The effect of acupressure on quality of sleep in Iranian elderly nursing home residents

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Elderly
Sleep disturbances

Abstract

Introduction: Sleep disturbances are very common in elderly people and Traditional Chinese acupressure a noninvasive technique that promotes health and comfort recently has been used in this regard. The purpose of the present study was to evaluate the potential beneficial effects of acupressure on a group of institutionalized elders experiencing sleep disturbances.

Method: A randomized controlled clinical trial was conducted to test the effectiveness of acupressure on quality of sleep of elderly residing in a Nursing home. The Pittsburgh Sleep Quality index (PSQI) questionnaire was used as a screening tool to select 90 residents with moderate to marked sleep disturbances. The elders were randomly assigned to an acupressure group, a sham acupressure group and a control group by Balanced randomization method.

Results: There were significant differences between the acupressure group and the control group in subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency and sleep disturbance. But no significant differences were found in sleep indices between the sham acupressure group and the control group. Sleep log data showed a significant decrease in nocturnal awakenings in acupressure group compared to other two groups.

Conclusion: The findings of this study indicated that acupressure has an effect on improvement of sleep quality and endorsed it as a non-pharmacological and complementary therapy for sleep-disturbed elderly people.

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meridian tissue is highly conductive and preferentially directed compared to adjacent nonmeridian tissue. When the network is disrupted, health affects; therefore, acupuncture and acupressure were developed to stimulate these clogged meridians.

Previous studies demonstrated that Acupressure or acupuncture may alleviate lower back pain, headaches, osteoarthritis pain, neck pain, musculoskeletal pain, perioperative pain, postoperative and chemotherapy related nausea, and managing sleep disturbance in chronic illness patients. Several studies have showed that acupressure may be helpful in treating sleep problems. Tsay and Chen (2003) studied the effectiveness of acupressure on sleep quality of 98 patients with end stage renal disease in three groups, and reported significant differences between acupressure group and control group in subjective sleep quality, sleep duration, sleep efficiency and sleep sufficiency. Guerrero da silva et al. (2005), studied the effects of acupressure on 30 pregnant women with insomnia, and reported a significant improvement on insomnia in experimental group compared to the control group. Auricular Acupuncture Therapy is one form of acupuncture of the ear that has been showed to improve sleep latency in older adults. Acupressure may regulate the production of melatonin, a neurohormone that affects chronobiological activity and has been theorized to restore melatonin levels to normal sleep cycles. In addition, acupressure has been showed to reduce pain by activating the endogenous opioid system, and thus reducing or eliminating sleep disruption due to pain.

Early identification of sleep problems and interventions to improve sleep quality are crucial, because sleep disturbances that persists for a long period of time could decrease general health and functional status thus affecting quality of life. Although there are adequate research on sleep, few studies have focused on the effects of acupressure on improving sleep quality in Iran, and particularly on older adults.

2. The study

Following ethical approval from USWR and the research and Ethics Committee of kahrizak charity nursing home, a randomized controlled clinical trial was carried out to test the effect of acupressure on quality of sleep of elderly insomniacs. After Convenience sampling by means of balanced randomization method elders who scored 5 points or higher on the Pittsburgh Sleep Quality Index (PSQI) were randomized into an experimental (receiving acupressure plus usual care), a placebo (receiving sham acupressure plus usual care), or a control group. The placebo group received massage with the same frequencies as in experimental group, but at locations other than acupoints. The control group received just routine care. Data were collected at baseline and after the final treatment session. For blinding purposes the interviewers and raters, care providers, and participants did not know any things about group allocations.

3. Sample and setting

This study was conducted in a nursing home (KCF = Kahrizak Charity Foundation) in Tehran- Iran. The required sample size for this study was estimated 26 subjects for each group (with power of 0.80, medium effect size, of 0/5, And at confidence level of 95% and an attrition rate of 10%). 30 subjects per group were chosen to participate in this study amounting a total sample size of 90 elders. Inclusion criteria for participation in the study was set as: (1) aged 60 years or older; (2) scoring 5 or grater on pittsburgh sleep quality index (PSQI) that means existence of sleep disturbances; (3) Normal mental status with no dementia; (4) ability to communicate in Farsi language. Exclusion criteria was set as: (1) sever CHF, severe pulmonary disease, any amputation of upper and lower extremities, injury, bleeding, thrombo–phlebitis, or tumors near acupressure points in head, neck and hands; (2) hearing defects; (3) Any chronic or acute pain interfering on nocturnal sleep; (4) Transfer to acute care unit; (5) Prescription of hypnotics–sedatives during intervention period.

4. Procedures

A trained research assistant screened 350 elders using PSQI. All participants interviewed by research assistant because the majority (%64.9) of subjects were illiterate. The questions were read aloud and more explanations were given as needed. Medical records were used to evaluate some of criteria (severe CHF,...) set for the study. Of those 350 original elders, 146 met the inclusion criteria. All of the subjects gave their informed consent prior to randomization, and 116 were identified as having sleep disturbances (A PSQI score equal or grater than five points). Of those, 90 subjects randomly selected to participate in the study. They were then randomized to three groups. Each group had 30 subjects and gender ratio was equal in the study. However, 5 subjects in the acupressure group, 4 subjects in the sham group and 4 subjects in the control group were dropped from the study for various reasons including transfer to acute care unit, take sleep medication, pain due to fall and disagreement to continue the study. A total of 77 patients completed the study, including 25 patients in the experimental group, 26 in the sham group, and 26 in the control group. Subjects in the experimental group received acupressure massage three times a week for 4 weeks; in addition, patients were requested to refrain from massaging any acupoints during the study period.

4.1. Selection of acupoints

An acupressure protocol was developed based on literature and consultation with qualified traditional Chinese Physician with more than 6 years experience in the field. The acupoints were taken from traditional Chinese medicine (TCM) to enhance sleep. They were Neiguan in hands, Shenmen (HT7) in the ears and hands, Yung-chuan (K11) and Sanyinjiao (SP6) in both feet, and Anmian in the head (Fig. 1). These acupoints were chosen for subjects in the acupressure group. The precision of acupressure was confirmed if the subjects felt sore, numb, heavy, distended, and/or warm. Non-acupoints (sham acupressure), which were 0.5 cm (corresponding to body unit) away from meridian, were used to replace true acupoints.

The main investigator was trained by the expert a month prior to the study. A scale was used (20 gr–6 kg) to measure the force of finger pressure between 3 and 4 kg. The force of finger pressures was measured 30 times and the mean forces of fingers of left and right hands were from 3.39 to 3.21 kg (SD = 0.23–0.28). Accuracy of acupoints selection was also evaluated in patients.

5. Measures

The PSQI is a questionnaire that measures self-reported sleep habits during the previous 4 week. It is a global measure with seven components: perceived sleep quality, sleep latency, sleep duration, sleep efficiency, sleep disturbance, sleep sufficiency and use of sleep medication. The score for each component ranges from 0 to 3, and the sum of the score gave a global score. High scores indicated poorer sleep quality. A score of 5 (indicating poor sleep) yielded a diagnostic sensitivity of 89.6% and a specificity of 86.5%. The internal consistency of the scale was supported with a Cronbach’s α of 0.83, and test–retest reliability of 0.85 in this study. The PSQI translated and were given to experts for face validity. In this study,
the 21-point Iranian version had a Cronbach’s reliability coefficient of 0.74 overall and test–retest reliability, \( r = 0.88 \).

A sleep log was used to monitor sleep daily. Sleep quality was rated using a descriptive, numeric scale ranging from 0 (the worst sleep imaginable) to 10 (sleep well). Ratings were performed on a daily basis, prior to getting out of bed. Although reliability and validity of the daily log were rarely reported, researches have compared the daily log with polysomnographic monitoring, and found that objective data were in highly agreement with subjective data (kappa = 0.87), and that sensitivity and specificity were also high (92.3% and 95.6%) in narcoleptic subjects and control subjects. Researchers concluded that the log could provide accurate information about sleep/wake patterns.26

5.1. Data analysis

The statistical software package for social science (SPSS) Version 13 was used for data analysis. Data were analyzed using descriptive statistics, Chi-Square test, Paired \( t \)-test, willkakson sign-rank test, ANOVA, Repeated measure ANOVA, ANCOVA and the Kruskal–Wallis test.

6. Results

Of the original 77 subjects, 41 were men, and 36 were women. The mean age of subjects was 75.21 (SD = 8.88) and 64.9% was illiterate. The median of their chronic disease was 2. They stayed in an institution from 6 to 168 months and the mean months was 34.7 (SD = 32.3). There was no significant difference in data pertaining to gender, age, education, (Table 1) sleep style, Exposure to sun light, bed condition, habit of naps, light and voice at night, consumption of tea, coffee or smoking, current use of medication, number of chronic disease, among subjects in three groups (\( p > 0.05 \)). These data indicated homogeneity of demographic data of subject among three groups.

There were seven indices to represent subjects’ quality of sleep in the questionnaire. Mean and standard deviation of pretest and posttest on quality of sleep across groups are presented in Table 2. Table 2 shows that subjects’ global PSQI scores were ranged from 7 to 17 points in acupressure group (11.88 ± 2.53), and from 7 to 16 points (11.58 ± 3.24) in the sham acupressure group, and from 6 to 18 point (11.46 ± 2.97) in the control group. Before data analysis, the main study variables were examined for evidence of normal distribution. Using one-way ANOVA to compare mean difference on pretest data, revealed no significant differences on the global score of the three groups (\( p > 0.05 \)). These results indicate homogeneity of the subjects of the three study groups.

The Kruskal–Wallis test, which was corrected for tied ranks, was significant on the subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, and sleep sufficiency as indicated on Table 3. Follow-up tests were conducted to evaluate pair wise differences among the three groups, using the Holm’s sequential Bonferroni approach.

Results indicated significant differences between the acupressure group and the control group in the subjective sleep quality (\( p = 0.028 \)), sleep latency(\( p = 0.001 \)), sleep duration (\( p = 0.007 \)), habitual sleep efficiency (\( p = 0.028 \)), sleep disturbance(\( p = 0.013 \)), and sleep sufficiency (\( p = 0.049 \)), but there were no differences in sleep indices between the sham acupressure group and the control group. The analysis of data post intervention using one way ANOVA also showed significant differences in Global scores of PSQI among three groups (\( P = 0.000 \)). Scheffes post hoc comparison indicated

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**Fig. 1. The selected acupoints.**

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**Table 1.**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Men</th>
<th>Women</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (years)</td>
<td>75.21</td>
<td>75.21</td>
</tr>
<tr>
<td>Education (illiterate)</td>
<td>64.9%</td>
<td>64.9%</td>
</tr>
<tr>
<td>Chronic Disease</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Staying months</td>
<td>34.7</td>
<td>34.7</td>
</tr>
</tbody>
</table>

**Table 2.**

<table>
<thead>
<tr>
<th>Group</th>
<th>Pretest Score</th>
<th>Posttest Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acupressure</td>
<td>11.88 ± 2.53</td>
<td>9.00 ± 1.98</td>
</tr>
<tr>
<td>Sham Acupressure</td>
<td>11.58 ± 3.24</td>
<td>9.50 ± 2.10</td>
</tr>
<tr>
<td>Control</td>
<td>11.46 ± 2.97</td>
<td>9.50 ± 2.10</td>
</tr>
</tbody>
</table>
significant difference in Global scores of PSQI between the acupressure group and the control group \( (p = 0.000) \) but there was no differences in Global scores of PSQI between the sham acupressure group and the control group \( (p = 0.078) \).

Data from the daily sleep status record forms obtained during the study showed that there were significant reduction in frequency of nocturnal awakening in the three groups \( (f(2) = 4.283, p = 0.017) \). However, frequency of nocturnal awaking was reduced by 0.78 time in the acupressure group, by 0.39 time in the sham acupressure group and by 0.18 time in the control group. Data points obtained from the Sleep log included pretest (1 data-point), intervention period (8 data points), and post intervention (1 data-point). Repeated measures analysis of variance was performed to determine if there were any significant differences over time among the acupressure, the sham acupressure, and the control groups on the dependent variable. The trends of perceived quality of sleep at night over time were presented at Fig. 2. The results demonstrate the group main effect was significant in perceived quality of sleep at night \( (F(2) = 6.46, p = 0.003) \).

Follow up tests were conducted to evaluate pair wise differences among the three groups, using Sheffes post hoc comparison. Results indicated significant differences between the acupressure group and the control group on the perceived quality of sleep at night.

### Table 1

Demographic characteristics of the subjects within the Acupressure, sham acupressure and control groups.

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Acupressure</th>
<th>Sham acupressure</th>
<th>Control</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender Male</td>
<td>13(52)</td>
<td>14(53.8)</td>
<td>14(53.8)</td>
</tr>
<tr>
<td>Female</td>
<td>12(48)</td>
<td>12(46.2)</td>
<td>12(46.2)</td>
</tr>
<tr>
<td>Edu Illiterate</td>
<td>16(64)</td>
<td>21(80)</td>
<td>13(50)</td>
</tr>
<tr>
<td>Elementary</td>
<td>7(28)</td>
<td>4(15.4)</td>
<td>9(36.6)</td>
</tr>
<tr>
<td>High school</td>
<td>1(4)</td>
<td>1(3.8)</td>
<td>1(3.8)</td>
</tr>
<tr>
<td>Univ.(BS)</td>
<td>1(4)</td>
<td>0(0)</td>
<td>3(11.5)</td>
</tr>
<tr>
<td>Marriage Single</td>
<td>6(24)</td>
<td>8(30.8)</td>
<td>4(15.4)</td>
</tr>
<tr>
<td>Married</td>
<td>5(20)</td>
<td>2(7.7)</td>
<td>4(15.4)</td>
</tr>
<tr>
<td>Widowed</td>
<td>14(56)</td>
<td>14(54)</td>
<td>18(69)</td>
</tr>
</tbody>
</table>

### Table 2

Mean and standard deviation(SD) of pretest and posttest of sleep quality among three groups.

<table>
<thead>
<tr>
<th>Quality of sleep</th>
<th>Acupressure</th>
<th>Sham acupressure</th>
<th>Control</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pretest Mean SD</td>
<td>Posttest Mean SD</td>
<td>Pretest Mean SD</td>
</tr>
<tr>
<td>Global PSQI</td>
<td>11.88 2.53</td>
<td>6.84**** 2.79</td>
<td>11.58 3.24</td>
</tr>
<tr>
<td>Sleep quality</td>
<td>1.40 0.746 0.84** 0.473</td>
<td>1.23 0.765 1.00* 0.632</td>
<td>1.42 0.80 1.27 0.606</td>
</tr>
<tr>
<td>Sleep latency</td>
<td>2.52 0.714 1.52**** 0.918</td>
<td>2.35 0.797 2.27 0.604</td>
<td>2.50 0.76 2.42 0.945</td>
</tr>
<tr>
<td>Sleep duration</td>
<td>2.36 0.810 1.36**** 0.952</td>
<td>2.23 0.836 1.73* 1.11</td>
<td>2.04 0.958 2.19 0.694</td>
</tr>
<tr>
<td>Sleep efficiency</td>
<td>1.56 0.768 1.44**** 1.04</td>
<td>2.46 0.859 1.96 1.21</td>
<td>2.08 1.16 2.27 1.04</td>
</tr>
<tr>
<td>Sleep disturbances</td>
<td>1.60 0.50 0.98** 0.96</td>
<td>1.50 0.583 1.19* 0.56</td>
<td>1.50 0.510 1.42 0.578</td>
</tr>
<tr>
<td>Sleep medication</td>
<td>0.68 1.18 0.44 1.003</td>
<td>1.04 1.45 0.73 1.25</td>
<td>1.31 1.49 1.27 1.51</td>
</tr>
<tr>
<td>Sleep sufficiency</td>
<td>0.72 0.737 0.28* 0.458</td>
<td>0.81 0.749 0.69 0.679</td>
<td>0.62 0.697 0.73 0.778</td>
</tr>
</tbody>
</table>

\*p < 0.05, **p < 0.01, ***p < 0.001, ****p < 0.0001.
The results also suggest that acupressure might have an important role for managing sleep disturbances in institutionalized residents. It was assumed that improvement in the sham acupressure group should not be as good as those in the acupressure group because the sham acupressure points were selected 0.5 cm away from true acupressure points in this group, although manual technique were the same. These findings are consistent with studies carried out by Chen et al. and Tsay & Chen (2003).

The stimulation of these acupuncture points may increase a release of serotonin and melatonin relaxes the body, and thus, promote sleep. Acupuncture techniques can be easily taught to patients so that they can manage sleep alteration, decrease adverse health outcomes and improve their quality of life. Although subjects in the sham acupuncture group improved in the PQSI subscale of the subjective sleep quality on the results of the Kruskal–Wallis test, the improvements of quality of sleep were the greatest in the acupressure group. Acupressure on non-acupoints by clinical workers who can identify neither acupoints nor massage acupoints correctly may produce some improvements in sleep. This may be due to the physiologic and psychological effects of massage itself.

The findings of this study found that acupressure could improve the PSQI global scores in the acupuncture group, the mean score differences between before and after was 5.04, and also the average frequency of nocturnal awaking reduced by 0.87 time. Such findings are comparable to Chen (1999) and Wang's (1997) studies, which revealed that the mean score differences between before and after acupuncture were 5.93 and 3.8 and the average frequency of nocturnal awaking were 0.91 and 0.99 time. Guerrero da Silva et al. (2005) reported a significant improvement of insomnia in experimental group (5.1 mean score) compared to the control group (0.0 mean score).

The present study gives support to previous studies in terms of the positive effect of acupressure on the quality of sleep. The results indicated that acupressure could both enhance the sleep and exhibit rapid results right after one or two acupuncture massage sessions. These findings are consistent with Chen (1999) and Tsay (2003) research results and further support that acupressure is a rapid and effective technique in caring for elderly people with sleep disturbance. This study used sham and control groups to avoid potential placebo effects of acupressure. The results revealed, that acupressure was effective. Thus, there was no placebo effect in this study. This result implied that the effectiveness of acupressure depend on accurate selection and proper massage of acupoints.

Sleep disturbances are common problem in elderly people. The use of medications is always a concern. Acupressure, as was evidenced in this study, seems to be an efficacious means to improving quality of sleep in elderly nursing home residents. Therefore, it is suggested that nurses, nurses aid and patient or their relatives can use this simple, noninvasive healing method to manage sleep disturbances.

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References