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RESEARCH ARTICLE

Acupressure on Self-Reported Sleep Quality During Pregnancy

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Abstract
The aim of this study was to investigate the short-term effect of acupression at the H7 point on sleep quality during pregnancy. After oral consent had been obtained, the midwife invited the women claiming to have poor sleep quality and anxiety symptoms to complete the Pittsburgh Sleep Quality Index questionnaire and the State-Trait Anxiety Inventory-1. Then, the same midwife, previously trained by an expert acupuncturist (I.N.), advised the women to put on the wrist overnight compression H7 Insomnia Control half an hour before going to bed and to take it off upon awakening, for 10 consecutive days and thereafter every odd day (active group). Women refusing to wear the device for low compliance toward acupression were considered as the control group. After 2 weeks, a second questionnaire evaluation was completed. In the active, but not in the control, group, a significant improvement of sleep quality was observed after H7 device application. The study suggests that H7 acupression applied for 2 weeks improves sleep quality in pregnant women. This preliminary result should serve to stimulate further studies on the long-term effects of acupression.

1. Introduction

Poor sleep quality is commonly reported during the 3rd trimester of pregnancy; sleep walking, difficulty in falling asleep, and early awakening are the disorders most frequently reported by women [1]. Many factors could be suggested to explain such phenomena, in particular, the physiological changes occurring during pregnancy such as increases in progesterone and prolactin levels, size of the maternal abdomen, and fetal movements [2]. Low back

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pain and girdle pain, which frequently occur during pregnancy (30%—90%), and some not well-defined worries about pregnancy and the newborn often worsen sleep quality [3]. Moreover, poor sleep quality could be amplified by the anxiety disorders that most frequently occur during late pregnancy [4].

However, during pregnancy, the Food and Drug Administration of Italy has recommended avoiding sleep medications such as mefloquine, flurazepam, and temazepam (labeled as X-drugs), which are thought to be strongly related to teratogenic effects [5], and zolpidem (labeled as a C-drug), which is unrelated to teratogenic effects, but is related to adverse fetal—neonatal outcomes such as smallness with respect to gestational age and preterm delivery [6]. In addition, pregnant women are cautious about using medications; indeed, in the past 10 years, a growing interest in nonpharmacological approaches to treating several pregnancy disorders, including poor sleep quality, has been observed [7].

A recent systematic review analyzed the results of existing studies by taking into account the effects of acupuncture, yoga, aerobic exercise, and massage on sleep quality during pregnancy without reaching any strong conclusions [8]. However, two studies included in the above-mentioned review demonstrated that acupuncture applied twice a week for 8 weeks reduced sleep disorders during pregnancy in half of the treated patients [9,10]. No maternal or fetal side effects were found during the treatment period, and a very high compliance toward acupuncture was reported. On this subject, a recent Cochrane Review analyzed the uses of needle acupuncture, electroacupuncture, acupression, and magnetic acupression for sleep improvement in the general population. An analysis of 33 studies (2,293 participants) comparing acupression with no treatment or with placebo/sham acupression showed acupression to be more effective than placebo/sham acupression for improving sleep quality. Due to poor methodological quality and high levels of heterogeneity of the studies, no definitive conclusions were reached, supporting the need for high-quality clinical studies [11]. The aim of the present study was to investigate, in a sample of healthy pregnant women, the short-term effects of acupression on the H7 point by comparing baseline and post-treatment values obtained from the Pittsburgh Sleep Quality Index (PSQI) questionnaire for sleep quality [12] and the State-Trait Anxiety Inventory-1 (STAI-1) for anxiety feelings often related to worsening sleep quality [13].

2. Materials and methods

Pregnant women referred to the Ante-partum Outpatient Clinic from January 2012 to September 2013 were enrolled in the study. The study was approved by the Local Ethics Committee (Institution of Azienda Ospedaliero-Universitaria Policlinico di Modena), and oral consent was obtained from all women included in the study. Inclusion criteria were the ability to understand the Italian language, a singleton pregnancy, and feelings of anxiety and poor sleep quality. Exclusion criteria were maternal or fetal disease, planned elective cesarean section, and a previous history of severe anxiety or depressive disorders requiring drugs or psychological support. During the first visit at the Outpatient Clinic, the women routinely underwent a file compilation, a vaginal swab, and a fetal heart-rate evaluation, which were administered by a midwife. Thereafter, oral consent to take part in the study was obtained from each included woman, and each included woman completed the PSQI questionnaire and the STAI-1.

The PSQI questionnaire investigates seven aspects of sleep quality: "sleep latency" indicating difficulty in going to sleep, "habitual sleep efficacy" indicating the real time spent in sleep and not the total time spent in bed, "sleep duration" indicating the presence of nocturnal awakening, "sleep disturbances" indicating frequent arm or leg movements, "subjective sleep quality" indicating the personal perception of one's own sleep, "use of sleeping medication," and "daytime dysfunction" indicating difficulties encountered during the day time caused by poor sleep quality. Each of these seven aspects is given a score of 0—3 points, with a higher score meaning worse sleep quality; the sum of the scores on all seven items ranged from 0 to 21. Usually, a PSQI score of ≤ 5 is associated with good sleep quality, while a PSQI score of > 5 is associated with poor sleep quality. In our study, we associated good sleep quality with a PSQI score of ≤ 7 and moderate—severe poor sleep quality with a PSQI score of > 7—21 points.

Next, the same midwife, who had previously been trained by an expert acupuncturist (I.N.), advised the women to wear a soft rubber pin kept in place by an adhesive plaque able to exert acupressure on Point 7 of the heart meridian (HT 7; H7 Insomnia Control; Consulteam S.R.L., Como, Italy). The HT 7 point, called *Shenmen* or "gate of the spirit," is located on the outer side of the wrist on the radial side of the flexor carpi ulnar tendon between the ulna and the pisiform bone. Following the traditional Chinese medicine indications, its stimulation by needle insertion or acupressure is indicated to improve insomnia and reduce anxiety [14]. The device was applied half an hour before going to bed and removed upon awakening, for 10 consecutive days and on every odd day thereafter. Two weeks later, a second visit was scheduled to complete the post-treatment PSQI questionnaire and the STAI-1.

A Chi-square analysis was used for noncontinuous variables such as the PSQI and STAI-1 items. Student *t*-tests were used for demographic continuous variables. A p value of < 0.05 was considered significant.

3. Results

A total of 263 women met the inclusion criteria, and 235 agreed to participate in the study, of whom 134 received acupression (active group); the remaining 101 refused the treatment because of low compliance toward acupression and were considered as the control group. The low compliance was due to their believing that the device would not be able to affect the symptoms or that it might cause skin irritations. No differences were observed between the control and the active groups in terms of maternal age (33 ± 3.1 years *vs.* 32.4 ± 4.3 years), rate of nulliparous women (65% *vs.* 70%), and gestational age at entry into the study (36 ± 4.1 days *vs.* 36 ± 3.8 days). After

2 weeks, 209 women completed the second questionnaire evaluation; 21 in the active group had been removed from the study because they had removed the device during the night, and five in control group refused to complete the second questionnaire.

The STAI-1 evaluation showed that the percentage of women reporting mild–severe anxiety did not differed significantly between the control and the active groups, both at baseline (94.6% *vs.* 100%) and after 2 weeks of treatment (100% *vs.* 90%). However, the Chi-square analysis showed a significant reduction in the number of women suffering from mild–severe anxiety in the active (100% vs. 90%; $p < 0.02$), but not in the control (94.6% *vs.* 100%, no significance) group.

The PSQI evaluation showed that moderate–severe symptoms occurred more frequently in the active group than in the control group, based on the total score and the score for each PSQI item, as shown in Table 1. In the active group, the percentages of women complaining of moderate–severe symptoms based on the PSQI total score and the scores for five of the seven aspects of sleep quality, sleep latency, habitual sleep efficacy, sleep duration, sleep disturbances, and subjective sleep quality, were lower after the 2 weeks of treatment, as shown in Figs. 1–6. Two aspects, use of sleeping medications and daytime dysfunction, were not considered in the analysis because no women interviewed reported the use of medications during pregnancy or difficulties in taking part in routine activities during the day. In the control group, no significant differences were observed between the baseline and the post-treatment PSQI values ($p < 0.894$).

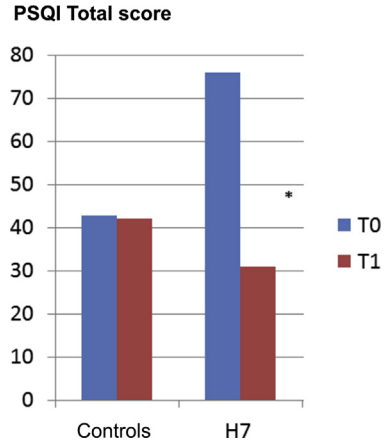

Figure 1 Percentage of women reaching a PSQI total score ranging from 7 to 21, suggestive of moderate–severe insomnia, in the control and active groups at the baseline interview and after 2 weeks. * For the H7 (active) group, $p < 0.02$. PSQI = Pittsburgh Sleep Quality Index.

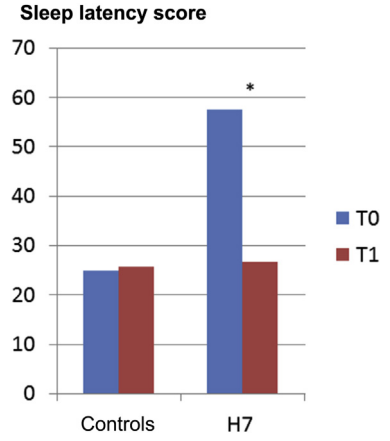

Figure 2 Percentage of women reaching a PSQI sleep latency score ranging from 7 to 21, suggestive of moderate–severe insomnia, in the control and active groups at the baseline interview and after 2 weeks. * For the H7 (active) group, $p < 0.02$. PSQI = Pittsburgh Sleep Quality Index.

4. Discussion

In this preliminary study, acupression on the HT 7 point improves sleep quality and reduces feelings of anxiety in pregnant women in the 3rd trimester of pregnancy. High compliance toward acupression was observed: just 10% of the women reported incorrect application, and none reported side effects or negative feelings during treatment. Acupuncture has been shown to be able to significantly reduce sleep disorders when compared with a placebo group or the general population [15]. Moreover, human biochemical studies on HT 7 acupoint stimulation have suggested the involvement of melatonin or opioid system regulation [16–18].

Our study suggested that overnight acupression on the HT 7 point applied for 2 weeks improved sleep quality and reduced feelings of anxiety during pregnancy even though methodological bias may have affected the results. The baseline symptoms of anxiety and insomnia differed between the two groups in this study, being higher in women

Table 1 Percentage of women reaching a PSQI score ranging from 7 to 21, suggestive of moderate–severe insomnia at the baseline interview.*

PSQI	Total score	Sleep latency	Sleep efficacy	Sleep duration	Sleep quality	Sleep disturbances	Sleep drugs	Daytime dysfunction
Control group ($N = 96$)	41 (42.7)	24 (25)	32 (33.3)	32 (33.3)	21 (22)	62 (64.6)	2 (2)	5 (5)
Active group ($N = 113$)	86 (76%)	65 (57.5)	55 (48.7)	69 (61)	63 (56.8)	98 (87.5)	1 (0.9)	26 (23)
p-value	< 0.01	0.01	0.01	0.01	0.01	0.05	–	0.05

Data are presented as *n* (%).
PSQI = Pittsburgh Sleep Quality Index.
* The total PSQI score and the scores for the seven aspects of the PSQI are shown. Values < 0.05 are considered as significant.

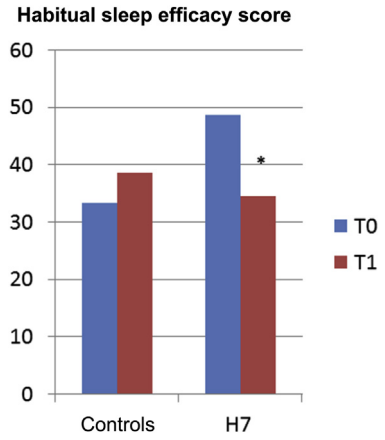

Figure 3 Percentage of women reaching a PSQI habitual sleep efficacy score ranging from 7 to 21, suggestive of moderate—severe insomnia, in the control and active groups at the baseline interview and after 2 weeks. * For the H7 (active) group, $p < 0.02$. PSQI = Pittsburgh Sleep Quality Index.

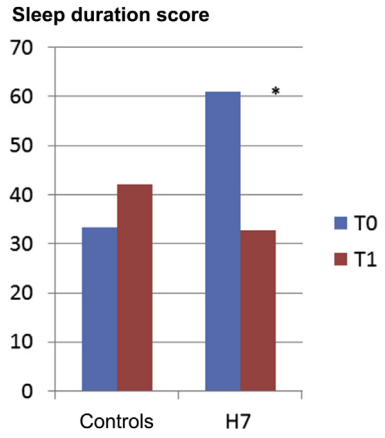

Figure 4 Percentage of women reaching a PSQI sleep duration score ranging from 7 to 21, suggestive of moderate—severe insomnia, in the control and active groups at the baseline interview and after 2 weeks. * For the H7 (active) group, $p < 0.02$. PSQI = Pittsburgh Sleep Quality Index.

in the active group, whereas the women refusing to wear the device, and considered as the control group, probably experienced a lower degree of symptoms. The post-treatment PSQI evaluation was performed too early (at 2 weeks) considering that such a questionnaire evaluates the symptoms of the past month. Moreover, no data were available after the 2 weeks of observation, so no conclusions could be drawn about the long-term effects of acupression on the H7 point.

In conclusion, HT 7 overnight acupression for 2 weeks seems to affect sleep quality and anxiety feelings. Even though the poor sample pool and the methodological bias did not allow us to draw any strong conclusions, this report should serve to stimulate further studies on the long-term effects of acupression on the H7 point during pregnancy.

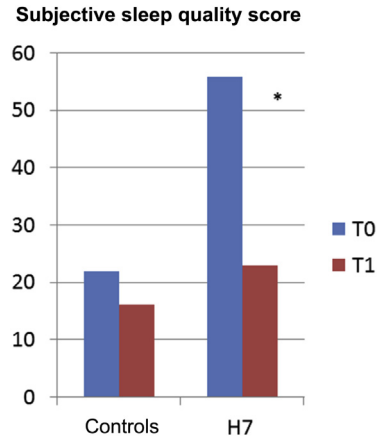

Figure 5 Percentage of women reaching a PSQI subjective sleep quality score ranging from 7 to 21, suggestive of moderate—severe insomnia, in the control and active groups at the baseline interview and after 2 weeks. * For the H7 (active) group, $p < 0.02$. PSQI = Pittsburgh Sleep Quality Index.

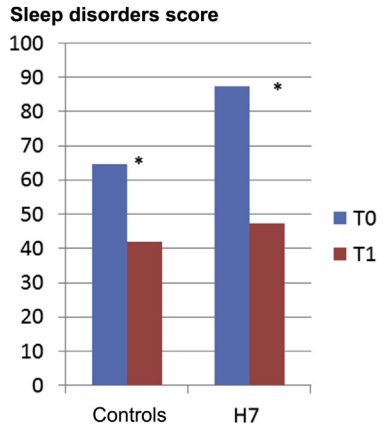

Figure 6 Percentage of women reaching a PSQI sleep disorder score ranging from 7 to 21, suggestive of moderate—severe insomnia, in the control and active groups at the baseline interview and after 2 weeks. * For the H7 (active) group, $p < 0.02$. PSQI = Pittsburgh Sleep Quality Index.

Disclosure statement

The authors declare that they have no conflicts of interest and no financial interests related to the material of this manuscript.

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