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Original article

Effect of acupressure with valerian oil 2.5% on the quality and quantity of sleep in patients with acute coronary syndrome in a cardiac intensive care unit

Masoumeh Bagheri-Nesami [a], Mohammad Ali Heidari Gorji [b], Somayeh Rezaie [c, *], Zahra Pouresmail [d], Jamshid Yazdani Cherati [e]

[a] Antimicrobial Resistant Nosocomial Infection Research Center, Mazandaran University of Medical Sciences, Sari, Iran
[b] Traditional and Complementary Medicine Research Centre, Mazandaran University of Medical Sciences, Sari, Iran
[c] Student Research Committee, School of Nasibeh Nursing and Midwifery, Mazandaran University of Medical Sciences, Sari, Iran
[d] TCM Specialist, Shahid Beheshti University of Medical Sciences, Tehran, Iran
[e] Department of Biostatistics, Health Sciences Research Center, Mazandaran University of Medical Sciences, Sari, Iran

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ABSTRACT

The purpose of this three-group double-blind clinical trial study was to investigate the effect of acupressure (指壓 zhǐ yā) with valerian (纈草 xié cǎo) oil 2.5% on the quality and quantity of sleep in patients with acute coronary syndrome (ACS) in a coronary intensive care unit (CCU). This study was conducted on 90 patients with ACS in Mazandaran Heart Center (Sari, Iran) during 2013. The patients were randomly assigned to one of three groups. Patients in the acupressure with valerian oil 2.5% group (i.e., valerian acupressure group) received bilateral acupoint (穴位 xué wèi) massage with two drops of valerian oil for 2 minutes for three nights; including every point this treatment lasted in total 18 minutes. Patients in the acupressure group received massage at the same points with the same technique but without valerian oil. Patients in the control group received massage at points that were 1–1.5 cm from the main points using the same technique and for the same length of time. The quality and quantity of the patients' sleep was measured by the St. Mary's Hospital Sleep Questionnaire (SMHSQ). After the intervention, there was a significant difference between sleep quality and sleep quantity in the patients in the valerian acupressure group and the acupressure group, compared to the control group ($p < 0.05$). Patients that received acupressure with valerian oil experienced improved sleep quality; however, this difference was not statistically significant in comparison to the acupressure only group. Acupressure at the ear spirit gate (神門 shén mén), hand Shenmen, glabella (印堂 yìn táng), Wind Pool (風池 fēng chí), and Gushing Spring (湧泉 yǒng quán) acupoints can have therapeutic effects and may improve the quality and quantity of sleep in patients with ACS. Using these techniques in combination with herbal medicines such valerian oil can have a greater impact on improving sleep and reducing waking during the night.

1. Introduction

Cardiovascular diseases are among the most common diseases in human societies and the number of these patients has increased in recent decades.[1] In 2008, coronary artery disease caused one of every six deaths in America. On average, one American experiences cardiac events every 25 minutes, and one person dies every 1 minute.[2] The emergence of cardiovascular diseases, especially coronary diseases, is widely increasing in China, India, Pakistan, the East Mediterranean region, and the Middle East; it is an important health and social problem.[3–6] Every year, approximately 3.6 million people are hospitalized in hospitals under the Ministry of Health and Medical Education and Treatment of Iran. A remarkable number of these patients have heart disease, especially patients with acute coronary syndrome (ACS), which includes acute myocardial infarction and unstable angina.[7] Most sleep problems encountered by patients are because of

* Corresponding author. Nursing Department, School of Nasibeh Nursing and Midwifery, Khazar St, Mazandaran University of Medical Sciences, Sari, Iran.
E-mail address: aram_ir2007@yahoo.com (S. Rezaie).
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their hospitalization.[8] Many patients who are hospitalized in a coronary intensive care unit (CCU) experience reduced quality and quantity of sleep with regard to mental and environmental factors.[9–13] Even if environmental factors are controlled, patients with acute myocardial infarction have an altered sleep structure (i.e., sleep pattern) that can result from physiologic inflammatory changes or from the nature of the myocardial infarction itself.[14]

Approximately 56% of the patients are sleep-deprived at the end of the 1st day of hospitalization. Based on other studies, ACS patients have low sleep quality during the first 3 days of their hospitalization.[15,16] Comfortable sleep is difficult for patients hospitalized in intensive care units because of constant monitoring, lighting on the unit, noise due to the staff caring for other patients, mechanical ventilation, frequent awakening by the nurses, the use of sedating and inotrope drugs, disease severity, and the staff awakening patients early in the morning in these units even though the patients need more sleep.[9] Hospitalization can remarkably disturb the sleeping model.[17]

Sleep is a primary need of human beings. It is necessary for maintaining energy, appearance, and physical well-being. Sleep has an important role in cardiovascular function. Its deprivation intensifies anxiety, irritability, and anger, and increases the heart rhythm and myocardial oxygen demand in a frequent and dangerous cycle.[18,19] Insomnia can be treated by drugs, herbal medicine, psychotherapy, and physiological treatments.[20] The most common way to treat or cope with sleeping problems is by using drugs. Based on research studies,[11] there is no significant difference in sleep quality and quality of the patients who use these drugs and patients who do not use them. The effectiveness of drugless therapies is slower than the effectiveness of sleep aids; however, drugless therapies are more permanent and do not have the side effects of drugs such as memory deficits, drug resistance, drug dependency, and drug addiction.

Insomnia can be treated by medication, herbal therapy, and psychological or physical therapy.[20] Acupressure (指壓 zhǐ yā) can enhance comfort and sleep through massaging and stimulating certain points in the head, hands, and back.[21] Individuals can use this treatment method by themselves or with the help of other family members.[22]

A traditional way of treating insomnia is by using valerian herb (纈草 xié cǎo) self grown in nature plant. It is one of many plants used to treat insomnia.[23] The effect of valerian is similar to that of the benzodiazepines (e.g., its effect is comparable with that of 10 mg oxazepam[24]); however, the adverse effects of valerian are fewer. When the human body absorbs valerian, gamma-aminobutyric acid (GABA) receptor activity increases.[25] The result of a review article concluded that valerian could improve sleep quality with minimal or no adverse effect.[26]

Based on available data, an article concerning the effectiveness of acupressure with valerian oil on the quality and quantity of sleep in patients with ACS has not been previously published. Because of the high prevalence of insomnia in intensive care units and because of the effect that acupressure has as a noninvasive and complementary method in treating sleep disorders, the present study aimed to examine the effect of acupressure with valerian oil on sleep quality and quantity in patients hospitalized in a CCU, and thus improve sleep quality, health, and life quality and satisfaction in patients with ACS.

2. Material and methods

This three-group double-blind clinical trial study was performed on 90 patients with ACS in Fatimatazahra Education Center of Sari, Iran (i.e., Mazandaran Heart Center) in 2013. Participants of this study were selected from a convenient statistical population. After determining the inclusion criteria, the participants were, TRADE KEY Company. Thailand randomly assigned by random Rand numbers and Excell software into three 30-patient groups: the acupressure (指壓 zhǐ yā) group the valerian (纈草 xié cǎo) acupressure group, and the control group. In accordance with a similar study,[27] the present Iranian study had a 95% confidence level: the average and standard deviation of the insomnia total score before and after intervention in the experimental group was 20.12 ± 5.76 and 13.31 ± 2.58, respectively; and the sample size with 30 people in each group counted as 90 samples in total. The inclusion criteria included a patient's willingness to participate in the study, a minimum age of 18 years, an awareness of time and place, having not undergone surgery, and an ejection fraction (EF) > 40%.[27] The exclusion criteria included receiving drugs 5–6 hours before sleeping at night, having hearing and vision disorders such that the patient could not communicate with the researcher, drug addiction, being used to using any kind of effective drug or medicine for sleeping, leg amputation or wound amputation at the site of the acupressure points or using inotropes at the site of the acupressure points, allergy to flower essences or their pollens, emergence of acute problems at the time of hospitalization, and a person's lack of cooperation in continuing the research study.

The aims of the study were explained to the patients before beginning the study. After achieving written consent and before beginning the intervention, the patients completed questionnaires that assessed their demographic and clinical characteristics, and completed the St. Mary's Hospital Sleep Questionnaire (SMHSQ), which assessed the patients' sleep at home (i.e., the night before hospitalization). These questionnaires were considered the base measurement. The demographic questionnaire included questions about age, sex, marital status, literacy level, education level, history of heart disease, history of hospitalization, type of underlying disease, the amount of EF, the patient's experience in using sleep aids and the type, and their experience with using complementary medicine.

The SMHSQ is designed to evaluate the sleep status of hospitalized patients.[28] It is a systematic sleep questionnaire for assessing the previous night's sleep. It can be repeated. The questionnaire includes 14 items for assessing subjective sleep time and quality. It includes a Likert scale and a fill-in-the-blank response for every question. The validity and reliability of the SMHSQ questionnaire have been assessed in many studies throughout the world. There is no standard grading in this questionnaire and it is used based on the study.[29] The SMHSQ questionnaire was scored in the present study, based on the opinion of experts and specialists and because of the need for sleep status analysis. Scores were between 10 and 50. A score up to 10 indicates the lack of a sleep disorder; a score of 10–22, a slight sleep disorder; a score of 23–36, a moderate sleep disorder; and a score of 37–50, a severe sleep disorder. In Iran, Moyeeni[13] and Abolhasani[30] used this questionnaire for their studies. Abolhassani achieved 91% reliability using the Cronbach α for this questionnaire.[30]

In the present study, quantitative content validity with the content validity relative (CVR) index and the content validity index (CVI) were used to assess content validity and the value for questions CVR were up to 0.75, 0.79 for questions of CVI, and for the total instrument it was estimated 0.938. The reliability of this questionnaire was also calculated using the Cronbach α coefficient. This questionnaire has an estimated 80% reliability.

There was no intervention on the first night of hospitalization because of the patients' acute conditions. On the following day, questionnaires were completed by the patients concerning their first night of sleep in the hospital. Intervention for the patients was initiated on the second night of hospitalization. Patients in the valerian acupressure group and the acupressure group received acupressure in the Wind Pool point (風池穴 fēng chí xué) behind the head, the glabella point (印堂穴 yìn táng xué) in the forehead, the ear

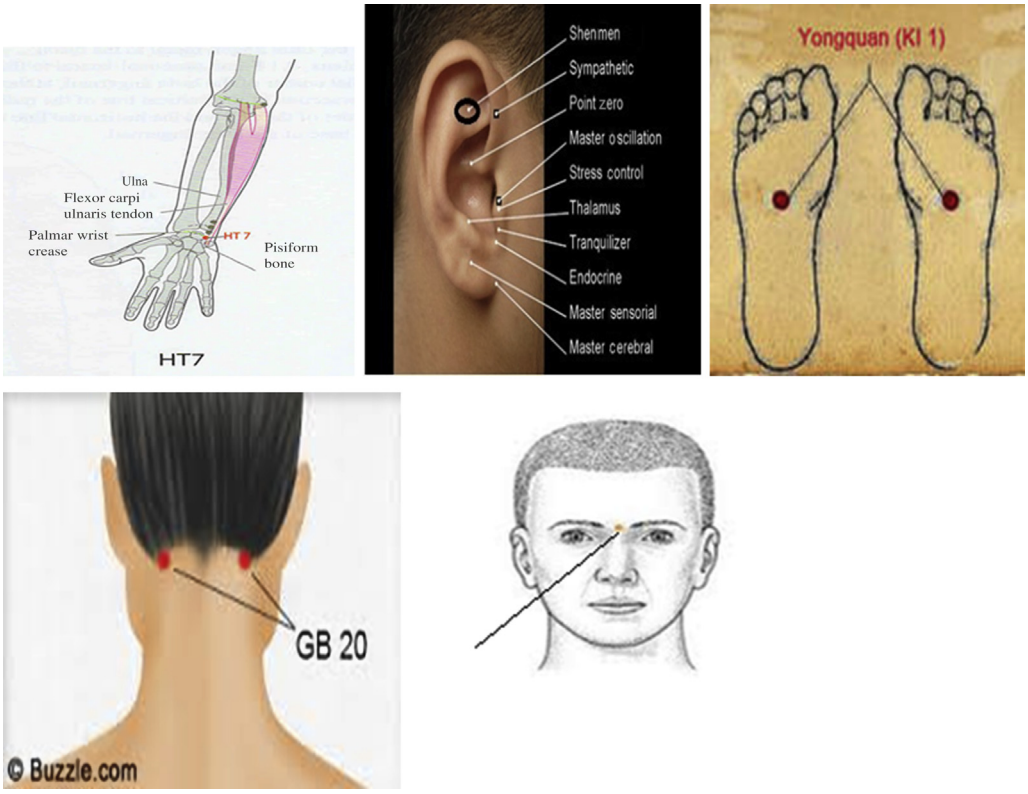

Fig. 1. Points selected for massage in the actual acupressure points.

Shenmen, the wrist spirit gate (神門 shén mén), and the Gushing Spring (湧泉 yǒng quán) in the soles of the feet bilaterally (Fig. 1). They received acupressure with a pressure of approximately 3–4 kg in every point, and they received a 2-minute massage for every point in the form of a 5-second massage with a 1-second rest rotationally at 2 rounds/sec with the thumb. This amounted in total to 18 minutes for nine points for three consecutive nights between 7 PM and 10 PM.[21,25,31–36] The intervention was performed by the researcher who was trained for 1 month by professors of an acupuncture (針灸 zhēn jiǔ) center in Tehran, Iran. In the valerian acupressure group, massage was performed with two drops of valerian oil 2.5% at every point. In the control group, pressure at the same points was performed for the same amount of time at a distance of 1.0–1.5 cm from the main points. For all three groups, the questionnaires were completed every day in the morning between 7 AM and 8 AM for 4 days (i.e., the 1st day of hospitalization and 3 days of intervention) by a person who was aware of how the patients were allocated to the groups. The patients themselves were unaware of their group allocation. According to review studies[37] on acupuncture and acupressure, achieving an acupuncturist's blindness is very difficult, however, necessary efforts should be performed concerning the blindness of the patients and the person who is assessing the results of the intervention.[37] Therefore, the patients and the person who completed the questionnaire were blinded in this study.

In this study, SPSS 18 software (*SPSS* Inc., 233 South Wacker Drive, 11th Floor, Chicago, USA) and descriptive and inferential statistics were used for data analysis. For demographic features, descriptive statistics (e.g., frequency distribution table, the average, the standard deviation) were used for the two groups; for comparing scores related to quality, the independent *t* test was used for the two groups; and by considering repetitive measurements, variance analysis of repeated measurements test was used for the two groups. The significance level for calculations was $p < 0.05$.

3. Results

There was no significant difference between the three groups in age and sex. Other demographic and medical variables before the researcher intervention and three separate groups are presented in Table 1. The average age of the patients in the acupressure (指壓 zhǐ yā) group was 60.30 ± 11.78 years; in the valerian (纈草 xié cǎo) acupressure group, 60.76 ± 11.59 years; and in the control group, 61.60 ± 10.52 years. Among the two intervention groups and the control group, 50% of the patients were male and 50% were female. The average EF of the patients was 50.01 ± 4.65%. Most (96.7%) patients were married, 43.3% of patients were housekeepers, 48% of patients were illiterate, 68.3% of patients had a previous hospitalization, 21.1% of patients had a history of diabetes, and 37.8% of patients had a history of high blood pressure. Most (83.3%) patients did not use any sleeping aids at home. The most used drugs included diazepam and lorazepam, which were stopped in the hospital.

In this study, 90 patients had a moderate sleep quality at home score of 27.07 ± 4.39; this was considered the base score. Because this average score was between 23 and 36, the patients had a moderate sleep disorder. There was no significant difference in sleep quality score at home between the two groups ($p = 0.806$; Table 2).

On the first night of hospitalization, 93.3% of the patients were experiencing a sleep disorder. On the first night of hospitalization in this study, 90 patients had a moderate sleep quality score of 29.11 ± 5.45, which indicated a moderate sleep disorder. This score was greater than the sleep quality at home score (27.06) ($F = 1.22$, $P = 0.298$, SError = .961 and SD = 5.45). These patients experienced lower sleep quality on the first night of hospitalization in comparison to their sleep quality at home. On the first night of hospitalization, the average sleep quality score between the three groups was not statistically significant using the analysis of variance

Table 1
Group demographics and medical separated information.

Group information		Acupressure (%)	Acupressure with valerian oil (%)	Control (%)	Test type	Significance level
Age (y)		60.30 ± 11.7	60.76 ± 11.59	61.60 ± 10.52	ANOVA	$p = 0.903$
Sex	Female	50	50	50	Chi score	$p = 1.000$
	Male	50	50	50		
Marriage	Married	96.7	100	96.7	Chi score	$p = 1.000$
	Single	3.3	0	3.3		
Job	Housekeeper	40	50	46.7	Chi- score	$p = 0.301$
	Farmer	30	20	3.3		
	Other occupation	30	30	50		
Literacy level	Illiterate	46.7	43.3	50	Chi score	$p = 0.203$
	Elementary	30	40	30		
	High school	6.7	10	13.3		
	BS	16.7	6.7	6.7		
Use of sleeping drugs	Yes	10	13.3	23.3	Chi score	$p = 0.333$
	No	90	86.7	76.7		
Traditional and herbal treatment history	Yes	0	3.3	3.3	Chi score	$p = 0.60$
	No	100	96.7	96.7		

ANOVA = analysis of variance.

(ANOVA) test ($p = 0.298$). However, a comparison of the sleep quality scores between the three groups during the three nights of hospitalization was significant when using the statistical ANOVA test ($p < 0.0001$) (Table 2). A comparison of the average sleep quality scores between the three groups using the ANOVA test showed a significant difference in sleep quality between the valerian acupressure group, the acupressure group, and the control group on the first night of intervention ($p < 0.0001$), the second night of intervention ($p = 0.001$) and the third night ($p < 0.0001$) of intervention. The variance analysis test of repeated measurements showed that sleep quality between the three groups was statistically significant, based on the patients' sleep quality score with respect to time and to time and group interaction; the test showed that the improved sleep status over time in the three groups was significantly different (power = 0.954 and Degree of freedom (df) = 8, $p = 0.003$).

Variance analysis test of repeated measurements during five times of assessment in the acupressure group ($p = 0.003$) and the valerian acupressure group ($p < 0.0001$) showed a significant statistical difference (Table 2). For the 2 × 2 comparison of each group for sleep at home, the Bonferroni test was used for the sleep quality score at home, on the first night of hospitalization, and during the nights of intervention. This comparison showed a significant difference between the sleep quality score on the first night of hospitalization and on the first night of intervention in the acupressure group ($p = 0.023$). This indicates that this group of patients had better sleep quality after the first night of intervention. In the valerian acupressure group, the comparison showed a significant difference between the sleep quality score on the first night of hospitalization and on the third night of intervention ($p = 0.002$). The patients of this group experienced a good night sleep from first night, but there was a significant difference on the third night of intervention. In the control group, the average of sleep quality score before intervention (i.e., the first night of hospitalization) and during intervention was not statistically significantly different.

The variance analysis test of repeated measurements was used for comparing the sleep quantity scores of the three groups and for comparing the sleep quantity score with respect to time and to time and group interaction. The test showed that the three groups were not significantly different in improving the sleep status over time (power = 0.660 and df = 6.743, $p = 0.128$). Variance analysis test of repeated measurements during five times of assessment in the acupressure group ($p = 0.02$) and the valerian acupressure group ($p = 0.002$) showed a significant difference statistically (Table 3). For the 2 × 2 comparison in the acupressure group, the Bonferroni test showed a statistically significant difference in the sleep quantity score between the first night of hospitalization and the first night of intervention ($p = 0.01$), the second night of intervention ($p = 0.08$), and the third night of intervention ($p = 0.01$). In the valerian acupressure group, there was a statistically significant difference between the first night of hospitalization with the second night of intervention ($p = 0.036$), and the first night hospitalization with the third night of intervention ($p = 0.002$). Using the ANOVA test, the mean difference in the sleep quantity score between the three groups was not statistically significant at home ($p = 0.72$) and on the first night of hospitalization ($p = 0.9$);

Table 2
Comparison between the three groups in the sleep quality score at home, on the first night sleeping in the hospital, and after each of three nights of intervention.

Groups	Frequency of review					
	Home	First night of hospitalization	First night of intervention	Second night of intervention	Third night of intervention	Repeated measures ANOVA
Acupressure (指壓 zhǐ yā)	26.94 ± 4.30	28 ± 5.2	24.63 ± 2.96	25.83 ± 3.88	25.66 ± 3.60	$p = 0.003$ $F = 5.16$
Acupressure with valerian oil	27.06 ± 5.9	29.13 ± 5.27	25.93 ± 4.19	25.5 ± 16.25	24.13 ± 3.5	$p < 0.0001$ $F = 5.98$
Control	27.20 ± 3.83	30.20 ± 5.82	29.63 ± 5.12	29.83 ± 4.82	30.03 ± 4.05	$p = 0.18$ $F = 3.11$
Significance level by ANOVA	$p = 0.975$ $F = 0.26$	$p = 0.298$ $F = 1.22$	$p < 0.0001$ $F = 11.51$	$p < 0.0001$ $F = 8.68$	$p < 0.0001$ $F = 19.90$	

ANOVA = analysis of variance. Variance analysis test of repeated measurements during five times of assessment in the acupressure group (F = 5.16, P < 0.005) and the valerian acupressure group (F = 5.98, P < 0.0001) showed a significant statistical difference (Table 2).

Table 3
Comparison between the three groups in the patients' sleeping quantity scores (average hours and minutes) at home and after each of three nights in the hospital.

Groups	Sleep duration					
	Home	First night of hospitalization	First night of intervention	Second night of intervention	Third night of intervention	Repeated measures ANOVA
Acupressure (指壓 zhǐ yā)	6.39 ± 2.00	5.00 ± 1.92	7.00 ± 1.50	6.44 ± 1.60	6.44 ± 1.60	$p = 0.02$ $F = 3.45$
Acupressure with valerian oil	6.24 ± 2.28	5.18 ± 2.03	7.00 ± 2.09	7 ± 2.24	7 ± 2.24	$p = 0.002$ $F = 5.48$
Control	6.15 ± 1.39	5.00 ± 2.17	5.26 ± 1.98	5.36 ± 1.88	5.36 ± 1.88	$p = 0.06$ $F = 2.27$
Significance level by ANOVA	$p = 0.72$ $F = 0.33$	$p = 0.9$ $F = 0.09$	$p = 0.006$ $F = 5.49$	$p = 0.01$ $F = 4.77$	$p = 0.01$ $F = 4.77$	

ANOVA = analysis of variance.

however, the mean difference between the three groups was statistically significant on the first night of intervention ($p = 0.006$), the second night of intervention ($p = 0.01$) and the third night of intervention ($p = 0.01$) (Table 3). The 2 × 2 comparison using Tamhane's test showed a statistically significant difference in the mean sleep quantity score between the control group and the acupressure group, the acupressure group on the first night of intervention ($p = 0.005$), and the acupressure group on the third night of intervention ($p = 0.04$). Using the Bonferroni test, the mean difference between the valerian acupressure group and the control group in the sleep quantity score was statistically significant on the first night of intervention ($p = 0.005$) and the third night of intervention ($p = 0.04$). The mean difference in the sleep quantity score using the Bonferroni test showed a statistically significant difference between the valerian acupressure group with the control group on the second night of intervention ($p = 0.03$) and the third night of intervention ($p = 0.002$).

The 90 patients in the three groups slept on average 6 hours and 44 minutes at home and 5 hours and 16 minutes on the first night of hospitalization. The poorer sleep condition on the first night of hospitalization in comparison to home sleep was significant, using the Bonferroni test ($p = 0.0001$).

4. Discussion

The results of this study showed that 93.3% of the patients experienced a sleep disorder on the first night of hospitalization. Most patients in the study had inappropriate sleep quality and quantity and experienced reduced sleep quality during the first night of hospitalization. Different studies have reported these statistics differently. The percentage of sleep quality disorder was reported as 68.3% in one study[37] that focused on the effect of earplugs on the sleep quality of the patients with ACS. In a study by Zerahati et al,[11] 74% of the patients of an internal ward had inappropriate sleep quality. The percentage of sleep quality disorder was 46.59% in a study by Izadi et al[38] on hospitalized elderly patients; the percentage was 63.6% in a study by Jafarian Amiri et al[39] on patients in different hospital wards; and the percentage was 50% in a study by Kazemi et.al.[40] It may be that the high percentage of inappropriate sleep quality in this study in comparison to the percentage reported by other studies is related to the differences in wards used in the study, the type of patients, or the questionnaire used. In this study, the SMHSQ was used; however, the aforementioned studies used the Pittsburgh Sleep Questionnaire. The present study did not use the Pittsburgh Sleep Questionnaire because this questionnaire is designed to show the sleep quality during the previous month[41]; therefore, it was inappropriate for studying the effect of interventions for a time <1 month or for assessing the sleep status of the previous night of the hospitalized patients. Other studies also reported reduced sleep quality and quantity and discussed different factors to justify sleep disorder in a CCU. Therefore, it seems that these factors (which include nursing interventions in caring for patients, disease severity, noise and environmental factors, mechanical ventilation, pain, drugs, and circadian rhythm change[16,42–47]) differ among various hospitals and have different effects on patients' sleep quality. The results of research on the sleep quality of patients with ACS shows that these patients have lower sleep quality during the first 3 days of hospitalization after ACS.[16,48] In our study, the patients' sleep quality was reduced in comparison to their sleep status, despite using a sleeping drug; this reduction was statistically significant. This finding was inconsistent with the study of Zerahati et al[11] and Frighetto et al.[45] The patients of the present study had the lowest sleep quality on the first night of hospitalization.

This study showed improved sleep quality in the acupressure (指壓 zhǐ yā) group after intervention at the acupoint (穴位 xué wèi) of ear spirit gate (神門 shén mén), wrist Shenman, Wind Pool (風池 fēng chí), glabella (印堂 yìn táng), and Gushing Spring (湧泉 yǒng quán) in comparison to the control group, which received intervention at false points. This improvement in sleep quality was also statistically significant. The achieved results was inconsistent with the studies of Lee,[46] Carotenuto,[48] Wang,[22] Tsay,[21] Nordio,[47] Arab,[32] and Hoseinabadi.[31] Patients in the valerian (纈草 xié cǎo) acupressure group had better sleep quality, compared to the acupressure and control groups. That this improvement of sleep quality was statistically significant with control group that revised acupressure in false point. Chen et al[25] conducted a study to examine the effect of acupressure with valerian oil on sleep disorders of patients admitted to an intensive care unit (ICU). The results determined that after the valerian acupressure intervention, patient in the experimental group slept more and waked up less in compare to the patients in the control group. Chen's study results are in agreement with our research results. However, they did not specify either valerian oil or acupressure in their study. In this research study with design acupressure group showed that the difference in the total sleep quality and sleep quantity scores between the acupressure and the acupressure with valerian oil groups was not statistically significant. However, the mean sleep score of the two groups showed that valerian oil used with acupressure has a greater impact. However, we did not achieve significant differences, based on the results of this study. More studies are needed to corroborate this finding by increasing the duration of the intervention or by increasing the percentage of valerian oil.

Our results showed that hospitalization reduces sleep quality and can affect the quantity of sleep in patients. Therefore, patients on the first night of hospitalization had the least amount sleep—on average, 5 hours. After the intervention, patients in the acupressure group had longer sleep duration, compared to patients in the control group. This improvement in sleep was statistically significant. Patients in the acupressure group experienced improvements

in their sleep from first night of hospitalization. Compared to the control group, patients that received acupressure with valerian oil had longer sleep duration and a reduced number of nocturnal awakenings. The results of this study is consistent with the findings of Chen et al's[25] research, which showed that patients experienced better sleep and fewer natural awakenings in an acupressure with valerian oil group than in the control group. The patients who received acupressure with valerian oil had a greater sleep time during the night, compared to patients in the acupressure group; however, this difference was not statistically significant. It may be that if the intervention duration was greater or a greater concentration of valerian had been used, a statistically significant difference may have occurred. Future studies are needed to confirm this. Natural waking was reduced in the acupressure group compared to the control group. This finding was consistent with the studies by Husainabadi et al[31] and Arab et al.[32]

The results showed that the patients in the valerian acupressure group have a further reduction in natural waking compared to the acupressure and control groups. This finding is consistent with Chen's research.[25]

The current study verified that the effect of acupressure with valerian oil on the quality and quantity of sleep patients is faster is created than acupressure with valerian oil, Therefore, patients in the acupressure group experienced improved quality and quantity of sleep on the first night of intervention, whereas patients in the valerian acupressure group experienced improved quality and quantity more effectively from the second night of intervention. This effect continued in the two groups until the end of the intervention.

Thus, to justify why such affection (with applying acupressure oil) is increasing, its probably due to the chemical effect of Synergistic of valerian along with acupressure on patients sleep. Applying acupressure over fake points in the control group did not improve these patients' sleep in comparison to the other two groups; therefore, applying an empathetic effect during acupressure is not a factor and is therefore rejected.

Acupressure is an effective technique that is well accepted by patients. This study showed that acupressure in the ear Shenman, wrist Shenman, Fengchi, Yintang, and Yangchuan points can has a therapeutic effect in improving sleep quality in patients with ACS. If acupressure techniques in combination with herbal medicines such as valerian oil, which has a pain relief effect and relaxation effect that results in sleep, could be used to increase sleep in patients and reduce waking time, and thereby improve the amount of sleeping hours during the night. According to Chen et al[25] and Bent et al,[26] when the human body absorbs valerian, GABA receptor activity increases; therefore, valerian could improve sleep quality with minimal or no adverse effects.

The authors suggest that future researchers analyze the GABA levels in the blood/brain when the human body is absorbing valerian *in vivo* after acupressure with valerian treatment. In addition, this method can be taught to nurses, who have an important role in identifying and relieving sleep disorders in patients. The technique can also be taught to patients and their relatives.

Conclusion

This study has some limitations. Because patients were displaced and transferred from a CCU to a cardiac ward and were subjected to changes in environmental conditions; it was not possible to control completely the environmental factors that can influence sleep. After the patients' discharge, it was not possible to study the durability of the effect of acupressure (指壓 zhǐ yā) on sleep status. Therefore, patients should be followed up after their discharge, and the duration of acupressure durability should also be studied.

Conflicts of interest

There are no conflicts of interest in this study. The Mazandaran University of Medical Science provided a source of funding.

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