Critical Care Nursing

Iran J Crit Care Nurs. 2014;6(4):229-234

Journal home page: www.inhc.ir

Comparing the effect of metatarsus and ankle reflexology massage on patients' state anxiety after coronary artery bypass graft surgery

Mahnaz Ahamadi [*], Ali Akbar Veisi Raygani[1], Mansour Rezaee[1], Behzad Heydarpour[1], Parvin Taghizaeh[1]

**1. Department of Nursing, Kermanshah University of Medical Sciences, Kermanshah , Iran*

ARTICLE INFO

Article type:
Original article

Article history:
Received: 5 Apr 2013
Revised: 9 Nov 2013
Accepted: 23 Nov2013

Key words:
Metatarsus reflexology massage
Ankle reflexology massage
Anxiety
Coronary artery bypass graft surgery

ABSTRACT

Aims: Anxiety is a common phenomenon after all the surgeries. Anxiety increases metabolism, cardiovascular and gastrointestinal activity and decreases immunity. Complementary methods such as; reflexology massage are interventions that due to their simplicity and lack of need to specialists are used for patients. This study was done with the aim of "comparing the effect of metatarsus and ankle reflexology massage on patients' anxiety".

Methods: In this clinical trial, the research society included men and women undergoing Coronary Artery Bypass Graft Surgery in Imam Ali hospital of Kermanshah that were randomly assigned to one of the three metatarsus, ankle reflexology massage and control groups in 2012. Anxiety is measured through Spileburge's State Anxiety Standard questionnaire; SPSS16 software, Kruskal Wallis, ANOVA and Man-Whitney tests were used for data analysis.

Results: Anxiety was decreased after using metatarsus and ankle reflexology massage. There was significant difference between state anxiety mean scores in control group and metatarsus reflexology massage group and also between control group and ankle reflexology massage group in the first day ($p<0.001$).

Conclusions: Metatarsus and ankle reflexology massage are effective in decreasing state anxiety in patients undergoing coronary artery bypass graft surgery. Therefore it is recommended to use these complementary methods for decreasing anxiety.

Please cite this paper as:
Ahamadi M, Veisi Raygani AA, Rezaee M, Heydarpour B, Taghizaeh P. Comparing the effect of metatarsus and ankle reflexology massage on patients' state anxiety after coronary artery bypass graft surgery. Iran J Crit Care Nurs. 2014. 6(4):229-234.

1. Introduction

Coronary artery diseases are among the most common cardiac diseases that despite the effectiveness of current medical practices in treatment, it is possible that many of the patients need to have vascular reconstruction. Coronary artery graft surgery is an effective way for reducing or eliminating symptoms of

* Correspondence Author: Mahnaz Ahmadi
Department of Nursing, Kermanshah University of Medical Sciences, Kermanshah , Iran. Tel:+98 8314276332
Email: ahmaif59@yahoo.com

[Downloaded from jccnursing.com on 2026-09-09]

angina [1]. About 500000 coronary artery bypass graft surgery is doing in the United States annually. Also in Iran 25000 open heart surgery is doing that about 50 to 60 percent of them is related to coronary artery bypass graft surgery [2]. Surgeries are among the causes of anxiety and anxiety is common phenomenon after every kind of surgery [3].

Surgery is a common treatment method in many hospitals that causes pain and anxiety for the patient [4]. Anxiety disorders is the most common mental disorders which is seen in 5 to 20 percent of the patients in medical centers, the main characteristics of these anxieties is mental and physical symptoms [5].

Anxiety like pain has negative effect on healing and tissue repair. Using enormous physical and mental energy during anxiety and pain can lead to patient's tiredness, incidence of biochemical activity in the body, autonomic nervous system stimulation, muscle tension and increased production of corticosteroids [6]. Maintaining this energy is necessary for tissue repair and improvement. Providing strategies for decreasing physical and emotional symptoms of anxiety justifies usage of non-drug therapies treatment, oil therapy and music therapy in nursing cares [7].

Anxiety is divided into two state and hidden category, the incidence of state anxiety is situational and depends on stressful situations [8], but hidden anxiety indicates individual differences in answering stressful situations with different amounts of state anxiety [9]. During taking care of the patients undergoing surgery, patient's anxiety should be noticed. A nurse should be able to investigate anxiety in the patient to perform necessary cares for preventing and reducing complications with appropriate measures [10]. Methods of controlling anxiety include pharmacological and non-pharmacological methods. According to the studies, Benzodiazepines are effective in relieving anxiety, but from one side complication of these drugs and from the other side, their temporary effect led to some studies regarding non-pharmacological methods; balancing anxiety and pain by using alternative (complementary) care methods are among these interventions [11]. Most of these interventions are easy and cheap and have little danger and complications that are used alone or along with other methods [12].

One of the branches of complementary medicine is reflexology massage which is done through reflexology [13]. Reflexology points are found in metatarsus or palms that reflect all the parts of the body in the form of a small mirror [14]. One of the theories regarding reflexology massage is that because mental tensions and pressures are responsible for 75% of the human's mental problems and because there are seven thousand nerves in every leg, stimulation of these nerve cells cause relaxation and stress reduction and returns the body to balance [15].

Study of Gonarsotio showed that foot massage have little effect on reducing anxiety of the patients suffering from artery coronary bypass graft surgery [16]. There are some studies regarding positive effect of metatarsus on the level of anxiety of the patients under surgery and there are some contradictions in them. These interventions are easy and cheap and have little risks and complications and it can be performed easily by non-specialist people. Considering that there limited number of the patients that metatarsus can't be used for them and ankle was not used for massage in none of the studies, this study had been done with the aim of "investigating the effect of metatarsus and ankle reflexology massage on the state anxiety level of the patients under heart surgery".

2. Methods

It was a clinical trial study which was done in Imam Ali hospital of Kermanshah in 2012. The researcher after investigating patients' files put the patients who had inclusion criteria in one the three groups of metatarsus massage, ankle massage and control group according to their gender and through randomly allocation. Inclusion criteria included having the age range

[Downloaded from jccnursing.com on 2026-09-09]

of 26 to 65 years old, having at least primary education, graft from the patient's left foot is removed, having feet health specially in patient's metatarsus and thumb, non-addictive drug use, sedatives and alcohol, lack of sensory and motor disorders, not having medical health care jobs, not suffering from chronic pain in other parts of the body such as; migraines and back pain, also all the patients who had weak to severe anxiety level were in the study. Exclusion criteria included; patient's unstable hemodynamic status, remobilization to ICU for more care, patient's dissatisfaction for participating in the study, failure to achieve adequate environmental conditions for doing intervention during research and patient's cardiopulmonary resuscitation (CPR).

Massage was done by the researcher and fellow sampler who achieved the necessary education by the sport medicine specialist, it was done under patient's right foot thumb and in the ankle once a day for ten minutes from 9 to 10 in the morning in the third and fourth days after surgery. Baby oil lubricant was used in massage places for reducing friction; in addition the gloves were not used.

In the women's surgery ward, massage was done by the researcher and in men's surgery ward, it was done by a colleague who was an educated man. A two-part questionnaire was used for collecting data. The first part was related to demographic information which includes: age, gender, residence, education level, marital status, occupation, history of hospitalization, number of hospitalizations and history of surgery.

The second part is related to questions of state anxiety in Spielburger's questionnaire. The amount of patient's state anxiety was measured before massage and immediately after massage in the third and fourth day after surgery. For analyzing data, SPSS 18 software and descriptive statistic (mean and standard deviation) and analytic statistic (Man-Whitney analysis, Kruskal Wallis, Chi-square and variance analysis test) were used.

3. Results

The most frequency of age in all the three groups was 51 to 60 years old and by using Chi-square, it was cleared that there is no statistical significant difference in terms of age (p=0.78). Number of the male and female samples is equal in all the three groups.

The most frequency of education level in all the three groups is under diploma (metatarsus 66.3%, ankle 81.8%, and control group 88.6%) and the least frequency of education level in metatarsus with 9.1% and in ankle group with 2.3% is BA and in control group with 2.3% is diploma. Most of the samples of the study were married (metatarsus 95.5%, ankle 96.6% and control group 96.5%) the most frequency of job in all the three groups was housekeeping (metatarsus 52.3%, ankle 45.5%, control group 45.5%). Most of the samples of the study were living in city (metatarsus 84.1%, ankle 75%, and control group 75%). Most of the samples of the study had the history of hospitalization (metatarsus 86.4%, ankle 88.6%, and control

Table 1: comparing the mean of state anxiety score in three metatarsus and ankle reflexology massage and control groups

The mean of state anxiety		Groups			ANOVA
		Metatarsus	Ankle	Control	
State anxiety score before the first intervention	Mean	45.50	42.18	44.11	0.292
	Standard Deviation	9.06	10.73	9.86	
State anxiety score after the first intervention	Mean	37.61	35.75	41.55	0.013
	Standard Deviation	9.19	8.80	9.65	
State anxiety score before the second intervention	Mean	41.50	39.41	42.52	0.226
	Standard Deviation	8.93	7.33	9.34	
State anxiety score after the second intervention	Mean	37.32	35.61	39.50	0.105

[Downloaded from jccnursing.com on 2026-09-09]

group 88.6%).

The mean of hospitalization times in metatarsus is 6102 times, in ankle 2.43 times and in control group 3.25 times and Kroskal Valias test did not show any significant difference in terms of hospitalization times in three groups. Most of the samples of the study had the history of surgery (metatarsus 65.9%, ankle 54.5%, and control group 61.4%). By using variance analysis test, there was significant difference statistically in the mean of state anxiety scores in the third day after the first intervention (p=0.013), but there was no significant statistical difference in the fourth day (p=0.105) (table 1). According to the results of Kroskal Valias test, there was significant difference between the means in the state anxiety scores in the first day of intervention (table 2). According to the results of Man-Whitney test, there was no statistical difference between the difference of state anxiety scores in metatarsus and ankle groups, but there was statistical difference between two ankle and control groups and metatarsus and control groups (p=0.001).

4. Discussion

Results show that there is significant difference in the mean of state anxiety scores in three metatarsus, ankle reflexology massage and control groups in the first day of intervention (p=0.013). The least mean of anxiety score is in the ankle group and the most mean of anxiety score is in control group. Mirbagher et al. (2011) showed significant difference in the mean of state anxiety scores in three music, Quran recitation, and control groups (p=0.001), also comparison among groups showed significant difference between music and control groups and between Quran recitation and control groups [16]. In the study of Mokhtari Nouri et al. (2007), there was significant difference between the mean of state anxiety scores in three control, foot reflexology massage and relaxation groups in the first time after intervention [14].

Kan states that reflexology causes relaxation in hyperactive parts of the body and stimulates inactive areas of the body and therefore makes balance and relaxation for the body. Also results of the study of Fritz showed that stimulating leg in reflexology activates parasympathetic nervous system and reduces anxiety symptoms.

Most of the studies in the world indicate positive effects of reflexology on anxiety of the patients that suffer from different problems such as different kinds of cancers and chronic diseases [18].

Studies of Lie showed that foot massage is also effective for reducing stress and anxiety and it can be helpful for the patients' depression which can be mentioned as foot massage side effects [19]. Also Hiest during some studies found that foot massage have potential effect in increasing patients' relaxation level and having the feeling of well-being [20]. Also Halm et al. during some different studies determined that patients who receive massage have better behavior and less stress [14].

In the study of Gounarsitio et al. that

Table 2: comparing the difference of the mean of state anxiety scores in three Metatarsus, Ankle reflexology massage and control groups before and after the first and the second intervention.

Difference of the mean of state anxiety scores during hospitalization	Groups						Kruskal Wallis
	Metatarsus		Ankle		Control		
Difference of the mean of state anxiety scores in the first day of intervention	Difference of the mean	difference of standard deviation	Difference of the mean	difference of standard deviation	Difference of the mean	difference of standard deviation	<0.001
	7.88	7.82	6.43	7.58	2.56	4..6	
Difference of the mean of state anxiety scores in the second day of intervention	4.18	7.82	3.79	5.95	3.02	5.26	0.24

[Downloaded from jccnursing.com on 2026-09-09]

investigated the effect of foot reflexology massage in patients under artery coronary bypass graft surgery showed that the mean of state anxiety scores after intervention in experimental group is more than control group [16], which is in contradiction with the results of our study, the reason of this contradiction may be in the little number of the samples that in this study four people were in intervention group and five people were in control group; also some problems in the process of this study can affect results.

In this study, inclusion criteria such as the effect of using anti-anxiety drugs with other complementary methods which leads to reduction of patients' anxiety is not considered. It can cause lack of observing any significant difference in terms of anxiety level between two intervention and control groups, while in our study, lack of using anti-anxiety drugs is among inclusion criteria.

Comparing the difference of the mean of state anxiety scores before and after intervention in one of the three groups of metatarsus, ankle reflexology massage and control groups showed significant statistical difference in the first day of intervention. There was no difference between metatarsus and ankle groups scores, but there was significant difference between metatarsus and control groups, study of Mokhtari Nouri et al. (2008) in this regard reported significant difference in the first day of intervention in the difference of the means in two control and metatarsus reflexology massage groups and between two control and foot relaxation groups; this difference is also significant between metatarsus reflexology massage and relaxation group [14]. Study of Kathrin et al. (2006) that investigated the effect of foot reflexology massage in cancer patients reported significant difference in the difference of the means in state anxiety scores in the first day of intervention group, while this difference was not significant in the second day of intervention [21].

In the results of the study of Nasrabadi et al. (2004), there was no significant difference in terms of the mean of state anxiety scores between two relaxation and incovations of God [22]; the reason of this contradiction with our study may be due to using two different methods in reducing patients' anxiety, also the time of study which is before surgery can affect the results of the study.

Results achieved from the research regarding the effect of reflexology is in consistence with the findings of Jeeraeeng Munkegel which indicates that foot reflexology massage increases blood flow, relaxation and the feeling of well-being, in addition , he/she showed that touching causes Endorphin secretion and anxiety reduction and as the result, it is very useful physically and mentally [23]. Study of Myoung Soug et al. (2013) also showed that massage affects improvement of systolic, diastolic blood pressure and sleep quality [24]. Results of the study of Eghbali et al. indicate (2012) useful effects of reflexology on severity of chronic pain among nurses [25].

5. Conclusions

Considering the results of the present study, reflexology can restore relaxation and reduce patients' anxiety in special and life-threatening conditions and also considering the results of other studies in the conditions that the patients suffer from anxiety related to acute, chronic and incurable diseases and even in front of daily life tension are also counted as a useful and worthy intervention.

6. Acknowledgements

This article is a student's thesis in Medical Sciences University of Kermanshah with the recorded code of IRCT201210031099N in clinical trial site. We thank and appreciate respectful colleagues of research and technology deputy of Kermanshah Medical Sciences University and also all the respectful staff of Imam Ali Hospital.

References

1. Sadeghi Shermeh M, Bozorgzad P, Ghafourian A, Ebadi A, Razmjooe N, Afzali M, et al. Effect of foot reflexology on pain of intensity sternotomy after

[Downloaded from jccnursing.com on 2026-09-09]

Coronary artery bypass surgery. J Crit care Nurs. 2009; 2(2): 51-4.[Persian]
2. Imanipoor M, Bassam poor S, Bohrani N. Evaluation of preoperative variables associated with extubation time after Coronary artery bypass patients. J Nurs & Midwifery Tehran Univ Med Sci. Hayat. 2006;12(1):5-11. [Persian]
3. Mc Clean GJ, Cooper R. The nature of preoperative anxiety . Anaesthesia. 1990;45:153-5.
4. Atari MA. Quran effect on reduction of anxiety and fixation of patients vital signs before induction of anesthesia. Quartery Med & Purification. 2000;37: 91-4. [Persian]
5. Koshan M, Vaghei S. Psychiatric Mental Health nursing, 7th ed. Tehran: Andisheh Rafie. 2005. [Persian]
6. Brunner LSH, SuddarthDS. Text book of medical surgical nursing: Critical thinking, ethical decision making and nursing process. Sami P, Translator1th ed. Tehran: Boshra. 1995. [Persian]
7. Ganger Tjellesen D, Yurkovich EE, Gragertm. Use of music therapy and other itnis in acute care. J psychosoc Nurs Ment Hearth . 2001;39:26-37.
8. Ghobari nabat B. Relationship between anxiety in parents with exceptional and normal chidren. J Area & Univ. 2007;31:56-70. [Persian]
9. Behdani F, Sargolzae MR, Ghorbani E. Evaluation of life associated with depression and anxiety in students of Sabzevar. J Sabzevar School Med Sci. 2000;7(2): 30-109. [Persian]
10. Craven RF, Hirnle CJ. Fundamental of nursing: human health and function. Philadelphia: Lippinco tt Co. 2000.
11. Memarian R,Vanaki Z, KelatehJari M. The effect of Bensons relaxation methods on anxiety of patients before abdominal surgery in men ward. Scientific J Res Scolar. 2000; 8(30):65-70. [Persian]
12. Hosseini Sima M, Elahi Moshksaran SH, Racekh AR, Mohebbi Nuviandegani Z. The effect of percutaneus electrical nerve stimulation in pain control after hip fracture surgery. J Sci Med Yasooj. Armaghan Danesh. 2002;7(27): 9-16. [Persian]
13. Stephenson NLN, Dalton JA. Using reflexology of pain management: Areview J Holistic Nurs. 2003;21(2):179-91.
14. Mokhtari Nouri J, Sirati Nir M, Sadeghi Shermeh M, Ghanbari Z, Hagiamiri Z, Tayebi A, et al. Effect of Benson quet and Foot reflexology massage on anxiety. School of nursing of medical sciences Baqiyatallah Tehran. J Behavioral Sci Res Center. 2009;3(2):159-65. [Persian]
15. Navidi AA. Methods modern medicine. 1th ed. Tehran: Tabib. 2008. [Persian]
16. Gunnarsdottir TG, Jonsdottir H. Does the experimental design capture the effects of complementary therapy? A study using reflexology for patients undergoing coronary artery bypass graft surgery. J Clin Nurs. 007;16(4):177-850.
17. Mirbagher Agorpaz N, Aghagani m, Shahshahani MS. Effect of music and sound of Quranon on anxiety and vital sighs of patients before abdominal surgery. Evidence–based care. J Nurs Midwifery Mashhad. 2011,1(1):63-76. [Persian]
18. Kahang LS, Moeni M, Babashahi M. Effect of foot reflexology on anxiety of patients before coronary artery bypass graft surgery in shahid chamran Isfahan hospital. Behavioral Sci Res Special Issue, Psychosomatic Disorders. 2001:1-8. [Persian]
19. Lee Ym. Effect of self- foot reflexology massage on depression , stress responses and immune function of middle aged women. Taehan Kanho Hakhoe chi. 2006;36(1):179-88.
20. Hayes J. Immediate effects of a five – minute foot massage on patients in critical care. Intensive care Nurs. 1999;15(2):77-82
21. Quattrin RA, Nini ZA, Buchini D, Turello MA, Nnunzi A, Atti S, et al. Use of reflexology foot massage to reduce anxiety in hospitalized cancer patients in chemotherapy treatment: methodology and outcomes. J Nurs Manage. 2006;14:96-100.
22. Nikbakht Nasr Abadi A, Taghavi Larijani T, Mahmoudi M, Taghlili F. The effect of Bensons relaxation methods and repeated invocations recommended on anxietry of patients before abdominal surgery. Hayat J. 2004;10(23):29-37. [Persian]
23. Jiraying Mongkol p, Chantein S, Phengchomjan N, Bhangananda N. The effect of foot massage with Biofeedback: A pilot study to enhance health promotion. Nurs & Health Sci. 2002;4(3):4-14.
24. Myeong-Sook Ju, Sahng Lee, Ikyul Bae, Myung-Haeng Hur, Kayeon Seong, and Myeong Soo Lee. Effects of Aroma Massage on Home Blood Pressure, Ambulatory Blood Pressure, and Sleep Quality in Middle-Aged Women with Hypertension. Evidence-Based Complementary and Alternative Medicine. 2013.
25. Eghbali M, Safari R, Nazari F, AbdoliS. The rffect of reflexology on chronic lowvback pain intensity in nurses employed in hospitals affiliated with Isfahan University of Medical Sciences. Iran J Nurs Midwifery Res. 2012:17(3):239-43. [Persian]

[Downloaded from jccnursing.com on 2026-09-09]