Original Article

The Effects of Acupressure on Sleep Quality and Compassion Fatigue among Emergency and Critical Care Nurses during the Coronavirus Disease 2019 Pandemic: A Clinical Trial

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Abstract

Background: Sleep disorders and compassion fatigues are two main physical and psychological problems among nurses, particularly during the coronavirus disease 2019 (COVID-19) pandemic. **Objectives:** The aim of this study was to assess the effects of acupressure on sleep quality and compassion fatigue among emergency and critical care nurses during the COVID-19 pandemic. **Methods:** This randomized controlled trial was conducted in 2020. Participants were eighty nurses recruited from two hospitals in Iran and randomly allocated to control and intervention groups. Acupressure on the Shenmen point was self-administered by participants twice daily for 30 days. The Pittsburg Sleep Quality Index and the Nurses' Compassion Fatigue Inventory were used for data collection before and after the intervention. Data analysis was done using the paired-sample *t*, independent-sample *t*, Chi-square, and Mann–Whitney U tests as well as the analysis of covariance. **Results:** The mean score of the subjective sleep quality, sleep latency, sleep duration, and sleeping medication dimensions of sleep quality significantly decreased in the intervention group ($P < 0.05$). Moreover, despite no significant between-group difference respecting the pretest mean scores of sleep quality and its dimensions ($P > 0.05$), the posttest mean scores of sleep quality and its subjective sleep quality, sleep latency, sleep disturbances, and sleeping medication dimensions in the intervention group were significantly less than the control group ($P < 0.05$). **Conclusion:** As a noninvasive technique, acupressure can be used to significantly improve sleep quality among nurses during the COVID-19 pandemic.

Keywords: *Acupressure, Compassion fatigue, Coronavirus disease 2019, Nurses, Sleep disorders*

Introduction

Sleep disorders and compassion fatigues are two main physical and psychological problems among nurses and have potential negative impacts on their occupational productivity.[1-3] These problems are more prevalent during the coronavirus disease 2019 (COVID-19) due to nurses' direct and continuous contact with afflicted patients and exposure to their pain and suffering, particularly in the emergency department and intensive care unit (ICU).[4-6] A study reported that the prevalence of psychological distress among health-care providers during the COVID-19 pandemic was higher than previous epidemics such as H1N1 influenza and the severe acute respiratory syndrome epidemics.[7] The prevalence of sleep disorders among health-care providers during the COVID-19 pandemic was reported to be 23.6% to

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34.8%.[3,8] During the COVID-19 pandemic, maintaining and promoting nurses' physical and psychological health received serious attention due to problems such as staff shortage, high possibility of COVID-19 transmission, high morbidity and mortality of COVID-19, frequent absences of health-care providers due to affliction by COVID-19, and mandatory quarantine.[3] Therefore, health policymakers need to develop and employ effective strategies to reduce nurses' occupational stress, reduce the effects of the pandemic on them, help them restore their psychological balance and manage their conditions, and minimize their sleep disorders and compassion fatigue.

Complementary and alternative medicine techniques, such as acupressure, are potentially effective in managing physical and mental health problems such as anxiety, fear, fatigue, and sleep disorders.[7] Acupressure is an easy and accessible technique which can be learned and self-administered for health problem management. Different studies reported that acupressure significantly improved sleep quality among patients with diabetes mellitus,[9] hypertension,[10] migraine,[11] leukemia,[12] percutaneous coronary interventions,[13] hemodialysis,[14] acute coronary syndrome,[15] and breast cancer[16] However, there are limited data about the effects of acupressure on sleep disorders and compassion fatigue among nurses in the COVID-19 pandemic, and it is still poorly known whether acupressure can significantly improve sleep quality and compassion fatigue among nurses. Therefore, the present study was carried out to provide further evidence in this area.

Objectives

The aim of this study was to assess the effects of acupressure on sleep quality and compassion fatigue among emergency and critical care nurses during the COVID-19 pandemic.

Methods

Study design and participants

This randomized controlled trial was conducted from July to September 2020 using a two-group pretest–posttest design. Study population consisted of all nurses in the emergency department and the ICU of Shahid Beheshti and Al-Zahra Hospitals, Kashan and Isfahan, Iran. Eighty nurses were conveniently selected based on the following inclusion criteria: Agreement for participation, work experience of at least 2 years in the emergency department or ICU, no intake of sedatives, hypnotics, or psychiatric medications, no history of acupressure, no feelings of warmth, heaviness, or numbness at the Shenmen (HT7) acupoint, a total score of 5 or more for the Pittsburg Sleep Quality Index (PSQI), no history of hyperthyroidism or hypertension, and no history of stressful life events (such as significant loss, employment loss, pregnancy, accident, or surgery) during the past 3 months. Exclusion criteria were voluntary withdrawal from the study, affliction by a disease affecting sleep quality during the study, use of any complementary and alternative medicine techniques during the study, and failure to closely adhere to the study intervention. Participants were randomly allocated to control and intervention groups through permuted block randomization. The size of blocks was four, and the number of blocks was ten [Figure 1].

Sample size was calculated to be forty per group [Figure 2]. Sample size calculation parameters were a confidence level of 95%, a power of 0.80, and a pretest and a posttest sleep quality score of, respectively, 9.15 ± 2.291 and 6.78 ± 2.768 in the intervention group.

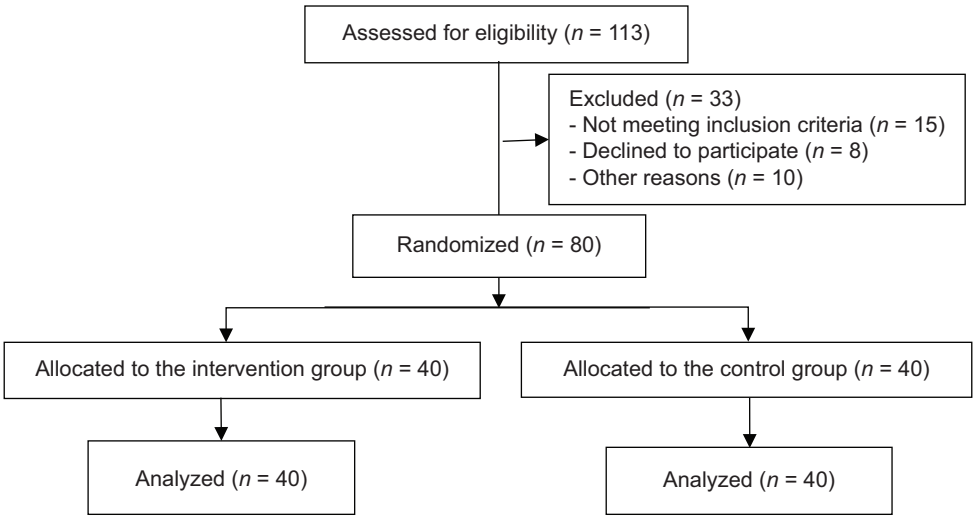

Figure 1: The CONSORT flow diagram

Data collection instruments

Data were collected using a sociodemographic characteristics questionnaire, PSQI, and the Nurses' Compassion Fatigue Inventory. The items of the sociodemographic characteristics questionnaire were age, gender, educational level, marital status, affiliated ward, work shift, the average number of work shifts per week and per month, monthly income, employment status, work experience, number of children, and place of residence.

PSQI is a self-report instrument for sleep quality assessment. It has 19 items in seven dimensions of sleep quality, namely subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances, use of sleeping medication, and daily dysfunction. Items are scored on a four-point scale from 0 "no problem" to 3 "severe problem," and the total score of the seven subscales is 0–21, with scores more than 6 showing poor sleep quality.[14] A study reported that the Cronbach's alpha values of the PSQI dimensions were 0.77–0.83.[17]

The Nurses' Compassion Fatigue Inventory is a self-report instrument developed through both deductive method (i.e., a literature review) and inductive method (i.e., a qualitative study). This instrument has 35 items in six dimensions, namely limited personal capabilities, caring infirmity, psychometric disorders, emotional fatigue, social isolation, and incompetence in self and family management. Items are scored on a five-point Likert scale as follows: (1) "Never;" (2) "Rarely;" (3) "Sometimes;" (4) "Often;" and (5) "Always." The possible total score of the inventory is 35–175, with higher scores showing severer compassion fatigue. Inventory scores are interpreted as follows: Scores 35–81.6: Low compassion fatigue; scores 81.6–128.2: Moderate compassion fatigue; and scores 128.2–175: High compassion fatigue. The construct validity of this inventory was confirmed through confirmatory factor analysis and its reliability was confirmed with a Cronbach's alpha of 0.94, an intraclass correlation coefficient of 0.935, and a standard error of measurement of 7.6.[18]

Intervention

Study intervention was acupressure on the Shenmen point. The first author provided face-to-face education to participants in the intervention group about how to find the Shenmen point [Figure 3], how to compress it, the amount of pressure, and the acupressure protocol. Education was provided in a big room in the study setting and with close adherence to COVID-19 protocols (wearing mask and physical distance). Besides, an educational pamphlet with materials about acupressure on the Shenmen point was provided to participants. Subsequently, participants were asked to use the thumb or the index finger to perform acupressure on the Shenmen point (10 s of pressure and 2 min of rest for each hand). They were trained to perform acupressure in supine or semi-setting position twice daily, once during the day, and once 30 min before bedtime and were asked to apply gentle massage to the point for 30 s before acupressure to improve local circulation. They were informed that senses of warmth, heaviness, and numbness at the Shenmen point were indicative of the accuracy of the acupressure technique. The amount of pressure was determined based on each participant's responsiveness to pressure. Participants in the control group did not receive any acupressure intervention. Participants in both groups completed the study instruments before and after the study intervention.

Data analysis

The SPSS software (v. 22.0, SPSS Inc., Chicago, IL, USA) was used for data analysis at a significance level of <0.05. Data were described using the measures of descriptive statistics, namely frequency, percentage, mean, and standard deviation. The Kolmogorov–Smirnov test was employed for normality testing. Moreover, the paired-sample *t*-test was employed for within-group comparisons, and the Chi-square, independent-sample *t*, and Mann–Whitney U tests as well as the analysis of covariance were employed for between-group comparisons.

$$n = \frac{\left(Z_{1-\alpha/2} + Z_{1-\beta}\right)^2 \left(\delta_1^2 + \delta_2^2\right)}{\left(\mu_1 - \mu_2\right)^2}$$

Figure 2: Sample size calculation formula

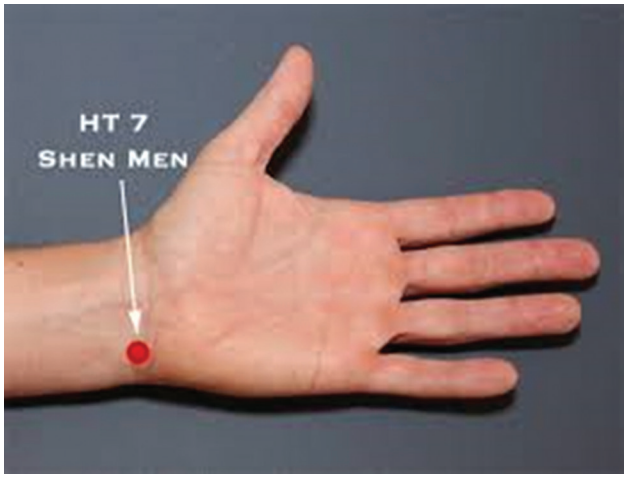

Figure 3: The Shenmen point

Table 1. Between-group comparisons with respect to participants' characteristics

Characteristics	Control group	Intervention group	*P*
Age (Year)	28.68±3.40	28.55±4.01	0.58[a]
Number of work shifts per month	26.69±2.41	26.7±2.12	0.659[a]
Number of children	0.88±1.07	0.58±0.96	0.19[a]
Gender			0.49[b]
Male	17 (42.5)	14 (35)	
Female	23 (57.5)	26 (65)	
Marital status			0.17[b]
Single	13 (32.5)	19 (47.5)	
Married	27 (62.5)	21 (52.5)	
Educational level			0.78[c]
Bachelor's degree	31 (77.5)	32 (80)	
Master's degree	9 (22.5)	8 (20)	
Work experience (Years)			0.82[c]
<5	21 (52.5)	20 (50)	
5-10	14 (35)	13 (32.5)	
>10	5 (12.5)	7 (17.5)	
Number of night work shifts/week			0.38[b]
0	10 (25)	6 (15)	
1	9 (22.5)	14 (35)	
2	14 (35)	16 (40)	
>2	7 (17.5)	4 (10)	
Shift type			0.26[b]
Fixed	10 (25)	6 (15)	
Rotating	30 (75)	34 (85)	
Affiliated ward			0.99[b]
Emergency department	20 (50)	20 (50)	
Intensive care unit	20 (50)	20 (50)	

[a]Independent-sample *t* test, [b]Chi-square test, [c]Mann-Whitney *U* test, Data presented as Mean±SD or *n* (%), SD: Standard deviation

Ethical considerations

The Ethics Committee of Kashan University of Medical Sciences, Kashan, Iran, approved this study (code: IR.KAUMS.NUHEPM.REC.1399.025). Besides, the study was registered in the Iranian Registry of Clinical Trials (code: IRCT20200424047190N1). Permissions for conducting the study were gained from the authorities of Kashan Faculty of Nursing and Midwifery, Kashan, Iran, and provided to the authorities of the study setting. Explanations about the study aim and confidentiality of the data were also provided to participants, and written informed consent was obtained from all of them.

Results

Forty nurses in each group completed the study. The age range of participants was 26–40 years. Most participants were married (78.6%) and worked as hospital nurses (80%) and half of them had a work experience of 5–10 years. There were no significant differences between the study groups in terms of participants' characteristics [$P > 0.05$; Table 1].

The study groups did not significantly differ from each other respecting the pretest mean scores of PSQI and all its dimensions [$P > 0.05$; Table 2]. Within-group comparisons revealed that the mean scores of PSQI and its dimensions did not significantly change in the control group ($P > 0.05$), whereas the mean scores of the subjective sleep quality, sleep latency, sleep duration, and sleeping medication dimensions of PSQI significantly decreased in the intervention group ($P < 0.05$). Moreover, the independent-sample *t* and the Mann–Whitney U tests showed that the groups significantly differed from each other respecting pretest–posttest differences of the mean scores of PSQI and its subjective sleep quality, sleep duration, and sleep disturbances dimensions ($P < 0.05$). The analysis of covariance with compassion fatigue as covariate also showed that the posttest mean scores of PSQI and its subjective sleep quality, sleep latency, sleep disturbances, and sleeping medication dimensions in the intervention group were significantly less than the control group [$P < 0.05$; Table 2].

The pretest and posttest mean scores of compassion fatigue were, respectively, 86.53 ± 23.22 and 85.40 ± 23.75 in the intervention group and 88.85 ± 23.75 and 88.68 ± 21.36 in the control group. Neither within-group changes nor between-group differences respecting the mean score of compassion fatigue were statistically significant [$P < 0.05$; Table 3].

Discussion

Study findings showed that acupressure on the Shenmen point is effective in significantly improving sleep quality among nurses, though it had no significant effects on some aspects of sleep quality. This is consistent with the findings of a study which showed that acupressure on several acupoints thrice weekly for 2 months significantly improved sleep quality and all its dimensions.[17] The difference between our findings and the findings of that study respecting the effects of acupressure on sleep quality dimensions may be due to the fact that acupressure in that study was performed on different acupoints, while acupressure in the present study was performed on only one acupoint. Moreover, our participants might have had higher levels of workload and physical and psychological strain due to the negative effects of the COVID-19 pandemic such as its high morbidity and mortality rates. Another study also reported that acupressure on the SP6, PC6, and Shenmen points thrice weekly for 1 month decreased sleep disorders among Australian older people.[19] Some other studies also reported the significant positive effects of acupressure among patients

Table 2: Between- and within-group comparisons with respect to the mean scores of sleep quality and its dimensions

Sleep quality	Groups/time	Before	After	P^a	Mean difference	P^b	P^c
Subjective sleep quality	Intervention	1.58 ± 0.90	0.8 ± 0.68	<0.001	–0.77	<0.001	<0.001
	Control	1.68 ± 0.82	1.55 ± 0.63	0.71	–0.12		
Sleep latency	Intervention	1.35 ± 0.70	0.90 ± 0.63	0.007	–0.4-	0.158	0.013
	Control	1.58 ± 0.93	1.35 ± 0.77	0.35	–0.22		
Sleep duration	Intervention	1.13 ± 0.82	0.68 ± 0.65	0.045	–0.45	0.022	0.413
	Control	1.18 ± 0.93	1.05 ± 0.84	0.82	–0.12		
Sleep efficiency	Intervention	0.75 ± 0.63	0.55 ± 0.59	0.53	–0. 2	0.674	0.943
	Control	0.90 ± 0.81	0.65 ± 0.66	0.48	–0.25		
Sleep disturbances	Intervention	0.98 ± 0.62	0.68 ± 0.61	0.94	–0.3	0.009	0.007
	Control	0.93 ± 0.76	0.89 ± 0.18	0.71	+0.05		
Sleeping medication	Intervention	0.13 ± 0.15	0.13 ± 0.40	0.031	0	0.053	0.028
	Control	0.18 ± 0.38	0.33 ± 0.52	0.199	+0.15		
Daily dysfunction	Intervention	1.03 ± 0.89	0.70 ± 0.68	0.682	–0.32	0.692	0.52
	Control	1.10 ± 1.64	0.83 ± 1.41	0.606	–0.27		
Total	Intervention	6.93 ± 1.96	4.48 ± 1.61	0.933	–2.45	<0.001	<0.001
	Control	7.53 ± 3.57	6.83 ± 2.81	0.682	–0.7		

[a]Paired-sample *t*-test, [b]Independent-sample *t* or the Mann–Whitney U test, [c]Analysis of covariance

Table 3: Within-group comparisons with respect to the mean scores of compassion fatigue

Group	Time	Mean ± SD	*P*
Intervention	Before	86.53 ± 23.22	0.086
	After	85.40 ± 23.75	
Control	Before	88.85 ± 21.49	0.291
	After	88.68 ± 21.36	

SD: Standard deviation, *P*-values for pretest and posttest between-group comparisons are 0.644 and 0.518, respectively

receiving hemodialysis,[20] patients with hypertension,[21] patients in adult ICU,[22] older people in nursing homes,[19] postpartum women,[21] and nursing students.[23] The positive effects of acupressure are attributable to its effectiveness in increasing serotonin release which in turn relaxes the body, reduces symptoms of anxiety, improves sleep quality, and decrease burnout and compassion fatigue.[10,24] Contrarily, a study reported that acupressure had no significant effects on sleep quality among patients with migraine.[11]

The findings of the present study also showed that acupressure on the Shenment point had no significant effects on compassion fatigue among nurses. Contrarily, a study showed that acupressure on the auricular Shenmen point for 6 weeks improved the quality of working life, reduced compassion fatigue and burnout, and enhanced compassion satisfaction among health-care providers.[24] Another study concluded that auricular acupressure on the Shenmen, lung, sympathetic autonomic, liver, and kidney acupoints applied by a specialist in 25-min weekly sessions in 16 sessions reduced compassion fatigue, burnout, and anxiety among health-care providers.[25] Similarly, a study found that 4-month acupressure was effective in preventing occupational stress and significantly improving physical, psychological, and organizational outcomes among health-care providers.[26] These contradictory results are attributable to the differences among these studies respecting acupressure intervention type and duration, participants, and acupressure therapists.

An important limitation of the present study was that acupressure was self-administered by study participants, and hence, they might not have closely adhered to the intervention due to physical or psychological problems. Moreover, the potential confounding effects of nighttime activities on sleep quality were not assessed and controlled in the study. The study intervention was also rather short, and there was no follow-up assessment period. Therefore, future studies are recommended to assess the long-term effects of acupressure on sleep quality.

Conclusion

This study confirms that 30-day acupressure on the Shenmen point can significantly improve sleep quality among nurses during the COVID-19 pandemic, though it may not have significant effects on their compassion fatigue. Given the high prevalence of sleep disorders among nurses, particularly during the COVID-19 pandemic, acupressure can be used as a noninvasive nonpharmacological intervention to manage their sleep disorders and improve their sleep quality.

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Conflicts of interest

There are no conflicts of interest.

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