Sleep quality of obese workers of a teaching hospital: acupuncture as a complementary therapy*

QUALIDADE DE SONO DE TRABALHADORES OBESOS DE UM HOSPITAL UNIVERSITÁRIO: ACUPUNTURA COMO TERAPIA COMPLEMENTAR

CALIDAD DE SUEÑO DE TRABAJADORES OBESOS DE UN HOSPITAL UNIVERSITARIO: ACUPUNTURA COMO TERAPIA COMPLEMENTARIA

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ABSTRACT

The objective of this study was to verify the effect of acupuncture on the sleep quality of obese workers in a teaching hospital. Data were collected from July to October 2009, focusing on 37 workers who attended eight weekly acupuncture sessions. The Pittsburgh Sleep Quality Index was used to assess their sleep quality before and after the intervention. Results show that before the intervention, five (13.5%) people experienced good quality of sleep whereas at the end of the study 14 (37.8%) showed this condition. Statistic significance (p=0.0001) was found in comparing the mean scores obtained before and after acupuncture. Acupuncture had effects on the quality of sleep in the studied sample, presenting itself as a complementary technique for treating sleep disorders and consequently improving the quality of life in this population.

DESCRIPTORS

Acupuncture
Sleep disorders
Obesity
Occupational Elath
Nursing

RESUMO

O objetivo do estudo foi verificar o efeito da acupuntura na qualidade de sono de trabalhadores obesos em um hospital universitário. Os dados foram coletados no período de julho a outubro de 2009, junto a 37 funcionários, submetidos a oito aplicações semanais de acupuntura. O Índice de Qualidade de Sono de Pittsburgh foi utilizado para identificar a qualidade de sono dos sujeitos antes e após a intervenção. Os resultados mostram que antes da intervenção cinco (13,5%) pessoas apresentaram boa qualidade de sono e, ao final da intervenção, 14 (37,8%) relataram este quadro. A diferença obtida na comparação das médias dos escores obtidos antes e após a acupuntura foi significativa (p=0,0001). Concluiu-se que a acupuntura produziu um efeito positivo sobre a qualidade do sono na amostra estudada, apresentando-se como uma técnica adjuvante no tratamento dos distúrbios do sono e consequentemente na melhoria da qualidade de vida desta população.

DESCRITORES

Acupuntura
Transtornos do sono
Obesidade
Saúde do trabalhador
Enfermagem

RESUMEN

El estudio objetivó verificar el efecto de la acupuntura en la calidad de sueño de trabajadores obesos de un hospital universitario. Los datos se recogieron entre julio y octubre de 2009, de 37 empleados sometidos a ocho sesiones semanales de acupuntura. El Índice de Calidad del Sueño de Pittsburgh fue utilizado para identificar la calidad de sueño de los sujetos antes y luego de la intervención. Los resultados muestran que antes de la intervención, cinco (13,5%) personas presentaban buena calidad de sueño, y al finalizar la intervención, 14 (37,8%) relataron tal cuadro. La diferencia obtenida en comparación de promedios de puntajes antes y después de la acupuntura fue significativa (p=0,0001). En conclusión, la acupuntura generó efecto positivo sobre la calidad de sueño en la muestra estudiada, presentándose como una técnica adyuvante en el tratamiento de disturbios del sueño y, consecuentemente, en la mejora de calidad de vida de esta población.

DESCRIPTORES

Acupuntura
Trastornos del sueño
Obesidad
Salud laboral
Enfermería

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INTRODUÇÃO

The sleep-wake cycle is part of the circadian rhythm of the human organism, which is synchronized with environmental factors, and thus is constantly (24 hours) oscillating under natural conditions. This pace can be affected by external factors such as the change between day and night, characterized by the presence or absence of sunlight. It is also influenced by pre-established socials hours, such as the times for school, leisure, and other activities[1].

Physiologically, substances such as melatonin, the growth hormone, and cortisol have a direct effect on the regulation of the sleep-wake mechanism. Any unbalance in this process can cause several health problems, including sleep disorders, feeling unwell, mood changes such as irritability, tension, confusion and anxiety; and even result in reduced attention and concentration, thus harming one's performance in certain activities[1].

In the hospital setting, the working process has a particular nature, because the activities involved can trigger occupational health risks[2-3]. One example are the alternating work shifts, with workers performing tasks at different periods, during the day and at night, making it impossible for their organism to adapt to the working hours.

Another sign that is usually associated to an unbalanced sleep behavior is anxiety, evidenced by insomnia, which is identified by a pattern of waking several times during sleep. Anxious people find it difficult to stay asleep, they have a shorter deep sleep period, and their sleep is more fragmented compared to healthy individuals. Furthermore, lack of sleep causes symptoms that coincide with the mechanism of anxiety, therefore they may be confused despite having different concepts [4].

This set of disorders formed by insomnia and anxiety can also be associated with overweight. A recent denomination of changed eating behavior, referred to as Night Eating Syndrome (NES), associates insomnia to compulsive eating at night, and studies suggest that this condition is related to some type of stress disorder[5].

One attempt to minimize these symptoms is the traditional treatment using benzodiazepine-based drugs, which have anxiolytic effects and are broadly and commonly prescribed. However, these substances can cause physical and psychological risks, such as addiction, overdose, sedation, psychomotor or cognitive harms, memory loss, intensification of other drugs depressant to the central nervous system, and even depression[4].

Acupuncture is one alternative to allopathic therapy and its undesired side effects. It is an efficient strategy, because its mechanism of releasing endogenous agents does not cause harmful effects compared to psychoactive drugs[4].

Acupuncture is a millenary Chinese practice that is being used in the Western World. It consists of applying thin, flexible needles on specific points in different parts of the body[6] to stimulate peripheral nerves located where the needles are inserted. This causes changes in the neurotransmitters of the central nervous system (CNS)[6] and the consequent modulation of positive responses to the present energetic unbalances[7].

Other techniques are used in association with acupuncture, for example auriculoacupuncture, moxibustion, electroacupuncture, and others[6,8]. All these techniques are based on using acupoints distributed on the meridians on the human body, respecting their specificities. For example, in auriculoacupuncture, the points are distributed on the outer ear; and in electroacupuncture, electric stimuli are added to the needles, which can be on the acupoints of the meridians or on the ear, with the purpose to boost the treatment effects[6,8].

Although acupuncture is fairly recent in the Western World its use has been growing as well as studies on this topic. Some studies have been performed with the purpose to understand the effects related to inflammatory processes, muscular pain, stress, insomnia, and others[7,9-12].

More specifically, in terms of sleep problems, a systematic review listed several studies with results that emphasized the value of acupuncture in treating insomnia.

More specifically, in terms of sleep problems, a systematic review listed several studies with results that emphasized the value of acupuncture in treating insomnia[9]. Reports also exist about the use of auriculoacupuncture[6,8] and electroacupuncture to treat this type of problem[11]. For instance, a study performed in China demonstrated that electroacupuncture produced better effects than placebo acupuncture in treating this pathology[11]. Also, in Brazil, there is a report of a recent study that shows that acupuncture was more effective in treating Obstructive Sleep Apnea Syndrome compared to placebo acupuncture, which helped improve the quality of life of patients reducing hypersomnia episodes[12].

In this sense, and understanding that there may be a relationship between insomnia, anxiety, and excessive weight, and, also, that the sleep quality of healthcare workers may be harmed because of the changes in their physiological rhythm, considering the alternating work shifts (morning, afternoon, night), we believe that managing the workers' quality of sleep, particularly those who are obese, using acupuncture could have positive effects in reducing the signs, symptoms and causes of these problems, thus contributing to improving the quality of life of theses individuals.

The objective of this study was to verify the effect of acupuncture on the quality of sleep of obese workers of a university hospital.

METHOD

This descriptive, exploratory, and intervention study was performed using a quantitative approach, with obese workers of the Maringá University Hospital – PR.

The prevalence of obesity among the workers (20.91%) was determined by identifying the weight and height of 573 individuals (64.02% of the total hospital workers). This prevalence was considered when calculating the size of the study sample, with a 10% error, a confidence level of 0.9, and margin of 30% for losses. The same proportion was maintained between genders for the total number of obese workers, resulting in a sample consisting of 39 subjects (27 women and 12 men), selected at random.

Participants were included providing they met the following criteria: Body Mass Index (BMI) between 30 and 40, with cognitive skills that allowed them to fill out the research instruments on their own, who did not use any anticoagulant drugs and did not have any serious disease.

Data were collected between July and October 2009, through semi-structured interviews, self-administered questionnaires and interventions using electroacupuncture and auriculoacupuncture. The semi-structured interview was performed before the intervention with the objective to collect the subjects' personal information and sociodemographic data.

The Pittsburgh Sleep Quality Index (PSQI)[13] was filled out at two different times: on the week before the acupuncture sessions were started and the week following the end of the sessions. This instrument is used to measure the occurrence of disorders during sleep and its subjective quality. It is comprised by open and closed questions about the subjective quality of sleep, sleep latency, sleep duration, habitual sleep efficiency, sleep disorders, use of sleep medications, daytime sleepiness and daytime disorders. Scores ranged between 0 and 21, with scores 0 - 4 referring to good quality sleep; 5-10, poor quality sleep; and scores above 10, occurrence of sleep disorder. This instrument was validated for the Portuguese language by Xavier and collaborators in 2001, with intra-rater reliability measured by the weighted Kappa coefficient (K=0.81)[13].

During the intervention stage, each subject was subjected to one electroacupuncture and one auriculoacupuncture session per week, during eight weeks, all performed by the acupuncture specialist nurse (author to this study). The applications were performed in the Outpatient Clinic of the Maringá University Hospital, between 5 and 9 p.m., after the rooms for blood exams and chemotherapy had been closed to the regular public, so it was possible to use the comfortable reclining chairs available in that area. Each session lasted, in average, 40 minutes, considering the time for inserting and removing the needles. Due to the arrangement of the chairs, it was possible to perform sessions with up to three subjects in one hour. The session hours were scheduled according to the availability of the workers, from Monday to Saturday, with a seven-day interval between each application, and, in case the appointment had to be postponed, the interval was never longer than 10 days.

The acupuncture sessions were conducted for 30 minutes, in square wave, frequency of 2Hz and 3V, with 1-second interval, and amplitude adjusted to the patient's tolerance. Two needles (0.25X30mm) were inserted on the head, one on the *Baihui* point (VG20), facing the forehead and connected to the cathode (black electrode) and the other on *Yintang,* facing the tip of the nose and connected to the anode (red electrode). Both points are indicated for anxiety[9]. An electro-stimulation device was used at 2Hz, which is considered a low frequency that induces analgesic and regenerative processes, and is thus adequate to treat all kinds of pain, substance abuse, osteoarthritis, rheumatoid arthritis, vascular problems and organ dysfunctions[6].

In the auriculoacupuncture, semi-permanent needles (0.15X1.5mm) were inserted on the Shenmen, Hunger, mouth, Anxiety 1 and 2 points, following the locations determined by the Chinese School[8], and were fixated using skin-color medical tape, after cleansing with tincture of benzoin for a better fixation of the needles. Every week, the needles were removed and replaced by new ones, which were placed (taped) on the opposite ear.

The data were compiled and analyzed using Statistica v.8 software, and the non-parametric Wilcoxon test was used for paired groups with level of significance at 5% [14].

The study was conducted in agreement with the Regulation 196/96 of the National Health Council, and was approved by the Permanent Ethics Committee on Human Research at the State University of Maringá-PR (review number 094/2009). All participants signed the Free and Informed Consent Form (two copies).

RESULTS

The intervention started with 39 participants. Two subjects withdrew from the study before ending the intervention, for personal reasons. Therefore, 37 individuals composed the study sample, of ages between 32 and 67 years (mean 45 years), and standard deviation of 8.20.

Regarding the participants' marital status, 31 (83.78%) were married or in a common-law relationship, three (8.11%) were single, one (2.70%) was a widower, and two (5.41%) were separated. Regarding the work shift, 10 subjects (27.03%) worked in the morning (from 7 a.m. to 1 p.m.), 10 (27.03%) in the afternoon (from 1 a.m. to 7 p.m.), six (16.21%) at night (from 7 p.m. to 7 a.m.), and 11 (29.73%) worked full-time.

The distribution of the participants according to their positions revealed there were two nurses (5.40%), and

35 (94.60%) workers with secondary or technical education. Of the latter, 10 individuals worked as nursing technicians (27.03%), whereas 25 (67.57%) worked as janitors (5), laundry workers (5), maintenance workers (4), office clerk (4), telephone operator, security agent, driver, kitchen helper, cook, infant-food preparation room technician, and radiology technician (one each).

The subjects' quality of sleep was measured considering the PSQUI scores, directly related to symptom severity. Before the intervention, only five workers experienced good sleep quality, and, among the others, 14 experienced sleep disorders, thus they showed the highest scores (Figure 1). After the acupuncture sessions, nine individuals experienced good sleep quality, which meant a 24.33% increase; and two subjects continued experiencing sleep disorders, which meant a 32.45% reduction. The increased number of subjects with poor quality sleep is justified by the cumulative score of the instrument, as subjects who once had sleep disorders had their scores drop to the lower category. Therefore, although they did not reach a good quality of sleep, and remained in the poor sleep category, they at least experienced some symptom relief.

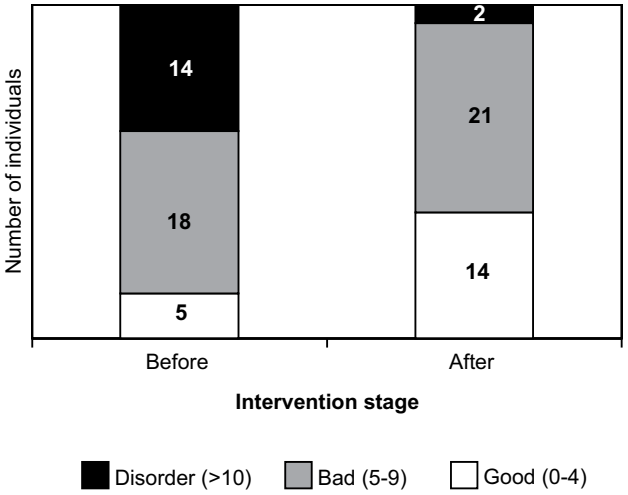

Figure 1 – Distribution of subjects according to their score on the Pittsburgh Sleep Quality Index obtained before and after the acupuncture sessions - Maringá, PR - 2009

By relating the medians of the PSQI scores obtained before and after the acupuncture sessions and the sociodemographic variables, it is observed that they were not significant (p>0.05) for females, for morning workers, and for unmarried subjects (Table 1).

DISCUSSION

There was a significant difference (p=0.0001) between the subjects' PSQI scores before (9.0) and after (6.0) the acupuncture, which suggests that this technique may have improved the sleep quality of the participants. One possible reason for this result is the strong influence that sleep has on the production of hormones, such as insulin, which is involved in controlling blood glucose levels, leptin and ghrelin, which together control the appetite; thus explaining the tendency that individuals with deprived sleep have for obesity[15].

Table 1 – Subjects' Pittsburgh Sleep Quality Index scored before and after the acupuncture sessions, according to the studied variables– Maringá, PR - 2009

Variables	N	%	Median		p-value
			Before	After	
Gender					
Male	11	29.73	9.5	5.0	0.0003*
Female	26	7027	7.0	7.0	0.1234
Age					
30⊦40	26	70.27	9.5	6.0	0.0117*
40⊦60	10	27.03	8.5	5.5	0.0022*
≥60	1	2.70	5.0	7.0	-
Marital status					
Married	31	83.78	9.0	6.0	0.0007*
Unmarried	6	16.22	10.0	5.5	0.0678
Education					
<9 years	19	51.35	10.0	6.0	0.0065*
≥9 years	18	48.65	8.0	6.0	0.0029*
Work shift					
Morning	10	27.03	8.5	6.0	0.0909
Afternoon	10	27.03	9.5	4.5	0.0440*
Night	6	16.21	9.5	4.5	0.0277*
Full-time	11	29.73	9.0	7.0	0.0414*
Body Mass Index					
30⊦35	26	70.27	8.5	6.0	0.0013*
35⊦40	11	29.73	9.0	4.0	0.0284*

*significant p-value (p<0.05)

Another China study[16] also verified the effectiveness of acupuncture to improve sleep quality, and found a significant difference (p<0.05) in PSQI scores regarding the improvement of sleep quality and an increase in the daytime functional state compared to the control group, treated with drugs.

The median PSQI score before acupuncture was 9.0, which is below the mean 12.8 found in another study[17] that nurses conducted with people living with HIV/AIDS. This higher score may be due to the fact that the referred population lives with a chronic disease of closed prognosis, and therefore cannot be totally compared to the characteristics of the present study sample.

Gender is one important aspect to be considered, as women are more affected by the rhythm of the working process, because they accumulate work re is an accumulation of work and domestic activities, which suspend the need for sleep and reduce the available time for sleep at

home, particularly if they have children[18]. Furthermore, the obstructive sleep apnea and hypopnea syndrome, a fairly common sleep disorder among obese individuals, is more prevalent and serious among menopausal women[19], and 21 women in the present study are in this stage in life (56.76%).

A study performed with menopausal women, distributed at random into an acupuncture group and a placebo acupuncture group did not find any differences (p≥0.59) in the PSQI scores between the two groups[20]. At the end of the intervention, there was a high frequency of subjects whose score was above 5 in both groups, with 67% in the control group. In comparison, in the present study the percentage of subjects of with scores above 5 after the intervention was lower: 54.05%.

Age is also often associated to instable circadian rhythms, causing sleep disorders, depression, and reducing one's physical capacity and health; factors that can lead workers towards a progressive intolerance[18]. In the study sample, most workers (70.27%) were between 30 and 40 years of age, therefore it was still possible to adopt attitudes to prevent the abovementioned symptoms, with a view to improving their quality of life and, consequently, their working capacities.

For this particular population of obese individuals, one factor that aggravates poor sleep quality is snoring; the most common complaint among individuals who snore, or their spouses, with a prevalence of 36% and 24.5% for men and women older than 40 years, respectively[15]. In this study, the sleep quality improvement was more significant for subjects with ages between 40 and 60 years (p=0.0022), which can be explained by the fact that most of the population that snores (57%) is in this age group, compared to younger subjects (30%)[17]. Snoring, when too loud, can cause hearing loss of the subject and their spouse[15], and the simple action of loosing a few pounds would be enough to stop the snoring[21].

In the present study, no statistical significance was found for the group of unmarried individuals (p=0.0678). One possible explanation for this result is the fact that not having a spouse contributes to maintaining the sleep quality unaffected, possibly because there are no factors such as interruptions because of the spouse's snoring habits, or worrying about the spouse or children.

The activities developed at the hospital have particular characteristics inherent to the healthcare working process, with factors that have a negative effect on the workers' quality of life[3], including the long work hours. Therefore, working a 12-hour shift with a 36-hour rest interval, which allows keeping continuous shifts, is appropriate to the nature of the working process that must be nonstop[2]. That is why the night shifts, held by a considerable part of the present study sample (16.21%), can cause a higher incidence of complaints about the appetite pattern and digestion difficulties because of the alternating shifts, eating habits and circadian alterations[3].

Statistical significance was observed for all work shifts except mornings (p=0.0909). For all individuals, and particularly this sample of hospital workers, sleeping is a very important part of life, as it takes up, in average, one third of one's whole life. Accumulating sleepless nights, in the long term, can reduce one's performance in everyday activities, besides exposing him or her to a high risk for hypertension and cardiorespiratory problems[3,21]. Therefore, the reduction in sleep problems, observed in the present study, and the consequent improvement in quality of life by using acupuncture are indications that this technique can favor these workers' quality of life.

Similar results were found in a Brazil study[22] with a significant improvement of insomnia, tiredness upon waking, fatigue, calm sleep, and disposition for leisure, comparing the pre and post-treatment situation.

At the same time, sleep quality is closely linked to emotional factors, considering that the reduced levels of melatonin in night eaters can have a negative effect on their quality of life, perpetuating their insomnia and depressed mood[5]. Leptin is another hormone that is found at low levels in this population. It has an anorexic action, which can justify the reduced inhibition that these subjects have in face of the impulses of night hunger that even interrupt their sleep[5]. This hormone can also be reduced by using acupuncture[18,21].

A Canada study[4] with 18 adult patients with insomnia who were subjected to acupuncture for five weeks showed an increased nighttime melatonin secretion and improvement in the sleep latency polysomnographic measurements, total time and efficiency, all with statistical significance. The changes in anxiety levels were also positive; therefore, these results corroborate other findings about the relaxing effects of acupuncture, showing it is a valuable technique for some categories of anxious patients with insomnia[4].

The anxiety expressed by obese individuals could result in a diagnosis for Night Eating Syndrome (NES). Individuals with this disorder have higher plasmatic levels of cortisol– a hormone related to stress[5]. Therefore, the Night Eating Syndrome is a particular response to a circadian stress that occurs mainly in obese people. Stress, in this case, is a triggering factor of NES, and its symptoms can be significantly improved if the anxiolytic factors can be controlled[5]. These workers' excessive weight has an important influence on their sleep quality, because obesity can cause obstruction of the pharynx, which increases the intensity of snoring and can also cause breathing difficulties. Furthermore, difficult breathing fragments the sleep at night, which results in problems the next day, such as sleepiness, and the individual can fall asleep anywhere, even while performing activities such as reading,

eating, talking or driving, also harming their professional performance[22].

A significant relationship was observed between the BMI variable and the difference between the PSQI score medians for both categories, in the group with BMI between 30 and 35 (p=0.0013) as well as for the group with BMI between 35 and 40 (p=0.0284). These results are justified by the characteristic inherent to type-I obesity, in which the signs and symptoms of the associated comorbidities are slighter and more recent compared to those presented in people with type-II obesity. Therefore, the improved sleep quality observed after acupuncture was more significant in obese individuals with smaller BMI.

The main evitable risk factor for obstructive sleep apnea and hypopnea syndrome, another common sleep disorder, is obesity, which affects 70% of patients with apnea[20]. In this sense, acupuncture can make positive changes in these workers' lives, because it improves sleep quality and helps reduce their weight, which can have a double effect on their quality of life and even reduce treatment time.

Finally, it is important to highlight that this study was performed between the years 2008 and 2009, and, for this reason, the new recommendations of the *STRICTA - Standards for Reporting Interventions in Clinical Trials of Acupuncture* were not taken into consideration, because they were published in 2010. The STRICTA recommendations are extremely relevant for conducting research in the clinical field, therefore they will be considered in further studies.

CONCLUSION

The present study outcomes suggest that acupuncture could be effective to improve the sleep quality of subjects. These data indicate that this technique can be used as an effective strategy to promote the quality of life of this specific population, mainly due to the nature of the working process in hospitals, which is characterized as wearing and causing sleep disorders, due to the long hours, working with constant stress, and other factors.

During the intervention, the subjects were not interviewed about changes to daily life habits such as starting on a diet, exercising or using medications. This fact is a limitation to the present study findings, because we cannot make a categorical statement about the improvements after the intervention having been caused exclusively by the effect from acupuncture. Another limitation was the absence of a control group in the study design, which would offer a stronger level of evidence to the findings. Therefore, further studies are needed with a greater control of the independent variables and sample number, counting with a control group, and, if possible, blind to the subjects.

It is emphasized that the referred drawbacks do not make the present study findings obscure. Nursing has already been established as a professional category of great importance in healthcare, and should be encouraged to master acupuncture knowledge, a technique of the Traditional Chinese Medicine, with the purpose of using it as a complementary tool in the practice of providing clients with comprehensive care, aiming at improving their quality of life.

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