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The effect of acupressure on the quality of sleep in patients with acute coronary syndrome in Cardiac Care Unit

Masoumeh Bagheri Nesami[1], Mohammad Ali Heydari Gorji[1], Somayeh Rezaie*[2], Zahra Pouresmail[3], Jamshid Yazdani Chorati[4]

1. Department of Medical- Surgical Nursing, Nursing and Midwifery Faculty, Mazandaran University of Medical Sciences, Sari, Iran
**2. Nursing & Midwifery Faculty, Mazandaran University of Medical Sciences, Sari, Iran*
3. Faculty Member of Shahid Beheshti University of Medical Sciences and Health Services and TCM Specialist ,Tehran, Iran
4. Department of Biostatistics, Health Sciences Research Center, School of Health and Psychiatry and Behavioral Sciences Research Center, Mazandaran University of Medical Sciences, Sari, Iran

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ABSTRACT

Aims: Many patients hospitalized in CCU experience reduced quality of sleep. One of the methods for treating sleep disorders is using complementary medicine such as acupressure. The purpose of this study is "investigating the effect of acupressure on the quality of sleep in patients with Acute Coronary Syndrome (ACS) in CCU".

Methods: This is a two-group double blind clinical trial study which was conducted on 60 patients with Acute Coronary Syndrome (ACS) in Mazandaran Heart Center in 2013. Samples were selected from statistical available population and were randomly assigned in two groups. The group of acupressure received bilateral acupoint massage from the second night of hospitalization for two minutes during three nights, in every point it was totally 18 minutes. Patients in the control group received massage on these points with the same technique and time with 1-1.5 cm distance from the main points. The quality of patients' sleep was completed with SMHSQ hospital sleep questionnaire. Findings were analyzed by $SPSS_{18}$ software and $\chi 2$, independent t-test, RM-ANOVA statistical tests.

Results: There was significant difference between sleep quality of the patients in acupressure group and control group which was also statistically significant ($p < 0.05$).

Conclusions: This study showed that acupressure can have therapeutic effect in improving quality of sleep in ACS patients. Therefore this method can be taught to nurses who have an important role in the identification and elimination of patients' sleep disorder and also it should be taught to the patients themselves and their companions.

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1. Introduction

Cardiovascular diseases are among the most common diseases in human societies and number of these patients is increasing in the recent decades [1]. One death of every six deaths in America in 2008 was due to coronary artery disease. On mean in every 25 minutes one American suffers from cardiac events and one person dies every one minute [2].

* Correspondence Author: Somayeh Rezaie
Nursing & Midwifery, Mazandaran University of Medical Sciences, Sari, Iran. Tel:+98-235235112
Email: aram_ir2007@yahoo.com

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The beginning of cardiovascular diseases, especially coronary diseases is extremely increasing in China, India, Pakistan and also east Meditrenean and Middle East and it is considered as an important health and social problem [3-6]. Every year about 3.6 million people are hospitalized in the hospitals under the medical education, treatment and health Ministry of Iran and the remarkable number of these patients are those who are suffering from heart diseases specially patients with acute coronary syndrome that includes acute myocardial infarction and unstable angina [7]. Most of the problems due to sleep in the patients is because of their hospitalization [8]. Many patients who are hospitalized in CCU experience reduced quality of sleep regarding mental and environmental factors [9-13]. Patients with acute myocardial infarction, despite controlling environmental factors have altered sleep structure (pattern) that it can be because of physiologic inflammatory changes or nature of MI itself [14].

About 56percent of the patients are sleeps–deprived at the end of the first day of hospitalization. According to the studies, ACS patients had low sleep quality in the first three days of their hospitalization [15,16]. comfortable sleep is hard for the patients hospitalized in intensive units and it is because of monitoring, lights of the unit, noise due to taking care of other patients, mechanical ventilation, nurses' frequent waking, using sedating and inotrope drugs, disease severity and awakening patients early in the morning and it is while patients need more sleep in these units [10]. It is clear that hospitalization can disturb remarkably sleeping model [17].

Sleeping is one of the main needs of the human beings and it is necessary for maintaining and keeping energy, appearance and physical well-being. Sleep has an important role in cardiovascular function and its deprivation causes intensified anxiety, irritability, anger, increase in heart beat and myocardial oxygen demand in a frequent and dangerous cycle [18,19].

Insomnia can be treated by drug, treatment plant, psychotherapy and physiological treatments [20]. The most common way to treat or cope with sleeping problems is using drugs; according to the researches, there is no significant difference in sleep quality of the patients who use these drugs and people who do not use them, however, the effectiveness of therapies without using drugs is slower than the effectiveness of sleep aids, but it is more permanent and it doesn't have the drugs side effects such as; memory deficit, drug resistance, dependency and addiction. One of the methods for treating sleep disturbance is using complementary medicine such as acupressure. Acupressure is among non-pharmacological treatments which are attended a lot nowadays and world health organization confirmed using acupressure in one hundred cases. Acupressure is an art in traditional Chinese medicine, in this method of treatment fingers are used for pressing the key points on the skin surface for stimulating and inducing body's natural self-healing abilities [21] acupressure can make comfort and sleep through massaging and stimulating some points in the head, hands and back [22], people can use this treatment method by themselves or by the help of other members of the family [23]. There are some articles about acupressure effect on elderlies [24] and hemodialysis patients' sleep quality [25] in the Iranian available database, but there is no article regarding acupressure effect on sleep quality of ACS patients; therefore because of high prevalence of insomnia in intensive units and the effect of acupressure as a noninvasive and complementary method in treating sleep disorders , the present study is done with the aim of studying the effect of acupressure on sleep quality of the patients hospitalized in CCU to take a step in improving sleep quality, health and thus improvement of ACS patients' life quality and satisfaction.

2. Methods

This is a two-group double blind clinical trial study with IRCT201302277494N3 code which

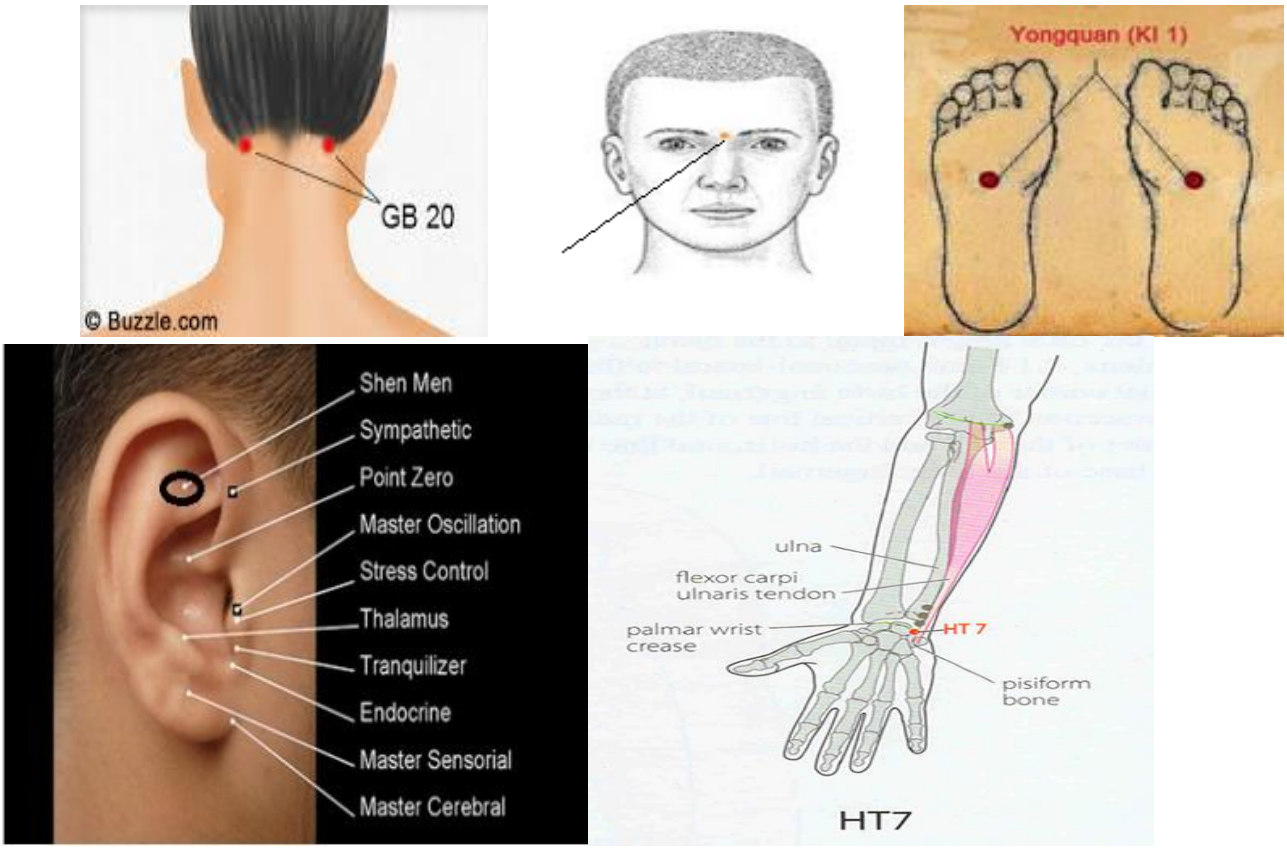
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was done on 60 ACS patients in Fatimatazahra (S) education center of Sari (heart center of Mazandaran) in 2013. Samples of this study were selected from convenient statistical population and after determining inclusion criteria, they were divided into two thirty-people intervention and control group through randomly assignment and by using random numbers of Rand between Excel software.

According to a similar study, the present study in Iran (9) with 95% confidence and with mean and standard deviation of insomnia total score before and after intervention in experimental group was counted 20.12±5.76 and 13.31±2.58 respectively, sample size with thirty people in every group was counted 60 samples totally. Inclusion criteria included; patient's willingness to participate in the study, having the minimum age of 18 years old, awareness of the time and the place, not doing surgery and Ejection Fraction (EF) over forty percent [26].

Exclusion criteria included; receiving drugs five to six hours before sleeping at night, hearing and vision disorders (in a way that cannot have communication with the researcher), drug addiction, getting used to using any kind of effective drug or method for sleeping, using leg or wound Amputation and Inotrope at the site of acupressure points, emergence of acute problems at the time of hospitalization and lack of the person's cooperation in continuing the research.

Before the beginning of the study, the aims of the study were explained to the patients and after achieving the written consent and before beginning of the intervention, questionnaires regarding assessment of demographic and clinical characteristics of SMHSQ (ST Mary's Hospital Sleep Questionnaire) regarding patients' sleeping at home (the night before when they were at home) was completed and considered as the basis of measurement.



Picture 1: selected points for massage in the real acupressure points

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Demographic questionnaire included; age, gender, marital status, literacy level, education level, history of heart disease, history of hospitalization, type of underlying disease, the amount of EF, the experience of using sleep aid and its type and the experience of using complementary medicine.

SMHSQ is a questionnaire that is designed for evaluating sleep status of the hospitalized patients [27]. It is sleep systematic questionnaire for assessing the last nigh sleep and it can be repeated again. The questionnaire includes fourteen items for assessing subjective sleep time and quality; it includes Likert scale and filling the blanked in every question. Validity and reliability of SMHSQ questionnaire have been assessed in many studies all over the world.

There is no standard grading in this questionnaire and it is used based on the study [28]. In the present study, according to the experts and specialists' opinion and due to the need to sleep status analysis, SMHSQ questionnaire is scored. Scores are between ten to fifty. Ten means lack of sleep disorder and fifty means severe sleep disorder, 10 to 22; slight sleep disorder, 23 to 36; moderate disorder and 37 to 50; severe sleep disorder. Less scores means less sleep disorder and higher scores means more sleep disorder. In Iran Moyeeni [9] and Abolhosani used this questionnaire for their studies. Abolhasanin achieved 91 percent reliability by Cronbach alpha for this questionnaire [29].

In the present study, quantitative content validity with CVR (Content Validity Ratio) and CVI (Content Validity Index) were used for assessing content validity and their amounts were estimated 0.928 and 0.938 respectively. Also reliability of this questionnaire was calculated by Cronbach alpha coefficient. 80% reliability was estimated for this questionnaire.

There was no intervention at the first night of hospitalization due to the patients' acute conditions, the next day questionnaires about patients' first night of sleep in the hospital were completed. Intervention for the patients was started from the second night of hospitalization. Patients in intervention group received acupressure in the points of Feng Chi behind the head, Yin tang in the forehead, Ear Shenmen, Wrist Shenmen and Yangchuan in the soles of the feet bilaterally (picture 1) they received acupressure with the pressure about three to four Kilogram in every point and they received two minutes massage for every point in the form of five seconds massage and 1 second rest rotationally two rounds per second with thumb and it was totally 18 minutes for nine points for three consecutive nights between 7 to 10 at night [22,24,25,30-33] the intervention was done by the researcher who was trained for one month by acupuncture center professors of Iran. In the control group pressure of the same points was done for the same time with the distance of 1 to 1.5 cm from the technique main points.

For both of the group, the questionnaires were completed by another person who was aware of the way of patients' allocation in the groups, every day in the morning between 7 to 8 , for four days (the first day of hospitalization and three days of intervention). The patients themselves were not aware about the group that they were belonged to. According to the review studies about acupuncture and acupressure, although acupuncturist's blindness is very hard, necessary efforts should be done about blindness of the patients and the person who is assessing results of the intervention [32]. Therefore in this study blindness of the patients and the person who fills the questionnaire was done.

In this study $SPSS_{18}$ software and descriptive and inferential statistic are used for data analysis. For demographic features descriptive statistic (frequency distribution table, mean, standard deviation …) and for comparing scores related to quality, independent t-test and by considering repetitive measurements, variance analysis of repeated measurements test were used in the two groups. It should be mentioned that the significant level for doing calculations is considered $p<0.05$.

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3. Results

There was no significant difference between age and gender in the two groups. The mean age of the patients in intervention group was 60.30±11.78 and in control group was 61.60±10.52 and in both intervention and control groups 50% of the patients were male and 50% were female. Ejection Fraction mean of the samples were 50.01±4.65 percent. Most of the samples were married (96.7%), (43.3%) housekeeper and (48%) illiterate. 68.3% had the prior experience of hospitalization. 21.1% of the patients had the history of diabetes and 37.8% had the history of high blood pressure. Most of the patients (83.3%) did not use any sleeping aid at home. Most of the drugs included diazepam and Lorazepam respectively which were stopped in the hospital.

The moderate score of sleep quality at home in 60 patients of this study which was considered as the base score was 27.07±4.04. Since this mean is between 23 to 36, it indicates that patients were suffering from moderate sleep disorder. There was no significant difference in sleep quality score at home between the two groups (p=0.806) (Table 1).

88.4% of the patients were suffering from sleep disorder in the first night of hospitalization. Moderate score of sleep quality of 60 patients in this study in the first night of hospitalization was 29.11±5.45 which indicates moderate sleep disorder and it was increased in compare with sleep quality score at home (27.06). In other words these patients experienced lower sleep quality in the first night of hospitalization in compare with their sleeping in the house. The mean score of sleep quality of the two groups in the first night of hospitalization with the independent t-test was not statistically significant (p=0.806); but comparison of sleep quality scores in the two groups during the three nights of hospitalization was significant by using statistical independent t-test (p<0.05) (Table 2). Comparing the mean of sleep quality scores of the two groups with independent t-test showed that there was significant difference in the first night (p<0.0001), the second night (p=0.001) and the third night (p<0.0001) of intervention in sleep quality between intervention and control groups. By using variance analysis test of repeated measurements, sleep quality between the two groups was statistically significant in a way that in assessing patients' sleep quality score with respecting to the time and time and group interaction, it showed that the two groups were significantly different in improving their sleep status over time (p=0.01 and f=3.58).

Variance analysis test of repeated measurements during five times of assessment in acupressure group showed significant difference statistically (p=0.003) (Table 2). For two by two

Table 1: comparing score of sleep quality in the house, the first night of hospitalization and after three nights of intervention in the two groups

Times of assessing the groups	House	After the first night of hospitalization	After the first night of intervention	After the second night of intervention	After the third night of intervention	Analysis variance of repeated measures
Acupressure M±SD	26.94±4.3	28±5.2	24.63±2.96	25.83±3.88	25.66±3.60	p=0.003 f=5.16
Controlling false points M±SD	27.20±3.83	30.20±5.82	29.63±5.12	29.83±4.82	30.03±4.05	p=0.18 f=3.11
Significant level Independent t-test	p=0.806 t=0.35	p=0.130 t=0.025	p<0.0001 t=6.70	p=0.001 t=2.63	p<0001 t=1.40	

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comparisons in each group in the house, Benferroni test was used in terms of sleep quality score, in the first night of hospitalization and during the nights of intervention.

Results of the comparison showed that there was significant difference between sleep quality score in the first night of hospitalization and the first night of intervention in intervention group (p=0.023); it means that this group of the patients had better sleep quality after the first night of intervention. In the control group the mean of sleep quality score before intervention (the first night of hospitalization) and during intervention was not statistically significant.

4. Discussion

Results of this study showed that acupressure was effective in improving sleep quality. Most of the subjects of the study had inappropriate sleep quality and experienced reduced sleep quality in the first night of hospitalization in a way. Different studies have reported these statistics differently: in a study which was about the effect of earplugs on the sleep quality of the patients with Acute Coronary Syndrome (ACS), the percentage of sleep quality disorder was reported 68.3% [34].

In the study of Zerati et al. on the patients of internal ward, 74% of the patients had inappropriate sleep quality [12]. This percentage in the study of Izadi et al. regarding hospitalized elderly patients was 46.59% [35], in the study of Amiri et al. on the patients of different wards of the hospital was 63.6% [36] and in the study of Kazemi et al. [37] it was 50%. May be the high percentage of inappropriate sleep quality in this study in compare with other studies is related to the difference in wards of the study, type of the patients or the used questionnaire, in this study SMHSQ was used but other mentioned studies used Pitezburge sleep questionnaire.

Lack of using Pitezburge questionnaire in the present study was because of that this questionnaire is designed in a way that shows sleep quality of the last month [38]; therefore it is not appropriate for studying the effect of interventions that takes time less than one month and also sleeps status of the last night of the hospitalized patients. Also other studies reported reduced sleep quality and mentioned different factors in justifying sleep disorder in CCU. So it seems that these factors that include nursing interventions in taking care of the patients, disease severity, noise and environmental factors, mechanical ventilation, pain, drugs and change in Circadian rhythm [15, 18, 39-42] are different in various hospitals, so they have different effect on patients' sleep quality.

The results of the study which was done on sleep quality of the patients with ACS showed that these patients in the first three days of hospitalization after ACS had lower sleep quality [15]. Also in our study patients' sleep quality was reduced despite using sleep aid in compare with sleep status in the and this reduction was statistically significant which was in consistent with the study of Zerati et al. and Fergito [12,41] and the patients of the present study had the lowest sleep quality in the first night of hospitalization.

This study shows the improvement of patients' sleep quality after intervention in the acupressure group in the points of ear Shenman, wrist Shenman, Fen Chi, Ying tang and Yangchuan, in compare with control group that received intervention in none-real points and this improvement of sleep quality was also statistically significant. The achieved results were in consistent with the studies of Lee [43], Carotenuto [44], Wang [23], Tsay [22], Nordio [45] Arab [25] and Hoseinabadi [24].

It was clear in this research that the effect of acupressure on sleep quality is fast in a way that patients of acupressure group experienced improvement of sleep quality in the first night of hospitalization and this effect continued to the end of the intervention.

5. Conclusions

Acupressure is an effective technique with patients' well acceptance. This study showed that acupressure in the ear Shenman, wrist Shenman, Fen Chi, Ying tang and Yangchuan

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points can have therapeutic effect in improvement of sleep quality of the patients with ACS and also it doesn't have the side effects due to sleep aids. So this method can be educated to the nurses who have an important role in identifying patients' sleep disorders and reliving it and also it can be educated to the patients themselves and their relatives.

Regarding limitations of this study, it can be said that considering patients' displacement and transfer from CCU to Cardiac ward and changes of environmental conditions, there was no possibility for exact controlling environmental factors which can influence sleep completely. Considering patients' discharge, there was no possibility of studying durability effect of acupressure on sleep status. So it is suggested to follow-up patients after their discharging and study the duration of acupressure durability.

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