



## Investigating the Effect of Swedish massage on Thoracic Pain in Patients Undergoing Coronary Artery Bypass Graft Surgery

Zahra Pishkarmofrad<sup>1</sup>, Ali Navidian<sup>2\*</sup>, Ghangiz Azadi Ahmadabadi<sup>3</sup> and Elham Aliahmadi<sup>4</sup>

<sup>1</sup>Community Nursing Research Center, Zahedan University of Medical Sciences, Zahedan, Iran.

<sup>2</sup>Associate Professor, Pregnancy Health Research Center, Zahedan University of Medical Sciences, Zahedan, Iran.

<sup>3</sup>Cardiac Surgery Professor, Zahedan University of Medical Sciences, Zahedan, Iran.

<sup>4</sup>Master student of Critical Care Nursing, Department of Nursing and Midwifery, Zahedan University of Medical Sciences, Zahedan, Iran.

\* Corresponding E-mail address: [alinavidian@gmail.com](mailto:alinavidian@gmail.com)

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### ABSTRACT

Pain is one of the common complications after coronary artery bypass graft surgery. The current study aimed to investigate the effect of Swedish massage on thoracic pain in patients undergoing coronary artery bypass graft surgery at Ali-ibn Abi Talib Hospital of Zahedan, Iran in 2015. This study was performed on 50 patients undergoing coronary artery bypass graft surgery at Ali-ibn Abi Talib Hospital of Zahedan in 2015 in a randomized controlled clinical trial method. The patients were randomly divided into two massage and control groups with 25 cases in each group. The intervention group received Swedish massage for 20 minutes on the first day of transferring to cardiac surgical ward; however, the control group went under the routine control of the ward. Patients' pain intensity were measured and recorded 15 minutes before and after the intervention using Visual Analog Scale (VAS). Statistical analysis was done using Chi-square test, independent t-test and paired t-test and SPSS Software version 21. There was no statistical significant difference between the two groups in terms of pain intensity before the intervention. The mean pain score before and after intervention was  $60.80 \pm 11.46$  and  $44.32 \pm 11.58$  in the massage group and  $58.64 \pm 14.42$  and  $58.60 \pm 14.40$  in the control group, respectively. The result of covariance test showed that the mean pain score after intervention was significantly lower in the massage group than the control group ( $P=0.0001$ ). Considering the effect of Swedish massage on reducing pain in patients undergoing coronary artery bypass graft, massage therapy can be used as a safe and low-cost non-drug method for reducing pain in these patients.

**Keywords:** Coronary Artery Bypass Graft, Pain, Swedish Massage

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### INTRODUCTION

Cardiovascular diseases are considered as one of the most common causes of death for both men and women all over the world [1]. One of the available therapeutic interventions is open-heart surgery of Coronary Artery Bypass Graft (CABG) for Coronary Heart Disease (CHD) so that it is the most common open-heart surgeries [2]. This method has been done about 40 years in the medical world [3] and is one of the most valuable and effective ways to slow down and eliminate angina pectoris and the last option for treating CHD [4].

Heart surgeries are certainly followed by potential complications with regard to their difficult nature [5]. The most common complication after coronary artery bypass graft surgery is pain that the patient experiences in his sternal incision areas, areas of graft, invasive procedures and internal tissue sections, the drains, the chest tube and contraction of the experience [6]. Sternal pain is one of the significant problems of these patients and 50% to 70% of patients report severe to moderate pain which is vague and sometimes sharp and boring [7]. This acute pain starts a few hours after surgery and in case of inadequate control, it can make the person prone to chronic pains which remain stable for 6 months to one year [8]. Pain control leads to better breathing, easier and faster mobility and reduction of post-operative complications [9]. So, in order to reduce or control pain appropriately, various methods and drugs have today been examined. Relieving pain therapies include the use of narcotic and non-narcotic drugs, local anesthetic methods and complementary medicine method. Successful control of pain depends on the assessment of non- and pharmacological interventions and evaluation of patient's response [10]. Although pharmacological treatment of pain is the most powerful tool for pain relief which is available for nurses, it is not the only means of doing so. Along with the creation of less risk for patient, non-drug nursing activities can help to relieve pain and can be the most effective way for relieving pain on severe pain that last a few hours to a few days using non-pharmacological methods along with analgesics [11]. One of the ways attracting public attention is the use of complementary therapies after cardiac surgery [12,13].

Massage therapy is one of the most popular methods of complementary medicine and has the third rank with regard to the prevalence of use by patients [14]. The method is quite relaxing, simple and convenient and as a result, its tolerance is easy for all people. Today, there are more than 80 types of massage [15]. One of the types of massage is Swedish massage that Swedish per Henrik Ling began its clinical use in the early nineteenth century and thus, he was the founder of its principles and rules [16]. This massage is done with three moves of effleurage, pertissage and precaution. Effleurage consists of a stroke administered by the entire palm to improve the circulation in the area. In pertissage, muscle mass is gently rotated or pressed by hand. In precaution, light and fast rhythmic movements by the edge of hands or palms hit as concave to muscles [17].

During the massage period, on one hand, blood circulation is improved and pain transmission is prevented by sensory nerves; on the other hand; massage releases endorphins and enkephalins, so, it can cause reducing pain, increasing comfort, relaxation, decreasing muscle tension and anxiety in patients [18]. Studies conducted on the effects of massage on complications after cardiac surgery show conflicting results. For example, some studies suggest that massage reduces anxiety and stress, as well as post-operative pain in patients [19,20] while some show that massage will not cause any changes in these variables [21]. On the other hand, Wilkinson et al believe that the use of complementary therapies including massage and reflexology in health care services is still controversial [22]. Such uncertainties in communities and even among the medical community are one of the main challenges for entering these practices into a set of nursing measures [23]. This makes a rich background of research necessary to enter this issue into nursing interventions as soon as possible and on the other hand; given the importance of reducing post-operative cardiac complications, using complementary medicine will be a better alternative. Therefore, given this issue and since studies done in the world have achieved conflicting results and there are few studies in this field in Iran, the current study aimed to determine the effect of therapeutic massage on thoracic pain in patients undergoing CABG.

## MATERIALS AND METHODS

This is a single blind clinical trial study which was done on patients undergoing CABG in the time period between July to late January in 2015 at Ali-ibn Abi Talib Hospital of Zahedan. The sample size was obtained as 23 patients in each group based on the previous similar studies [19] and taking into account the level of confidence of 95%, the test power of 80% so that 25 patients were considered for more reliability and the possibility of sample loss. A total of 50 patients were selected for the two experimental and control groups. Samples were selected using convenient technique among from patients undergoing CABG and eligible with respect to the inclusion criteria of the study.

**Inclusion criteria:** the age range of 35 to 75 years old, lack of vision problem for the use of pain assessment tool, the first experience of thoracic surgery, elective surgery, the lack of personal drugs such as sleep aids, benzodiazepines, sedatives, narcotics and a minimum pain score of 40 by VAS, the history of diabetes less than 5 years, using saphenous vein and internal thoracic artery grafts and cardiac output more than 40% based on preoperative transthoracic echocardiography.

**Exclusion criteria:** patients with high pain who had no desire to be touched and continue to work, placement of tube chest in the time of collecting data, suffering from post-operative complications such as infection, bleeding, uncontrolled rhythm and dehiscence and facing with acute and severe emotional stress during the study.

The instrument for data collection was a form for demographic data and Visual Analogue Scale (VAS). Demographic form included age, sex, marital status, educational level and the number of grafts. Visual Analogue Scale (VAS) was designed to measure patients' pain by Faber and Taal in 1997. This is a 10 cm graded line whose first and last points represent the minimum and maximum pain intensity [24] and has been used to determine the severity of pain in several studies [25]. To calculate the reliability of VAS, retest method was used in a way that 20 patients were first asked to report their pain intensity on VAS and then, the same test was again performed on the same group in the time period of 2 hours later in the same conditions with the assumption that the patient's pain would not significantly differ compared to those of the first trial. The scores from the two tests were considered and their correlation coefficient was estimated and the reliability was obtained as 0.93.

After explaining the objectives of the study and adopting consent form from the study samples, the subjects were randomly divided into two experimental (therapeutic massage) and control groups. After determining the groups, the required explanations were presented to samples from both groups about the confidentiality of data, voluntary participation in the study, objectives, procedures and duration of the study. The researcher first provided patient and his surrounding environment for intervention before the onset of the intervention of therapeutic massage. The patients were prepared via referrals and familiarity, attracting trust and explaining the process and private environment was created with dragging the curtain. The whole intervention time was carried out in three stages including preliminary, intervention and post-intervention (support) stages.

Preliminary stage included referrals and familiarity with the study method which lasted for 10 to 15 minutes. Demographic information was recorded during the interview. Intervention was lasted for 20 minutes and after ending the intervention, the patient entered into the support stage and he was supported for 10 to 15 minutes so that the researcher was present next to the patient and replied to his questions.

In the therapeutic massage, massage was carried out by two male and female masseurs who were trained in the same method and were fluent for Swedish massage. Masseurs controlled the patient for wearing gowns before the start of the massage. Massage areas were back, neck, shoulders, arms and legs according to patient's request and preference and they were examined in terms of being healthy. Then, With regard to the placement of drains and pipes connected to the patient, the patient was in the most comfortable position: sitting on a chair, lying on his back or on his side on bed with the help of the masseur. Massage area was naked while other parts were covered by bathroom blanket. Masseur initially touched the client and considered his sensitivity and determined the desired pressure on the skin. The techniques used by the masseur included Swedish massage and focusing on the diaphragmatic breathing. Massage pressure was mild-to-moderate and odorless oil (glycerin) was used as a lubricant in the location of massage. The cause of avoiding aromatic oils was the possible effect of aromatherapy and interferes with the intervention. During the massage, the masseur focused on helping to remove tension or muscle cramps, pain, increase comfort and promote deep breathing. The masseur performed massage with a distance of 5 to 6cm from wounds and the place of the entered drains and according to patient preference in choosing area, angle, location, speed and amount of pressure, the massage was accurately determined by the masseur.

After doing massage for 20 minutes, the patient entered into support stage. At this time, the researcher remained bedside the patient for 10 to 15 minutes, supported him and answered his questions. To assess the degree of pain, the patient was asked to perform three cycles of deep breathing and then, cough. The degree of patients' pain was measured in the preliminary stage and 10 to 15 minutes after the support stages by nurses through VAS.

Patients in the control group underwent routine cares of ward and environment similar to that of therapeutic massage group was provided for them. The patient companions left the room for 20 minutes and the patient was encouraged to relax in bed. Like experimental group, determination of pain intensity was done in two stages of preliminary (before the break) and 10 to 15 minutes after the break. In addition, the support stage (respond to patient's questions) was carried out for these patients after the break.

The data was statistically analyzed by SPSS version 21. Descriptive statistics (frequency, percentage, mean and standard deviation) was used to describe data, chi-square test for comparing qualitative variables and independent t-test for quantitative variables. To determine the effectiveness of therapeutic massage on reducing patients' pain,

ANOVA was used via controlling the effect of pre-test. The level of significance was considered ( $P < 0.05$ ) in this study.

In the current study, ethical issues of obtaining permission from the university ethics committee, describing the work procedures to patients, adopting their consent, confidentiality of gathered data, justification of patients in conjunction with optional tend to continue to participate in the study and doing massage of male patients by a male colleague and female patients by a female colleague were considered. In addition, the physician treating patients was one of the study researchers and all considerations required for not harming patients were considered.

**RESULTS**

The mean age of the Patients was  $57.84 \pm 8.67$  years in the experimental group and  $62.40 \pm 10.27$  years in the control group. There was no statistical significant difference between the two groups in terms of age using independent t-test ( $P = 0.09$ ). The study subjects had also no statistical significant difference with each other in terms of other demographic features such as sex ( $P = 0.3$ ), marital status ( $P = 0.6$ ), education ( $P = 0.2$ ) and type of graft ( $P = 1.00$ ) and suffering diabetes ( $P = 0.6$ ) (Table 1).

**Table 1: Comparing demographic and medical characteristics in the experimental and control groups**

Variable \ Group		Experimental		Control		Result of Chi square test
		Number	Percentage	Number	Percentage	
Sex	Female	9	0.36	12	0.48	P=0.3
	Male	16	0.64	13	0.52	
Marital status	Marital	22	0.88	21	0.84	P=0.6
	Widowed men and women	3	0.12	4	0.16	
Educational level	Illiterate	17	0.68	19	0.76	P=0.2
	Elementary	2	0.08	3	0.12	
	Guidance	4	0.16	3	0.12	
	High school	1	0.04	0	0	
	Diploma and above	1	0.04	0	0	
Graft	Induction	1	0.04	1	0.04	P=1.00
	Saphenous vein	0	0.04	0	0	
	Both	24	0.96	24	0.96	
Suffering diabetes	Yes	9	0.36	8	0.32	P=0.6
	No	16	0.64	17	0.64	

According to Table 2, the study results showed that the two groups had no significant difference in terms of pain score before the intervention and the mean changes of pain score after the intervention was  $44.32 \pm 11.58$  in the therapeutic massage and  $58.60 \pm 14.40$  in the control group. The result of independent t-test indicated that the two groups had a significant difference with each other ( $P = 0.0001$ ).

**Table 2: Comparing the mean changes in the pain score before and after intervention in the experimental and control groups**

Group \ Time	Before intervention	After intervention	Changes	Paired t-test
	Mean $\pm$ SD	Mean $\pm$ SD	Mean $\pm$ SD	
Experimental	$60.80 \pm 11.46$	$44.32 \pm 11.58$	$-16.48 \pm 7.12$	t=11.56 df=24 P=0.0001
Control	$58.64 \pm 14.42$	$58.60 \pm 14.40$	$0.001 \pm 0.001$	P=0.99
Independent t-test	t=0.58 df=48 P=0.56	t=3.87 df=48 P=0.0001	t=-11.56 df=48 P=0.0001	

The result of ANOVA along with controlling the effect of pre-test revealed that the average pain score after therapeutic massage was significantly lower in the experimental group than that in the control group ( $P = 0.0001$ ).

**DISCUSSION**

The findings of this study showed that Swedish massage significantly reduced pain in patients after coronary artery bypass graft surgery. On the effects of massage on reducing pain in patients after cardiac surgery, the results other

similar studies are also consistent with the results of this study; however, they the types of massage are different in those studies.

The findings are in line with the findings of the following studies. In a similar study on 56 cases of coronary artery bypass graft, with one session of Swedish massage in 20 minutes within days 2 through 5 after surgery, Cutshall and Partners found that massage reduced the mean scores for pain, anxiety and stress in patients. In the study, the target population consisted of patients undergoing coronary artery bypass grafting and regurgitation replacement and massage area was chosen based on the patient preference [19].

Braun and colleagues studied 146 patients after open heart surgery in two stages of 20 minutes on days 3 or 4 and in the second stage of days 5 or 6 under the Swedish massage. They obtained positive results in reducing pain in the intervention group. The results of the above study is consistent with that of our study [26].

In order to determine the effects of massage therapy on pain and fatigue after coronary artery bypass graft surgery on 72 patients in Chamran Hospital in Isfahan, Shafie and colleagues concluded that there was a significant difference in terms of pain intensity after intervention in both intervention and control groups. In this study, Swedish massage for 20 minutes on four consecutive days on days 3 to 6 after the operation was performed in all patients, and for all the patients, the massage area included arms, legs and back [27].

In another study by Najafi *et al* on determining the effect of massage therapy on pain intensity in patients undergoing coronary artery bypass graft surgery at Namazi and Faghihi Hospitals of Shiraz, patient companions were trained classical Thai massage therapy for 60 to 90 minutes and then, the trained person was assessed. The patient massaged for 30 minute by the companion on the third day after surgery and the assessment of pain was done immediately, 30, 60 and 120 minutes after intervention so that in each of the four points, the patients reported the reduction of pain compared to the control group [28].

In the study conducted by Shafi'i, Najafi and Braun, patients received massage several times and its positive effect on patients was observed while in our study and in the study conducted by Cutshall [19], the positive impact of intervention was reported by a 20-minute massage session and pain assessment before and after the intervention.

However, in the study by Albert *et al*, the mean scores of mood, anxiety, stress and pain in patients after the intervention showed no statistical significant difference compared with those before the intervention [29] which is not consistent with the results of our study.

It seems that the reasons of controversy on the results of the mentioned and our studies are that in the above mentioned study, patients were laying on side during the massage and since these patients had a large incision in the sternum, this followed patient discomfort, as well as both feet were massaged thoroughly.

It seems that painful stitched foot also increased patients' pain and finally influenced the study results while in this and above studies, the area of massage has been in a comfortable position depending on request and choice of patient which causes patient's satisfaction with massage and reduction of patients' pain. In addition, in the above-mentioned study [29], researchers entered all patients with cardiac surgery including mitral valve repair or replacement and CABG and those who simultaneously underwent both surgeries while due to the difference in duration of surgery, these patients' place and amount of pain will vary with each other and the study results may be overshadowed by the mentioned cases while in the current study, only patients undergoing coronary artery bypass graft surgery were enrolled in the study and the same procedures were performed in terms of time in the first 24 hours of entering patients into the cardiac surgery ward.

Hattan *et al* conducted a quasi-experimental study on 25 patients with coronary artery bypass graft so that a 20-minute massage session was done for each of the test samples for 2 to 5 days after surgery and the results showed that massage therapy reduces the mean pain score and improves well-being in patients [30];

In the study by Hattan, Najafi and our study foot massage, Thai classical massage and Swedish massage have been used in a way that the results were positive.

Massage therapy has various types such as reflexology, Thai classical massage, deep muscle massage, Swedish massage, etc. [31]. During the massage period, blood circulation is improved and the transmission of pain is

prevented by sensory nerves; on the other hand, massage releases endorphins and enkephalins. So, massage reduces pain, increases convenience and comfort and reduces muscle tension and anxiety in patients [32]. In addition to the above cases observed in most kinds of massage therapy, Swedish massage stimulates the para-sympathetic system and inhibits the sympathetic system [33].

### CONCLUSION

The results obtained from the study suggest the positive effect of Swedish massage on reducing post-operative pain intensity in patients undergoing coronary artery bypass graft. Therefore, considering the positive effects of Swedish massage on post-operative pain, it can be said that as an effective nursing intervention, using it can reduce pain intensity in patients undergoing coronary artery bypass surgery and due to the simplicity of its application and low cost, it may be used as a useful supplement besides drug therapy and postoperative interventions in these patients.

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### REFERENCES

- [1] Murphy SL, Xu J, Kochanek KD, Bastian BA. Deaths: Final Data for 2013. *Natl Vital Stat Rep.* 2016; 64(2):1-119.
- [2] Academy for Guided Imagery, research findings using guided imagery for heart surgery [www.academyforguidedimagery.com](http://www.academyforguidedimagery.com). 2006. Available in 2013.
- [3] Aurora St. Management of Patients with Coronary Vascular Disorder. In: Hinkle JL, and Cheever KH. *Brunner Suddrth's Text Book of Medical Surgical Nursing*. 14<sup>th</sup> Ed. Philadelphia: Lippincott Williams & Wilkins; 2014:752.
- [4] Sadeghi M, Bozorgzad P, Ghaforian A, Ebadi A, Razmjoie N, Afzali M, et al. Effect of foot reflexology on sternotomy pain after coronary artery bypass graft surgery. *Iranian Journal of Critical Care Nursing* 2009; 22(92): 51-54.
- [5] Sadeghi A. Investigation the outcomes of CABG in patients with left ventricular dysfunction. *J Gilan Univ Med Scis.* 2009; 19 (73): 97-101.
- [6] Mehta Y, Kumar S. New horizons for critical care in cardiac surgery. *Indian Journal of Critical Care Medicine.* 2004; 8(1):11-13.
- [7] Pogatzki-Zahn EM, Zahn PK, Brennan TJ. Postoperative pain--clinical implications of basic research. *Best Pract Res Clin Anaesthesiol.* 2007; 21(1):3-13.
- [8] Gjeilo KH, Klepstad P, Wahba A, Lydersen S, Stenseth R. Chronic pain after cardiac surgery: a prospective study. *Acta Anaesthesiologica Scandinavica.* 2010; 54(1): 70-8.
- [9] Nerbass FB, Feltrim MI, Souza SA, Ykeda DS, Lorenzi-Filho G. Effects of massage therapy on sleep quality after coronary artery bypass graft surgery. *Clinics.* 2010; 65(11): 1105-10.
- [10] Meyerson J, Thelin S, Gordh T, Karlsten R. The incidence of chronic post sternotomy pain after cardiac surgery: a prospective study. *Acta Anaesthesiologica Scandinavica.* 2001; 45(8): 940-4.
- [11] Brunner, Lillian, Suddarth, Smith. *Text book of Medical-Surgical Nursing*. J.B co., Philadelphia. 2008; p.11.
- [12] Kshetry VR, Carole LF, Henly SJ, Sendelbach S, Kummer B. Complementary alternative medical therapies for heart surgery patients: feasibility, safety, and impact. *Annals of Thoracic Surgery.* 2006; 81(1): 201-5.
- [13] Beygab-aghmiri Z, Vije M, Latifnejad R. Effect of Acupressure on Early Painful Dysmenorea. *J of Faculty of Nursing and Midwifery, Tehran University of Medical sciences* 2006;11(3-4):19-28.
- [14] 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.
- [15] Bahraini S, Naji SA, Mannani R, Bekhradi R. The Comparison of the Effects of Effleurage Massage with Aromatic Oil and Non Aromatic Oil on Fatigue Severity in Women with Multiple Sclerosis. *Journal of Urmia Nursing And Midwifery Faculty* 2011; 9(5): 327-336.
- [16] Lund I. Massage as a pain relieving method. *Physiother;* 2000; 86 (12): 638-39.

- [17] Tappan F, Benjamin P, Editors. Tappan hand book of healing massage techniques. 4th Edition: United States:Appleton & Lange; 2005.
- [18] Torabi M, Solati M. Coercive effect of foot reflexology and relaxation on anxiety and physiological parameters of patients admitted for elective coronary angiography. *Journal of Nursing and Midwifery. Hamedan.* 2012;20(1):63-71.
- [19] 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. *Complementary Therapies in Clinical Practice.* 2010; 16(2): 92-5.
- [20] Braun LA, Stanguts C, Casanelia L, Spitzer O, Paul E, Vardaxis NJ, et al. Massage therapy for cardiac surgery patients--a randomized trial. *Journal of Thoracic and Cardiovascular Surgery.* 2012; 144(6): 1453-9.
- [21] 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.
- [22] Wilkinson S, Lockhart K, Gambles M, Storey L. Reflexology for symptom relief in patients with cancer. *Journal of Cancer Nursing.* 2008; 31(5): 354-60.
- [23] Crisp J, Taylor C, Pooter PA, Perry AG. Potter and Perry's fundamentals of nursing .2th ed. Philadelphia: Mosby. 2005.
- [24] Taal LA, Faber AW. Burn injuries pain and distress: exploring the role of stress symptomology. *Burns.* 1997; 23(4): 228-90.
- [25] Eghbali M, Safari R, Nazari F, Abdoli S. The effects of reflexology on chronic low back pain intensity in nurses employed in hospitals affiliated with Isfahan University of Medical Sciences. *Iranian Journal of Nursing and Midwifery Research.* March-April 2012; 17 (3): 239-243.
- [26] Braun LA, Stanguts C, Casanelia L, Spitzer O, Paul E, Vardaxis NJ, Rosenfeldt F. Massage therapy for cardiac surgery patients—a randomized trial. *J Thorac Cardiovasc Surg* 2012;144:1453-9.
- [27] Shafiei Z, Nourian K, Babae S, Nazari A. Effectiveness of light pressure stroking massage on pain and fatigue of patients after coronary artery bypass graft surgery-A randomized clinical trial. *J ClinNurs Midwifery* 2013; 2(3): 28-3.
- [28] Najafi S, Rast F, Momennasab M, Ghazinoor M, Dehghanrad F, Mousavizadeh S. The Effect of Massage Therapy by Patients' Companions on Severity of Pain in the Patients Undergoing Post Coronary Artery Bypass Graft Surgery: A Single-Blind Randomized Clinical Trial. *Int J Community Based Nurs Midwifery.* 2014; 2(3):128-35.
- [29] 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.
- [30] 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.
- [31] Mernagh D, Cartwright J. *Health and beauty therapy.* 3th Edition. United Kingdom: Nelson Thornes; 2006.
- [32] Torabi M, Solati M. Coercive effect of foot reflexology and relaxation on anxiety and physiological parameters of patients admitted for elective coronary angiography. *Journal of Nursing and Midwifery. Hamedan.* 2012;20(1):63-71
- [33] Fritz S, Editors. *Fundamental of therapeutic Massage.* 3<sup>th</sup> Edition. United States: Mosby; 2004.