

On the Comparison of the Effectiveness of Acupuncture and Medication Therapy on Improving Sleep Disorders in Women Suffering from Generalized Anxiety Disorder

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Abstract

This study aims to compare the effectiveness of acupuncture and medication therapy on improving sleep disorders in women suffering from Generalized Anxiety Disorder. This study is a quasi-experimental with pretest-posttest, control group, and follow-up period. The study population included all women suffering from generalized anxiety disorder and sleep disorder. Purposive sampling was used to select the sample. Using this method, 45 participants were selected and randomly assigned to three groups: acupuncture, medication therapy, and control groups. Acupuncture group received 12 to 15 treatment sessions (2-3 times a week) in DU20, HT7, PC6, Kid6, Ren12, UB62, Sp6, Anmian and Ear-shen men. Medication therapy group were taken drugs under the supervision of a psychiatric while the control group received no intervention over this period. In order to analyze the data, repeated measures were used in the statistical SPSS software version 21. The results showed that both acupuncture and medication therapy programs improve sleep disorder in women with generalized anxiety disorder; however, the acupuncture was more effective than medication therapy.

Keywords: Generalized anxiety disorder; Acupuncture effectiveness; Sleep disorder

Introduction

Sleep disorders, i.e. dissatisfaction with the quality or quantity of sleep, are along with complaints about the difficulty in falling asleep and in keeping sleeping [1]. Sleep quality has a key role in one's health and well being. Any sleep disorder, in addition to causing mental health problems, physically reduces the person's ability. Those suffering from sleep disorders are easily aroused and get angry. Furthermore, one's cognitive function and concentration level to deal with daily activities are reduced [2]. The results have shown that the mean frequency of hospitalization per month for people suffering from insomnia, compared with those with no history of sleep disorders, has almost doubled [3]. Sleep deprivation also leads to a decrease in function of the immune system and in function of hypothalamus, pituitary and adrenal during subsequent days, glucose tolerance, hypertension and increased risk of cardiovascular events, decreased maximum ability in anaerobic power and level [4].

Generalized anxiety disorder is a pervasive disorder in which a person is constantly worried about future events and is afraid of them. This subject leads to chronic and morbid concern about future events [5]. This disorder is characterized by intrusive and pervasive fears and daily dysfunction. People suffering from the generalized anxiety disorder are obsessed with non-controllable concerns (Pending concerns). Diagnosis of generalized anxiety disorder depends on the existence of two key symptoms: concern (e.g. negative preoccupation of future events) and physiological overstimulation (e.g. muscle tension, sleep disturbance, feelings of tuning). Concern is regarded as the most prominent symptom of generalized anxiety disorder. Concern is a cognitive activity which is determined by the perception of a potential risk in the future (for instance, If I fail licensing exam next

week, I won't be able to find a job). Concerns are often to gain control and to prevent the occurrence of negative events in the future (What can I do to avoid failing the exam) [6-8].

People suffering from generalized anxiety disorder first seek medical treatment because of some problems including physical difficulties, sleep disorders, muscle tension, indigestion, restlessness, boredom susceptibility, irritability as well as those problems occurring during individuals' leisure activities. In this disorder, there is distortion in the management of facts and risks, particularly in people who are concerned about their own and their family members' health, safety, welfare. They face cognitive distortions in perceiving the coming events [9]. In addition, studies have shown that there is a positive relationship between concerns in generalized anxiety disorder and other maladaptive emotion regulation strategies and psychopathology such as suppression rumination [10].

Previous studies examining the relationship between anxiety disorders and sleep problems show that one of the areas being severely affected by anxiety disorders is sleep quality and quantity. For example, Short in his study claimed that insomnia symptoms are directly associated with anxiety [11]. He also showed that anxiety treatment reduces symptoms of insomnia. In this regard, Wang also indicated that sleep disorder is closely related to problems such as hypertension, diabetes, hyperlipidemia, depression, and anxiety. He also showed that 54% of individuals suffering from sleep disorder have an anxiety disorder too [12].

For the treatment of sleep disorders, the effectiveness of various treatment methods including Cognitive Behavioral Therapy (CBT), medication therapy, herbal therapy, yoga, acupuncture, meditation and the like is separately studied. The research on the side effects of medication therapy indicates that long-term use of these medications may have undesirable consequences. For example, the results of the

study conducted by Feiz Abadi, et al. showed that the use of Benzodiazepines causes negative side effects including forgetfulness, drowsiness, fatigue, headache, weakness, exhaustion, irritability, and confusion. Benzodiazepines also affect the motor system, causing slowness of movement and impaired motor skills. Furthermore, the research has shown that taking these medications affect the liver enzymes and cause increased alkaline phosphatase.

Although the most common method to treat sleep problems is taking drugs, scientific evidence suggests that the effectiveness of non-pharmaceutical approaches, due to their long-term durability and lack of side effects, are recommended by physicians. For example, CBT which consists of a specific set of techniques that strengthen the bed-sleep connection, realign the homeostatic mechanisms and the circadian rhythm and decrease anxiety and rumination about sleep [13].

One of the methods of alternative medicine is acupuncture which has been of concern over recent years in the world as well as in Iran. Clinical advances in the acupuncture research, along with side effects of conventional medication treatment of chronic pains, have significantly increased the use of acupuncture over the past decades. It is estimated that over half a million therapist outside China have used acupuncture to treat diseases [14]. According to clinical evidence, acupuncture is a safe non-medication approach to treat insomnia. The first official organization reporting the effect of acupuncture on many diseases, including sleep disorder was the World Health Organization. In 1996, this organization, based on clinical trials, announced a list of diseases which can be treated by acupuncture. Spence et al. as a result of their research on a five-week clinical trial on 18 young patients suffering from anxiety and insomnia showed that acupuncture not also reduces anxiety but also decreases the number of waking-up times [15].

The results of the research regard the mechanism of acupuncture effect on sleep quality as follows:

- Adjusting the chemical transmitters (neurotransmitters) such as serotonin, noradrenaline, dopamine, and neuropeptide Y Gapa in the nervous system, which lead to positive psychological effects including enhanced good-temperedness, reduced anxiety and depression as well as stress management.
- Stimulating the secretion of Beta-endorphin and increasing the activity of opioid receptors in the central nervous system.
- Decreasing the sympathetic activity of nervous system and creating a relaxing effect.

- Improving blood flow by regulating the activity of the Nitricoxide synthase enzyme.

According to what was mentioned above, the researcher in this study is to compare the effectiveness of two methods of medication therapy and acupuncture therapy on improving sleep disorders in women suffering from generalized anxiety disorder. The results will be of great implications for researchers, physicians, and patients.

Methodology

This study is a pilot study with pre and posttest and control group design. The sample of the study consisted of forty five 18-70 year-old women referring to the clinic. Fifteen participants were randomly assigned to the acupuncture therapy group. Fifteen subjects were also randomly placed in the medication therapy (Zolpidem, diazepam, clonazepam, alprazolam) group and the remaining 15 patients were in the control group. Inclusion criteria were as follows: lack of therapeutic intervention at the same time, getting a score of 6 and higher in Pittsburgh's test, confirmed anxiety by questionnaire, complaints of insomnia for at least a month. The exclusion criteria included: developing medical insomnia, pregnancy, inflammation or infection in the acupuncture points. To collect data in the pretest and posttest phases, Structured Clinical Interview for DSMIV (SCID DSM-IV) Clinical Version (SCID-CV), Pittsburgh Sleep Quality Index (PSQI), Beck Anxiety Inventory, and Ketel Anxiety Questionnaire were used. In order to analyze the data, repeated measures were used in the statistical SPSS software version 21.

Findings

To compare the effectiveness of acupuncture and medication therapy on sleep disorders in women suffering from generalized anxiety disorder, the scores of participants with acupuncture and medication therapy in total score of Pittsburgh sleep quality questionnaire before and after the intervention and well as during follow-up period were statistically analyzed using repeated measures analysis are shown in Table 1.

One of the assumptions of repeated measures test is Mauchly test. It should be noted that Green Haos-Gasser index will be used if the Mauchly test is significant. On the other hand, sphericity index will be employed. The results for all aspects of the questionnaire and its total score in the acupuncture and medication therapy groups are shown in Table 2.

Dimension	Time periods	Acupuncture		Medication therapy		Control group	
		Mean	Standard deviation	Mean	Standard deviation	Mean	Standard deviation
Sleep mental quality	Pre- intervention	46/2	63/0	80/2	56/0	33/2	72/0
	Post-intervention	73/0	45/0	66/1	72/0	86/1	63/0
	follow-up	73/0	45/0	66/1	72/0	40/2	50/0
Delays in falling asleep	Pre- intervention	33/2	89/0	80/2	41/0	33/2	72/0
	Post-intervention	13-Jan	63/0	73/1	96/0	2	65/0
	follow-up	06-Jan	45/0	60/1	05-Jan	40/2	63/0

Sleep duration	Pre- intervention	60/2	63/0	66/2	48/0	66/1	72/0
	Post-intervention	40/0	50/0	06-Jan	22-Jan	33/2	48/0
	follow-up	60/0	63/0	1	13-Jan	2	06-Jan
Beneficial sleep	Pre- intervention	66/2	48/0	53/2	99/0	93/1	03-Jan
	Post-intervention	26/0	45/0	26/0	70/0	20-Feb	77/0
	follow-up	26/0	45/0	26/0	70/0	13-Feb	63/0
Sleep disorders	Pre- intervention	33/2	48/0	66/2	48/0	53/2	63/0
	Post-intervention	1	34/0	66/1	48/0	33/2	48/0
	follow-up	1	34/0	66/1	48/0	20-Feb	67/0
Daily dysfunction disorder	Pre- intervention	2	92/0	20-Feb	77/0	46/2	51/0
	Post-intervention	80/0	56/0	93/1	96/0	46/2	63/0
	follow-up	80/0	56/0	2	84/0	46/2	51/0
Total score of sleep quality questionnaire	Pre- intervention	40/14	88/1	66/15	63/1	13	92/1
	Post-intervention	33/4	11-Jan	10	3	80/15	65/1
	follow-up	46/4	18-Jan	26-Sep	84/2	60/16	19-Feb

Table 1: Descriptive indices of scores over three periods in sleep quality indices.

Mauchly sphericity test	Indices			
	W Mauchly	Chi-square	df	Sig.
sleep mental quality	75/0	66/14	2	25/0
Delays in falling asleep	329/0	30/3	2	001/0
Sleep duration	293/0	33/11	2	001/0
Beneficial sleep	265/0	19/18	2	01/0
Sleep disorders	76/0	30/7	2	028/0
Daily dysfunction disorder	115/0	38/58	2	001/0
Total score of sleep quality questionnaire	490/	27/19	2	001/0

Table 2: Mauchly Sphericity Test results to examine the assumptions of repeated measures.

As it can be observed in Table 3, the results show that the within-subjects index is significantly different in treatment and control group with regard to at least one of the pre- intervention, post-intervention, and follow-up tests since Green Haos-Gasser and sphericity tests are significant. The between-subjects results also showed that there is no

significant difference between acupuncture and medication therapy groups in terms of delay in falling asleep, sleep duration, and beneficial sleep; however, there is a significant difference between these two groups regarding other domains and total score of the sleep quality questionnaire.

Dimensions	Index	Test	Sum squares	of df	Mean squares	of F	Sig.	Eta
Sleep mental quality	Within-subjects	Sphericity test	41/08	2	54/20	54/103	001/0	78/0
		Time * Group	80/1	2	90/0	53/4	001/0	13/0
		Error	43415	56	198/0	-	-	-

	Between subjects	Group	43444	1	43444	32/17	001/0	38/0
		Error	55/19	28	69/0	-	-	-
Delays in falling asleep	Within-subjects	Green Haos-Gasser	18/28	43119	52/23	57/54	001/0	66/0
		Time * Group	067/0	43119	056/0	129/0	767/0	005/0
		Error	44/14	50/33	431/0	-	-	-
	Between subjects	Group	40/6	1	40/6	91/4	36586	14/0
		Error	48/36	28	43130	-	-	-
Sleep duration	Within-subjects	Green Haos-Gasser	75/69	43117	52/59	50/93	001/0	77/0
		Time * Group	35/1	43117	43115	81/1	187/0	36678
		Error	88/20	81/23	637/0	-	-	-
	Between subjects	Group	43180	1	43180	48/2	126/0	36739
		Error	17/36	28	43129	-	-	-
Beneficial sleep	Within-subjects	Green Haos-Gasser	88/108	1	88/108	78/149	001/0	84/0
		Time * Group	089/0	1	089/0	122/0	729/0	004/0
		Error	35/20	28	72/0	-	-	-
	Between subjects	Group	044/0	1	044/0	076/0	78/0	003/0
		Error	44/16	28	587/0	-	-	-
Sleep disorders	Within-subjects	Green Haos-Gasser	22/27	1	22/27	90/155	001/0	84/0
		Time * Group	556/0	1	556/0	43177	36739	102/0
		Error	88/4	56	087/0	-	-	-
	Between subjects	Group	94/6	1	94/6	43154	001/0	45/0
		Error	44/8	28	30/0	-	-	-
Daily dysfunction disorder	Within-subjects	Green Haos-Gasser	43401	43106	69/9	36/18	001/0	39/0
		Time * Group	68/4	43106	41/4	36/8	006/0	23/0
		Error	68/15	70/29	528/0	-	-	-
	Between subjects	Group	43206	1	43206	32/12	002/0	30/0
		error	44/36	28	43130	-	-	-
Total score of sleep quality questionnaire	Within-subjects	Green Haos-Gasser	68/1286	32/1	66/971	05/330	001/0	92/0
		Time * Group	48/81	32/1	53/61	90/20	001/0	42/0
		Error	15/109	13697	94/2	-	-	-
	Between subjects	Group	17/344	1	17/344	79/37	001/0	57/0
		Error	77/253	28	33025	-	-	-

Table 3: Results of within-subjects and between-subjects for acupuncture and medication therapy groups.

In Table 4, the results of Trace Pillai's multivariate analysis of variance to compare sleep quality dimensions and its total score based on variable Control Group is shown. Considering this information, it can be said that groups differ regarding their total score and sleep disorders dimensions. It means that there is a difference in the sleep

disorder at least between one of the tests (pre-intervention and post-intervention, follow-up) in acupuncture and medication therapy groups. Bonferroni post hoc test was used to evaluate the differences and the results are presented below.

Source of variation	Value	DF Hypothesis	DF error	F	Sig.
Sleep mental quality	78/0	2	27	54/3	001/0
Delays in falling asleep	686/0	2	27	43341	001/0
Sleep duration	785/0	2	27	19/49	001/0
Beneficial sleep	84/0	2	27	78/149	001/0
Sleep disorders	848/0	2	27	90/155	001/0
Daily dysfunction disorder	410/0	2	27	38/9	001/0
Total score of sleep quality questionnaire	934/0	2	27	62/189	001/0

Table 4: The results of Trace Pillai's multivariate analysis of variance to compare sleep quality dimensions and its total score based on variable Group.

Results presented in Table 5 show that there are significant differences between acupuncture and medication therapy groups with regard to sleep quality, delays in falling asleep, sleep disorders, daily dysfunction disorder and total score of sleep quality questionnaire. Based on descriptive statistics, mean, and standard deviation of sleep

quality dimensions and their total score and due to the significant differences between medication therapy and acupuncture groups regarding the aforementioned indices, it can be concluded that acupuncture therapy is more effective in improving sleep order in women suffering from generalized anxiety disorder.

Dimension	Group i	Group j	Mean difference (i-j)	Standard error	Sig.
Sleep mental quality	acupuncture	medication therapy	733/0	176/0	001/0
Delays in falling asleep	acupuncture	medication therapy	53/0	241/0	36586
Sleep duration	acupuncture	medication therapy	378/0	240/	36861
Beneficial sleep	acupuncture	medication therapy	044/0	162/0	78/0
Sleep disorders	acupuncture	medication therapy	556/0	116/0	001/0
Daily dysfunction disorder	acupuncture	medication therapy	844/0	241/0	002/0
Total score of sleep quality questionnaire	acupuncture	medication therapy	91/3	635/0	001/0

Table 5: Bonferroni test results for sleep quality total scores and dimensions over time periods in acupuncture and medication therapy groups.

Results and Discussion

The results showed that both acupuncture and medication therapy programs improve sleep disorder in women with generalized anxiety disorder; however, the acupuncture was more effective than medication therapy.

With regard to the effect of acupuncture on improving and enhancing sleep quality, the results of the current study are in line with the results of research conducted by Zhao [16]. Considering the emphasis on the role of acupuncture in improving sleep disorder, the results of this study are consistent with the results of Yuxin's study. Yuxin reported that the number of participants' nightmare attacks was halved after one week of acupuncture and there were no such attacks

after two weeks. Using PET scan, MRI and EEG, he showed that acupuncture had a significant impact on cortical structure, frontal cortex, medial temporal lobe, and limbic areas (Amygdala, Hypothalamus, and Hippocampus). Hence, it has been effective in reducing anxiety.

The results of this study and the research findings by Spence, et al. are in a same vein. In a five-week clinical trial on 18 young patients suffering from anxiety and insomnia, they show that acupuncture, in addition to reducing anxiety, significantly increases the brain endogenous melatonin secretion. According to the measurements of polysomnography (sleepography), it improved all sleep-related factors such as increased total sleep time and decreased frequency of waking-up times [15].

Considering the literature in explaining the effect mechanism of acupuncture in improving sleep quality and mood disorders, researchers have emphasized on the following cases: Adjusting the chemical transmitters (neurotransmitters) such as serotonin, noradrenaline, dopamine, and neuropeptide Y Gaba in the nervous system, which lead to positive psychological effects including enhanced good-temperedness, reduced anxiety and depression as well as stress management. Stimulating the secretion of Beta-endorphin and increasing the activity of opioid receptors in the central nervous system. Decreasing the sympathetic activity of nervous system and creating a relaxing effect. Improving blood flow by regulating the activity of the Nitricoxide synthase enzyme [16,17].

Accordingly, it can be argued that acupuncture can be effective in the treatment of sleep disorders in individuals suffering from anxiety disorders. However, there are a few research studies on long-term effects of acupuncture. Today, acupuncture has many advocators in different Asian, European, and American countries. Many people around the world, besides pain cure and relieve, use it to prevent the diseases. Even a group of men and women referring to clinics strive to improve their life quality, relaxation, increased calmness, and health by using acupuncture. This group, in addition to providing equal nutrition and blood supply to various parts of the body cells, transfer proper energy to different parts of the body cells through the regulation of the body's energy in energy channels and chakras. In this regard, it strengthens individuals' central and peripheral nervous system, power, and physical strength [18-22].

It also encourages further study on a large scale and fundamental research on the mechanism on another region of brain action. Furthermore, there is the possibility of using another methods namely laser acupuncture, auricular acupuncture, etc. The above mentioned research is only practical on women. It is also advised to do furthered examinations on men as well [22-26].

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