant correlation between the mood ratings and the pain level in the control group by applying the Pearson correlation test.

Table 1. Demographic Data and Sample Characteristics

Characteristics	Group		Total (N=40)	P value (Fisher exact test)
	Massage (N=20)	Control (N=20)		
Gender				
Male	11 (55%)	12 (80%)	18(60%)	
Female	9 (45%)	8 (20%)	2(40%)	
Age				
Mean \pm SD	55.8 \pm 12.6	54.4 \pm 14.3	55.1 \pm 13.4	1.00
Median	56	53	54.5	
Diagnosis				
Coronary artery disease	10 (50%)	9(45%)	19(47.5%)	0.28
Unstable angina	4 (20%)	6 (30%)	10(25%)	
Myocardial infarction	4 (20%)	4 (20%)	8(20%)	
Left ventricular Disease	2 (10%)	1 (5%)	3(7.5%)	

*Significant p value

Table 2. Comparison of the mean scores of mood profile and pain between control and study group before the intervention

Mood	Group Mean \pm SD		Paired t test	
	Control	Message	t	(P value)
Pain	64.70 \pm 2.90	63.20 \pm 2.39	246	.811
Anxiety	18.70 \pm 6.68	18.60 \pm 3.37	-.064	.951
Depression	20.20 \pm 2.65	22.00 \pm 2.98	2.141	.061
Anger	22.70 \pm 3.36	21.10 \pm 5.06	-1.037	.327
Ability state	9.40 \pm 2.716	9.50 \pm 2.32	1.500	.168
Fatigue	12.80 \pm 2.09	12.80 \pm 2.20	.000	1.000
Confusion	16.70 \pm 3.16	17.20 \pm 3.39	1.464	.177
Total Mood	110.60 \pm 11.59	111.60 \pm 9.05	.573	.581

Table 3. Comparison of the mean scores of mood profile and pain before and after the Massage intervention in the study group

Mood	Study Group Mean \pm SD		Paired t test	
	Before	After	t	(P value)
Pain	63.20 \pm 2.39	34.40 \pm 3.534	21.354	.000**
Anxiety	18.60 \pm 3.37	28.50 \pm 2.635	-8.613	.000**
Depression	22.00 \pm 2.98	23.40 \pm 3.596	-.868	.408
Anger	21.10 \pm 5.06	12.70 \pm 2.452	5.494	.000**
Ability state	9.50 \pm 2.32	19.90 \pm 1.370	9.847	.000**
Fatigue	12.80 \pm 2.20	9.80 \pm 1.033	5.379	.000**
Confusion	17.20 \pm 3.39	7.80 \pm 2.440	8.487	.000**
Total Mood	111.60 \pm 9.05	91.70 \pm 5.579	8.645	.000**

** Highly significant p value.

Table 4. Comparison of the mean scores of mood profile and pain before and after the intervention in the control group

Mood	Control Group Mean ± SD		Paired t test	
	Before	After	t	(P value)
Pain	64.70 ± 2.90	50.90 ± 5.04	8.254	.000**
Anxiety	18.70 ± 6.68	15.70 ± 5.47	1.660	.131
Depression	20.20 ± 2.65	19.30 ± 3.43	1.304	.225
Anger	22.70 ± 3.36	12.90 ± 2.99	9.822	.000**
Ability state	9.40 ± 2.716	19.50 ± 1.581	8.643	.000**
Fatigue	12.80 ± 2.09	11.90 ± 2.23	1.335	.215
Confusion	8.40 ± 2.716	16.70 ± 3.16	6.343	.000**
Total Mood	110.60 ± 11.59	77.60 ± 9.52	18.321	.000**

** Highly significant p value.

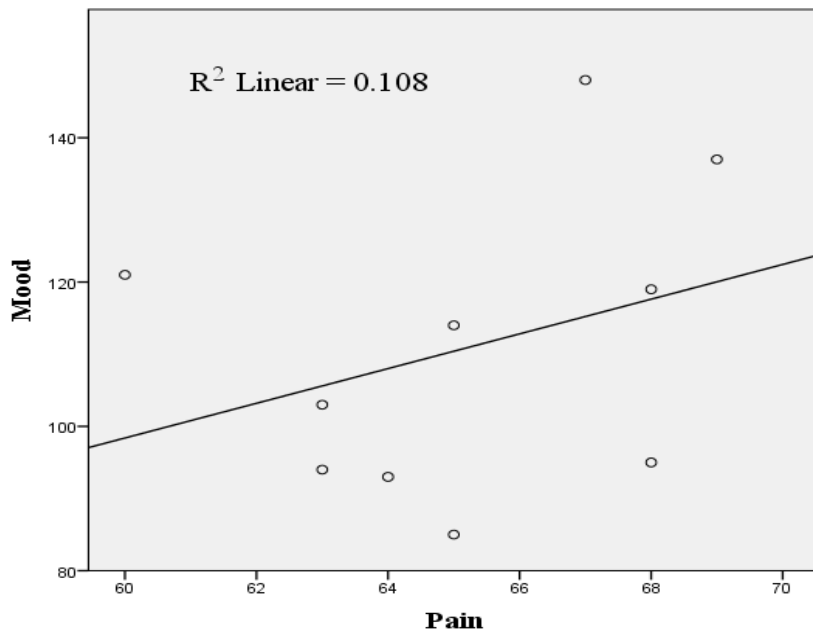


Figure 1. Correlation between the pain and mood scores after the intervention in the study group

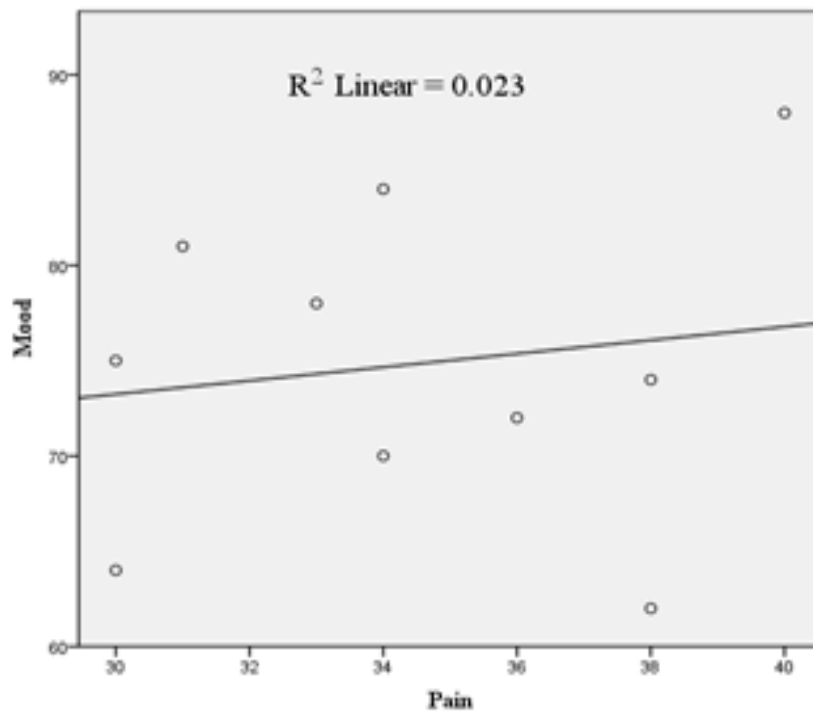


Figure 2. Correlation between the pain and mood scores after the intervention in the control group

5. Discussion:

The study finding showed that there is no significant difference between the demographic characteristics of the two groups. And also there is no significant differences through overall the mood profile and pain score this is mean that both group have the same characteristics and randomized properly. The findings of this study revealed that massage therapy could decrease pain score and improve the patients' mood after the post cardiac catheterization in the study group, that were characterized by a reduction in anxiety, depression, anger, fatigue, and confusion, while increase in patient's ability state.

The observed highly significant reduction of pain score after massaging on the study group and control group with routine intervention (pharmacologic intervention), it is important finding because of many pharmacologic interventions to treat pain full of adverse effect while massaging is safer especially if done by specialist. These results consistent with Soliman G & El-Amrosy S. [33] who conducted study to evaluate the effect of massage therapy on stress, anxiety, and pain among cardiac surgical patient, and reported that "There were highly statistically significant difference between pre and post intervention program regarding pain, anxiety and stress score levels in case group than control group, also there was highly statically significant positive relationship between pains, stress and anxiety (.000) i.e., when stress and anxiety increased, pain increased". In addition, Brent et al [34] found that, patients receiving massage therapy had significantly decreased pain, anxiety, and tension. Patients were highly, satisfied with the intervention and no major barriers to implementing massage therapy were identified.

Among the mood profile the study finding illustrated that there is a highly significant difference between the mean score of each component of mood profile (anxiety, depression, anger, ability state, fatigue and confusion) and overall total score before and after massage intervention in the study group which mean that the patient's mood was improved after massaging therapy.

According to the results of study was done by Albert et al [35], he found that there was a significant difference in the mean mood scores (before and after the interventions) in the case group and the mean changes in mood scores (after the intervention) was higher in the case group than the control group. So he concludes that the use of massage therapy as an effective nursing intervention can improve the mood of patients after open-heart surgery. Given the low cost and simplicity of this method, it can be used as a supplement to drug therapy and postoperative interventions in these patients.

In line with our findings, the study was done by Peng et al [36] indicated that massage treatments could reduce the preoperative anxiety level of cardiovascular Percutaneous Coronary Intervention (PCI) patients. After intervention, the blood pressure, heart rate, anxiety, and pain of the patients in the observation group were significantly better than those of patients in the control group. Therefore, health professionals should pay close attention to and strengthen the exploration of an effective and reasonable care intervention mode under PCI to

promote the physical and mental health of patients, and improve the life quality of the patients.

On the other hand; McNamara and colleagues assessed the impact of a 20-minute and Armstrong and others a 15 minute back massage with and without guided imagery. Both investigative teams found a significant reduction in blood pressure immediately post massage compared with the control group, and the Armstrong study demonstrated reduction in self-reported anxiety and heart rate. In contrast, Okvat and colleagues employed a 10-minute massage and that failed to reveal any difference between groups however they only employed a 10-minute massage and utilized visual analogue scales (VAS) to measure outcomes. There was no significant reduction in pain in either McNamara or OkxvcvOu studies [37]. Furthermore in a meta-analysis of 37 randomized controlled studies was done by Moyer et al [38] message therapy significantly decreased anxiety, pain, depression, heart rate and blood pressure in patient post-operatively.

Studies conducted in catheterization Laboratories have been limited to massage treatment alone or therapeutic touch and have provided conflicting results. Specifically, one study showed that a 10-min massage prior to a Cardiac catheterization procedure did not result in a significant reduction of anxiety or blood pressure, whereas another study showed that a 20-min massage prior to cardiac catheterization resulted in a significant reduction in systolic blood pressure and distress [7]. Moreover, study was done by Wentworth et al, to assess the efficacy of a 20 minute massage therapy session on pain, anxiety, and tension in patients before an invasive cardiovascular procedure. She found that the scores for pain, anxiety, and tension were identified along with an increase in satisfaction for patients who received a 20 - minute massage before procedure compared with those receiving standard care. This pilot study showed that massage can be incorporated into medical cardiovascular units' pre-procedural practice and adds validity to prior massage studies [39].

In addition, the present study finding shows that the mean scores between the study and control groups after massage intervention in relation to anxiety differed significantly. These results were in line with the study examined the effects of foot reflexology massage om anxiety in patients following CABG surgery and found this complimentary method effective in relieving anxiety in CABG patients, Our findings underscore the importance of non-pharmacological techniques for the relief of anxiety. Future research should investigate and compare the effects of different reflexology methods on anxiety in CABG patients [40]. In addition to Cutshall et al [41] investigated the role of massage therapy in the cardiac surgery postoperative period. Patients undergoing CABG and/or Valvular repair or replacement were recruited and divided into two groups. The experimental group received a 20 minutes full body massage between post-operative days 2 and 5, while control group was given standard care. Like the result of present study, the pilot study showed that massage therapy can reduce anxiety following cardiac surgery. Also, a study by Abert et al [23] concluded that it is possible to use massage therapy for cardiac surgery patients with two full body massages for 30 minutes each, which can have

an impact on the level of anxiety in cardiac surgery patients. Furthermore,

The present study shows that the pain scores after the massage interventions in the study group was decreased significantly. And also differed significantly in comparison with the control group. Which means that massage can positively affect the pain level. Carreck [42] evaluated effectiveness of massage therapy on level of pain perception in humans. She found that pain threshold was raised to significantly higher levels in the massage group and this work suggests that massage may be used to help manage pain and reduce treatment soreness. The effects of massage on connective tissues, which helps to reduce muscle spasm and soft tissue discomfort. Following the same hypothesis as other authors on the psychological effect on massage, this study confirms that the short term effects after the massage session were associated with a decrease in tension-anxiety and pain. These changes may be related to the ability of manual therapy to produce a parasympathetic vegetative response associated with massage-induced improvements in anxiety, depression and anger control.

The present study revealed that the mean scores of all components of the mood profile differed significantly between the two groups. Performing the three sessions of massage is associated with statistically significant effect on the total mood ratings of the study group in comparison with the mood of the control group. This result was in line with Jane SW et al [43] his result demonstrated that massage resulted in a linear trend of improvements in mood and relaxation over time. More importantly, the reduction in pain with massage was both statistically and clinically significant, and the massage-related effects on relaxation were sustained for at least 16-18 hours post intervention.

6. Implication

As the massage intervention gave satisfactory results for cardiac patients in the present study which means that integration of massage therapy into their routine nursing care become essential. Especially the nursing now days focus on caring and humanity so the massage therapy and also the results of this study can be used to provide good quality of nursing care and patient comfort.

7. Limitations

The sample size is considered small So that, the results of the present study is considered preliminary, and we cannot generalize especially it depends on patient-reported outcomes.

8. Conclusion

As far as we know, this is one of the very few studies that described the effectiveness of massage sessions on pain and mood of post cardiac catheterization patient in the intensive care unit. In conclusion integrating the massage therapy into nursing intervention can enhance the

mood and ability state and decreased anxiety, depressions, confusion and pain of patients after cardiac catheterization.

9. Recommendations

Based on the result of the present study, it can be recommended that further study should be applied in relation to:

- Increase the sample of the study in control and experimental group.
- Examine the relationship between illness perceptions and mood across coronary artery disease patients.
- Further research should focus on the systemic impact of illness perceptions.

References

- [1] Monahan FD, Sands JK, Neighbors M, Marek JF, Green CJ. Phipps's Text book Medical – Surgical Nursing. 8th edition, Mosby Co., 2007; 1: 321-324.
- [2] Lynch EP, Lazor MA, Gellis JE, Orav J, Goldman L, Marcantonio ER(1998) The Impact of postoperative pain on the development of postoperative delirium, *Anesthesia Analgesia*, 86(4): 782-785.
- [3] Mikosch P, Hadrawa T, Laubreiter K, Brandl J, Pilz J, Stettner H, et al. Effectiveness of respiratory-sinus-arrhythmia biofeedback on state-anxiety in patients undergoing coronary angiography. *J Adv Nurs*. 2010; 66(5): 1101-10.
- [4] De Jong-Watt WJ, Arthur HM. Anxiety and health-related quality of life in patients awaiting elective coronary angiography. *Heart Lung*. 2004; 33(4): 237-48.
- [5] McCaffrey R, Taylor N. Effective anxiety treatment prior to diagnostic cardiac catheterization. *Holist Nurs Pract*. 2005; 19(2): 70-3.
- [6] McNamara ME, Burnham DC, Smith C, Carroll DL. The effects of back massage before diagnostic cardiac catheterization. *Altern Ther Health Med*. 2013; 9(1): 50-7.
- [7] Okvat HA, Oz MC, Ting W, Namerow PB. Massage therapy for patients undergoing cardiac catheterization. *Altern Ther Health Med*. 2002; 8(3): 68-70-74-5.
- [8] Zakerimoghaddam M, Mehran A, Hashemi S, Shaban M. The effect of Benson relaxation in anxiety of patients with cardiac catheterization. *J Tehran Univ. Med Sci. (Hayat)* 2010; 16(2): 64e71 [Persian].
- [9] National center for complementary and Alternative Medicine Massage Therapy (2009). An Introduction. NCCAM Publication No. D327 Created: September 2006 Updated: June available in <http://nccam.nih.gov/>.
- [10] Kim MS, Cho KS, Woo H, Kim JH. The effect of hand massage on anxiety in cataract surgery using local anesthesia, *J. Cataract. Refract. Surg*. 2011; 27(6): 884-890.
- [11] Iwamitsu Y, Shimoda K, Abe H, Tani T, Kodama M, Okawa M. Differences in emotional distress between breast tumor patients with emotional inhibition and those with emotional expression. *Psychiatry Clin Neurosci* 2003; 57(3): 289-94.
- [12] DeJong-Watt WJ and Arthur HM. Anxiety and health-related quality of life in patients awaiting elective coronary angiography. *Heart Lung* 2004; 33: 237-248. 6.
- [13] Harkness K, Morrow L, Smith K, et al. The effect of early education on patient anxiety while waiting for elective cardiac catheterisation. *Eur J Cardiovasc Nurs* 2003; 2: 113-121.
- [14] Ridner SH. Psychological distress: concept analysis *J Adv Nurs* 2004; 45(5): 536-545. 8.
- [15] Bhattacharyya M and Steptoe A. Mood and transient car-diac dysfunction in everyday life. *J Biobehav Med* 2011; 32: 74-81.
- [16] Moser DK, Riegel B, McKinley S, et al. Impact of anxiety and perceived control on in-hospital complications after acute myocardial infarction. *Psychosom Med* 2007; 69: 10-16.
- [17] Carney RM and Freedland KE. Depression, mortality, and medical morbidity in patients with coronary heart disease. *Biol Psychiatry* 2003; 54(3): 241-247.

- [18] Arthur HM. Depression, isolation, social support, and car-diovascular disease in older adults. *J Cardiovasc Nurs* 2006; 21: 52-57.
- [19] Wentworth LJ, Briese LJ, Timimi FK, Sanvick CL, Bartel DC, Cutshall SM. Massage therapy reduces tension, anxiety, and pain in patients awaiting invasive cardiovascular procedures. *Prog Cardiovasc Nurs* 2009; 24: 155e61.
- [20] Babajani Saeed, Darzi Hosein Babatabar, Ebadi Abbas, Mahmoudi Hosein, Nasiri Ebrahim. The effect of foot reflexology massage on the level of pain during chest tube removal after open heart surgery. *Iran J Crit Care Nurs* 2014; 7(1): 15e22.
- [21] Chanif. Does foot massage relieve acute postoperative pain? A literature review. *Nurse Media J Nurs* 2013; 3(1): 483e97.
- [22] Braun Lesley, Stanguts Cathy, Spitzer Ondine, Hose Lisa, Gunawan Margaretha, Kure Christina E. A wellness program for cardiac surgery improves clinical outcomes. *Adv Integr Med* 2014; 1(1): 32e7.
- [23] Albert NM, Gillinov AM, Lytle BW, Feng J, Cwynar R, Blackstone EH. A randomized trial of massage therapy after heart surgery. *Heart Lung*. 2009; 38(6): 480-90. [PubMed]
- [24] Mok E, Woo CP. The effects of slow-stroke back massage on anxiety and shoulder pain in elderly stroke patients. *Complement Ther Nurs Midwifery*. 2004; 10(4): 209-16. [PubMed]
- [25] Tirgari B, Aghebati N, Fazel A, Koushiyar MM, Mokhber N, Esmaeli H. Adjuvant therapy relationship, with ascore of anxiety, depression and fatigue in breast cancer patients. *Journal of Nursing and Midwifery, Kerman* 2006; 6(1-2): 39-46. [InPersian].
- [26] Albert NM, Gillinov AM, Lytle BW, Feng J, Cwynar R, Blackstone EH. A randomized trial of massage therapy after heart surgery. *Heart Lung* 2009; 38(6): 480-90.
- [27] McNair, D.M., Lorr, M. and Droppleman, L.F. (1971). *Manual for the Pro@le of Mood States*. San Diego, CA: Educational and Industrial Testing Service.
- [28] Brezden CB, Phillips KA, Abdolell M, Bunston T, Tannock IF. Cognitive function in breast cancer patients receiving adjuvant chemotherapy. *J Clin Oncol*. 2000; 18(14): 2695-701. [PubMed]
- [29] Iwamitsu Y, Shimoda K, Abe H, Tani T, Kodama M, Okawa M. Differences in emotional distress between breast tumor patients with emotional inhibition and those with emotional expression. *Psychiatry Clin Neurosci*. 2003; 57(3): 289-94. [PubMed]
- [30] Tirgari B, Aghebati N, Fazel A, Koushiyar MM, Mokhber N, Esmaeli H. Adjuvant therapy relationship, with ascore of anxiety, depression and fatigue in breast cancer patients. *Journal of Nursing and Midwifery, Kerman*. 2006; 6(1-2): 39-46. [In Persian]
- [31] Fazel A, Tirgari B, Mokhber N, Koushiyar MM, Esmaeli H. Effectiveness of mastectomy on the quality of life in breast cancer patients. *Journal of Shaeed Sdoughi University of Medical Sciences Yazd*. 2008; 16(3): 28-36. [In Persian]
- [32] Melzack R. The McGill Pain Questionnaire: Major properties and scoring methods. 1975; *Pain*. 1(3): 277-299.
- [33] Soliman G & El-Amrosy S. Effect of Massage Therapy on Stress, Anxiety, and Pain among Cardiac Surgical Patients. *International Journal of Novel Research in Healthcare and Nursing*, January - April 2017, Vol. 4, Issue 1, pp: (185-194).
- [34] Brent A, et al. Effect of massage therapy on pain, anxiety, and tension after cardiac surgery: A randomized study. *Complementary Therapies in Clinical Practice* 16 (2010) 70-75.
- [35] Albert NM, Gillinov AM, Lytle BW, Feng J, Cwynar R, Blackstone EH. A randomized trial of massage therapy after heart surgery. *Heart Lung*, 2009 ; 38(6): 480
- [36] Peng S., Ying B., Chen Y., & Sun X. Effects Of Massage On The Anxiety Of Patients Receiving Percutaneous Coronary Intervention. *Psychiatria Danubina*, 2015; Vol. 27, No. 1, pp 44-49 Original paper © Medicinska naklada - Zagreb, Croatia.
- [37] Carrolll D., Malecki-Ketchell A. & Astin 3 F. Non-pharmacological interventions to reduce psychological distress in patients undergoing diagnostic cardiac catheterization: a rapid review. *European Journal of Cardiovascular Nursing* 2017, Vol. 16(2) 92-103.
- [38] Moyer CA, Rounds J, Hannum JW. A meta-analysis of massage therapy research. *Psychol Bull* 2004; 130: 3-18.
- [39] Wentworth et al *Massage Therapy Reduces Tension, Anxiety, and Pain in Patients Awaiting Invasive Cardiovascular Procedures*. *Progress in cardiovascular Nursing* .Dec. 2009; Vol. 24, No. 4.
- [40] Hattan J, King L, Griffiths P. The impact of foot massage and guided relaxation following cardiac surgery: a randomized controlled trial. *J Adv Nurs* 2002; 37(2): 199-207.
- [41] Cutshall SM, Wentworth LJ, Engen D, Sundt TM, Kelly RF, Bauer BA. Effect of massage therapy on pain, anxiety, and tension in cardiac surgical patients: a pilot study. *Complement Ther Clin Pract* 2010 May; 16(2): 92.
- [42] Carreck A: The effect of massage on pain perception threshold, *Manipulative Physiother* 26: 10-16, 2014.
- [43] Jane SW et al. Effects of massage on pain, mood status, relaxation, and sleep in Taiwanese patients with metastatic bone pain: a randomized clinical trial. *Pain*. 2011 Oct; 152(10): 2432-42.

