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Evaluation of the Effectiveness of Auricular Acupuncture in the Treatment of Insomnia in Patients with Chronic Pain at TTH Quang Binh General Hospital

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Abstract

Background: Insomnia is a common disorder characterized by a persistent reduction in sleep quality and/or sleep duration over a certain period, in which impaired sleep quality has greater diagnostic significance than sleep duration. This condition is highly prevalent among patients with chronic pain, leading to reduced quality of life and difficulties in pain control, with reported prevalence rates up to 72.8%. Among current therapeutic approaches, auricular acupuncture-a modality of Traditional Medicine is considered a potential, convenient, and effective complementary therapy. This provides the rationale for conducting a study to evaluate the effects of auricular acupuncture on insomnia in patients with chronic pain. Objectives: 1. To investigate selected clinical characteristics of insomnia in patients with chronic pain; 2. To evaluate the therapeutic effects of auricular acupuncture on insomnia in the study population and identify related factors.

Subjects and Methods: A total of 72 patients who presented for outpatient and inpatient treatment at the Department of Traditional Medicine and Rehabilitation 1, TTH Quang Binh General Hospital, and met the inclusion criteria, were enrolled. Patients were allocated into two comparable groups with respect to age, sex, and pain intensity. Both groups received standard analgesic treatment according to a unified protocol; Group I additionally received treatment for insomnia using auricular acupuncture. The study was designed as a controlled clinical intervention with pre- and post-treatment comparisons.

Results: Sleep onset latency decreased by 38.61 minutes, total sleep duration increased by 2.46 hours, and the Pittsburgh Sleep Quality Index (PSQI) score decreased by 8.78 points. No significant differences were observed with respect to age, sex, or types of musculoskeletal disorders. However, a significant association was found between pain intensity and the degree of PSQI score reduction.

Conclusions: Auricular acupuncture is clinically effective in the treatment of insomnia in patients with chronic pain. Management of chronic pain contributes to improvement in insomnia, and conversely, improvement in sleep quality facilitates better pain control.

Keywords: Chronic pain; insomnia; auricular acupuncture

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1. INTRODUCTION

Insomnia is a common disorder characterized by a persistent reduction in sleep quality and/or sleep duration over a defined period. In clinical diagnosis, sleep quality is of greater significance than sleep duration, as some individuals have a physiologically short sleep requirement without it being considered pathological, whereas many patients report adequate

sleep duration but poor sleep quality and frequent complaints of insomnia [1]. At present, insomnia is regarded as a pressing public health issue due to its increasing prevalence, particularly among patients with chronic diseases.

Insomnia is highly prevalent in patients with chronic pain and shows a bidirectional relationship with pain intensity, leading to impaired quality of life and difficulties in symptom control. Numerous studies have reported a high prevalence of insomnia in this population; notably, a study by Ueda et al. in 2024 reported that up to 72.8% of patients with non-cancer chronic pain experienced insomnia [2]. From the perspective of Traditional Medicine, insomnia falls under the category of "Shīmian" and is associated with mental restlessness, disharmony of Yin and Yang, and failure of Yang to enter Yin. Dysfunction of the Zang–Fu organs, particularly the Heart (Xin), Liver (Gan), Spleen (Pi), and Kidney (Shen), plays a central role in its pathogenesis [3].

Current approaches to the treatment of insomnia primarily include cognitive–behavioral therapy, pharmacological treatment, and physical exercise. Complementary and alternative therapies, especially acupuncture, have increasingly attracted attention and are considered potential supportive treatment options for insomnia [4].

Auricular acupuncture is an acupuncture modality that stimulates specific acupoints on the auricle. It offers advantages such as technical simplicity, low cost, ease of implementation at the primary healthcare level, and convenience in clinical practice. Although several studies have demonstrated the effectiveness of auricular acupuncture in improving sleep quality, research evaluating its effects in patients with chronic pain remains limited in Vietnam.

Based on clinical practice at TTH Quang Binh General Hospital, where a high proportion of patients with chronic pain present with concomitant insomnia, this study was conducted with the following objectives: (1) to investigate selected clinical characteristics of insomnia in patients with chronic pain; and (2) to evaluate the effects of auricular acupuncture in the treatment of insomnia in this population and to explore related factors.

2. SUBJECTS AND METHODS

2.1. Subjects

The study subjects were inpatients treated at the Department of Traditional Medicine and Rehabilitation 1, TTH Quang Binh General Hospital, from March 2025 to August 2025. Patients of both sexes and all occupations were eligible, provided they had sufficient capacity to respond to interviews and voluntarily agreed to participate in the study.

Inclusion criteria according to modern medicine: Patients with chronic pain (low back pain, knee osteoarthritis, neck–shoulder–arm syndrome, or sciatica) lasting ≥ 3 months and diagnosed with insomnia according to the International Classification of Sleep Disorders, Third Edition (ICSD-3). Sleep disturbances included difficulty initiating sleep, difficulty maintaining sleep, early morning awakening, or non-restorative sleep, accompanied by daytime symptoms such as fatigue, impaired concentration, emotional disturbances, or reduced functional capacity. Symptoms occurred ≥ 3 times per week and persisted for ≥ 3 months [5].

Inclusion criteria according to Traditional medicine: Patients were examined using the four diagnostic and classified into one of the following Traditional medicine pattern types: Heart–Spleen deficiency, Yin deficiency with hyperactivity of fire,

Heart–Gallbladder Qi deficiency, phlegm-heat disturbing the interior, or Liver constraint transforming into fire [3].

Exclusion criteria: Patients who declined participation; chronic pain due to cancer; severe chronic diseases (heart failure, renal failure, severe hypertension); other sleep disorders such as sleep-disordered breathing or circadian rhythm sleep–wake disorders; psychiatric disorders; alcohol, substance, or caffeine use; current use of medications affecting sleep (benzodiazepines, antidepressants, lithium, glucocorticoids); concurrent use of analgesics or muscle relaxants; or non-compliance with the treatment protocol.

2.2. Study Design and Methods

This study was designed as a controlled clinical intervention with pre- and post-treatment comparisons. During the study period, 72 eligible patients were enrolled and allocated into two groups according to the day of admission: patients admitted on even-numbered days were assigned to Group I, and those admitted on odd-numbered days to Group II.

Group I: Treatment of chronic pain using electroacupuncture according to standard protocols, combined with auricular acupuncture for the treatment of insomnia.

Group II: Treatment of chronic pain using electroacupuncture according to the standard protocol only.

A convenience sampling method was applied. The two groups were comparable in terms of age, sex, and baseline pain intensity.

Interventions: Chronic pain treatment: Electroacupuncture was administered according to the standardized protocols issued by the Ministry of Health for each condition (low back pain, neck–shoulder–arm syndrome, knee osteoarthritis, and sciatica). Needle retention time was 20 minutes per session, once daily, with a total treatment course of 15 days.

Insomnia treatment: Auricular acupuncture was applied at the Shenmen, Heart, Kidney, and Brain auricular points [6]. Needles were retained for 5 days per session, for a total of three sessions, with alternating ears, starting with the right ear. Patients were instructed to apply manual pressure to the needles before bedtime to enhance therapeutic effects.

Outcome measures: Pain intensity was assessed using the Visual Analog Scale (VAS). Sleep quality was evaluated using the Pittsburgh Sleep Quality Index (PSQI). Assessments were performed at two time points: before treatment (D0) and after 15 days of treatment (D15).

2.3. Data Analysis

Data were collected using standardized case report forms, coded, and analyzed using SPSS version 20.0. Categorical variables were presented as frequencies and percentages. Continuous variables were expressed as mean ± standard deviation.

Pre- and post-treatment comparisons were performed using paired t-tests, with a level of statistical significance set at $p < 0.05$. The correlation between the reduction in VAS scores and the reduction in PSQI scores was analyzed using Pearson's correlation coefficient. Linear regression analysis was employed to evaluate associations between quantitative variables.

2.4. Ethical Considerations

The study was approved by the Scientific and Ethics Committee of TTH Quang Binh General Hospital. All participants were fully informed about the objectives, procedures, and benefits of the study and provided voluntary consent. Participants had the right to refuse or withdraw from the study at any time without affecting their medical care. Personal information was kept confidential and used solely for scientific research purposes.

3. RESULTS

3.1. General Characteristics of the Study Population

The mean age of the study population was 62.68 ± 10.95 years, with patients older than 60 years accounting for the highest proportion (63.9%). The mean age in Group I was 62.75 ± 11.16 years (range: 39–85 years), and in Group II was 62.61 ± 10.89 years (range: 41–81 years); the difference between the two groups was not statistically significant ($p > 0.05$).

Female patients predominated, accounting for 68.1% (49/72), while males accounted for 31.9% (23/72). In Group I, females comprised 66.7% and males 33.3%; in Group II, females comprised 69.4% and males 30.6%. No statistically significant difference in sex distribution was observed between the two groups.

Regarding occupation, the retired/elderly group accounted for the highest proportion in both groups (63.9%). Manual laborers accounted for 25.0% in Group I and 30.6% in Group II, whereas intellectual workers accounted for 11.1% in Group I and 5.6% in Group II. The majority of patients were married; the proportion of married patients was 66.7% in Group I and 55.6% in Group II. Most patients lived with their spouse or children (Group I: 86.1%; Group II: 83.3%).

The mean duration of insomnia was 10.61 ± 3.27 months; it was 11.03 ± 3.54 months in Group I and 10.19 ± 2.97 months in Group II. Gradual onset of insomnia accounted for 83.3%, while sudden onset accounted for 16.7%; psychological stress was the most common precipitating factor (69.4%).

All patients experienced moderate to severe chronic pain; severe pain accounted for 79.2% and moderate pain for 20.8%. The mean VAS score was 7.18 ± 1.17 (Group I: 7.35 ± 1.15; Group II: 7.00 ± 1.17). The most common chronic pain conditions were low back pain (30.6%), neck–shoulder–arm syndrome (27.8%), sciatica (22.2%), and knee osteoarthritis (19.4%). According to Traditional medicine pattern differentiation, Heart–Spleen deficiency accounted for 68.1% and Yin deficiency with hyperactivity of fire for 31.9%; the distribution between the two groups showed no statistically significant difference ($p > 0.05$).

3.2. Treatment Outcomes

3.2.1. Evaluation of Pain Reduction

Table 1. Changes in chronic pain intensity assessed by VAS

Group / Time point	Group I ($\underline{X}$±SD)	Group II ($\underline{X}$±SD)	p_{I-II}
T0	7.36±1.15	7±1.17	>0.05
T15	3.53±0.51	3.64±0.59	>0.05
Mean change T_{15-0}	-3.83±1.2	-3.34±0.96	
p (T_{15-0})	<0.001	<0.001	

After 15 days of treatment, VAS scores decreased significantly in both groups ($p < 0.001$). No statistically significant differences were observed between the two groups at baseline (T0) or after treatment (T15) ($p > 0.05$). The mean reduction in VAS score was 3.83 ± 1.20 points in Group I and 3.34 ± 0.96 points in Group II.

3.2.2. Evaluation of Improvement in Insomnia and Related Factors

Table 2. Comparison of sleep onset latency between the two groups (minutes)

Group / Time point	Group I ($\underline{X}$±SD)	Group II ($\underline{X}$±SD)	p_{I-II}
T0	63.33±13.78	67.5±11.37	>0.05
T15	24.72±3.77	56.11±5.87	<0.001
Mean change T_{15-0}	-38.61±13.07	-11.39±6.61	
p (T_{15-0})	<0.001	<0.001	

After 15 days of treatment, sleep onset latency decreased significantly in both groups ($p < 0.001$). There was no significant difference between the two groups at baseline (T0) ($p > 0.05$); however, a statistically significant difference was observed after treatment ($p < 0.001$). The mean reduction in sleep onset latency was 38.61 ± 13.07 minutes in Group I, which was greater than that in Group II (11.39 ± 6.61 minutes).

Table 3. Comparison of the effects on mean nightly sleep duration between the two groups (hours)

Group / Tine point	Group I ($\underline{X}$±SD)	Group II ($\underline{X}$±SD)	p_{I-II}
T0	3.19±0.67	3.07±0.56	>0.05
T15	5.65±0.46	3.95±0.28	<0.001
Mean change T_{15-0}	2.46±0.61	0.89±0.51	
p (T_{15-0})	<0.001	<0.001	

After 15 days of treatment, mean nightly sleep duration increased significantly in both groups ($p < 0.001$). There was no significant difference between the two groups at baseline (T0) ($p > 0.05$); however, a statistically significant difference was observed at T15 ($p < 0.001$). The mean increase in sleep duration was 2.46 ± 0.61 hours in Group I and 0.89 ± 0.51 hours in Group II.

Table 4. Comparison of improvement in PSQI scores between the two groups

Group / Time point	Group I ($\underline{X}$±SD)	Group II ($\underline{X}$±SD)	p_{I-II}
T0	16.86±1.85	17.5±1.13	>0.05
T15	8.08±1.27	14.44±1.25	<0.001
Mean change T_{15-0}	-8.78±1.56	-3.06±1.12	
p (T_{15-0})	<0.001	<0.001	

After 15 days of treatment, PSQI scores decreased significantly in both groups ($p < 0.001$). There was no significant difference between the two groups at baseline (T0) ($p > 0.05$); however, a statistically significant difference was observed at T15 ($p < 0.001$). The mean reduction in PSQI score was 8.78 ± 1.56 points in Group I, which was greater than that in Group II (3.06 ± 1.12 points).

Table 5. Differences in the reduction of PSQI scores after 15 days of auricular acupuncture according to age group, sex, pain intensity, and chronic pain conditions, traditional medicine patterns

Characteristic		PSQI score reduction after 15 days (Mean ± SD)	p
Age group	18 - 39	9.00±0.00	>0.05
	40 - 60	8.50±1.38	
	>60	8.91±1.53	
Sex	Male	9.00±1.65	>0.05
	Famale	8.66±1.37	
Pain intensity	Moderate pain	7.50±1.52	<0.05
	Severe pain	9.03±1.33	
Chronic pain condition	Low back pain	8.61±1.44	>0.05
	Knee osteoarthritis	8.33±1.58	
	Neck–shoulder–arm syndrome	9.25±1.28	
	Sciatica	9.16±1.60	
Traditional medicine patterns	Heart–Spleen deficiency	8.65±1.62	>0.05
	Yin deficiency with hyperactivity of fire	9.10±0.87	

After 15 days of treatment, the reduction in PSQI scores did not differ significantly according to age group, sex, types of chronic pain conditions, traditional medicine patterns ($p > 0.05$). The mean reduction in PSQI score was greater in patients with severe pain (9.03 ± 1.33) than in those with moderate pain (7.50 ± 1.52), and this difference was statistically significant ($p < 0.05$).

A significant correlation was observed between the reduction in VAS scores and the reduction in PSQI scores after auricular acupuncture treatment for insomnia ($r = 0.417$; $p < 0.05$), indicating a positive correlation of moderate strength.

No adverse events were recorded. Specifically, there were no cases of acupuncture-related syncope, auricular skin infection, or perichondritis.

4. DISCUSSION

4.1. Discussion of the General Characteristics of the Study Population

This study was conducted in patients with insomnia comorbid with chronic pain, the majority of whom were older adults. The mean age of the study population was 62.68 ± 10.95 years; it was 62.75 ± 11.16 years in Group I and 62.61 ± 10.89 years in Group II. Patients older than 60 years accounted for 63.9% of the sample. Numerous studies have shown that the prevalence of insomnia increases with age due to aging-related changes, decline in organ function, and the coexistence of

multiple chronic diseases. From the perspective of modern medicine, neurodegeneration, vascular disorders, and internal medical conditions contribute to disturbances in sleep architecture. From the perspective of Traditional medicine, deficiency of the Zang–Fu organs, insufficiency of Qi and Blood—particularly involving the Heart (Xin), Liver (Gan), Spleen (Pi), and Kidney (Shen)—are considered fundamental causes of Shīmian (insomnia) [7,3].

Female patients predominated, accounting for 66.7% in Group I and 69.4% in Group II, with a female-to-male ratio of approximately 2.1. This proportion was lower than that reported in the study by Truong Tuyet Ngoc (2021) [8]. According to modern medicine, hormonal changes during the peri-menopausal and menopausal periods, mood disturbances, and comorbid conditions increase the risk of insomnia in women. From a Traditional medicine perspective, women are more susceptible to Blood deficiency; insufficiency of Heart Blood leads to instability of the spirit (Shen), thereby resulting in insomnia.

Regarding occupation, the retired/elderly group accounted for 63.9% in both groups; manual laborers comprised 25.0% in Group I and 30.6% in Group II, while intellectual workers accounted for a smaller proportion. These findings are consistent with the advanced age of the study population. Although occupational stress may be reduced, older adults are more likely to have physical inactivity, chronic musculoskeletal disorders, and prolonged psychological concerns, all of which contribute to insomnia. In Traditional medicine theory, age-related decline in Zang–Fu function is directly associated with the development of Shīmian.

The majority of patients were married (66.7% in Group I and 55.6% in Group II). Living with a spouse or children was reported in 86.1% of Group I and 83.3% of Group II, findings that are consistent with those reported by Truong Tuyet Ngoc (2021) [8]. This reflects the multigenerational family structure commonly observed in Vietnam. However, family conflicts and chronic psychological stress may also precipitate or exacerbate insomnia, particularly among female patients.

The mean duration of insomnia was 10.61 ± 3.27 months (11.03 ± 3.54 months in Group I and 10.19 ± 2.97 months in Group II). Most cases had a gradual onset (83.3%), indicating that insomnia often progresses insidiously with mild initial symptoms. Patients may underestimate the condition or self-manage until daily functioning is significantly affected, prompting hospital admission. Stress was the most common precipitating factor, accounting for 69.4% of cases (75.0% in Group I and 63.9% in Group II). In modern medicine, stress disrupts sleep regulation; in Traditional medicine, emotional disturbances (Qi Qing) injure the Heart, Liver, Spleen, and Kidney, leading to Qi–Blood disharmony and the development of Shīmian [3].

All patients experienced moderate to severe chronic pain, with severe pain accounting for 79.2%. The mean baseline VAS score was 7.18 ± 1.17 (7.36 ± 1.15 in Group I and 7.00 ± 1.17 in Group II). Chronic pain conditions were mainly low back pain, knee osteoarthritis, neck–shoulder–arm syndrome, and sciatica. These disorders are common in older adults and demonstrate a bidirectional relationship with insomnia.

Regarding Traditional medicine pattern differentiation, only two patterns were identified: Heart–Spleen deficiency (68.1%) and Yin deficiency with hyperactivity of fire (31.9%). Heart–Spleen deficiency

predominated in both groups (72.2% in Group I and 63.9% in Group II). Due to the small sample size and limited study scope, other clinical patterns beyond Heart–Spleen deficiency and Yin deficiency with hyperactive of fire were not observed. These findings are consistent with studies based on Traditional medicine classification systems for insomnia in China and highlight the central role of the Heart and Spleen in the physiology and pathology of sleep [9].

4.2. Discussion of Treatment Effects and Related Factors

4.2.1. Discussion of Pain Treatment Effects

After 15 days of treatment, VAS scores decreased significantly in both groups ($p < 0.001$). In Group I, the mean VAS score decreased from 7.36 ± 1.15 to 3.53 ± 0.51, corresponding to a reduction of 3.83 ± 1.20 points. In Group II, the VAS score decreased from 7.00 ± 1.17 to 3.64 ± 0.59, with a mean reduction of 3.34 ± 0.96 points. Although the between-group difference was not statistically significant ($p > 0.05$), Group I showed a trend toward greater pain reduction.

4.2.2. Discussion of Insomnia Treatment Effects and Factors Influencing PSQI Improvement

Improvement in insomnia was more pronounced in the auricular acupuncture intervention group. At baseline, sleep onset latency in Group I was 63.33 ± 13.78 minutes, which decreased to 24.72 ± 3.77 minutes after 15 days of treatment, representing a reduction of 38.61 ± 13.07 minutes. In contrast, Group II showed a reduction of only 11.39 ± 6.61 minutes. The post-treatment difference between the two groups was statistically significant ($p < 0.001$). Mean nightly sleep duration in Group I increased from 3.19 ± 0.67 hours to 5.65 ± 0.46 hours, corresponding to an increase of 2.46 ± 0.61 hours, which was significantly greater than the increase observed in Group II (0.89 ± 0.51 hours; $p < 0.001$).

Baseline PSQI scores did not differ significantly between the two groups (16.86 ± 1.85 in Group I vs. 17.50 ± 1.13 in Group II; $p > 0.05$). After 15 days of treatment, PSQI scores decreased significantly in both groups ($p < 0.001$). Group I showed a marked reduction to 8.08 ± 1.27 (mean reduction: 8.78 ± 1.56 points), whereas Group II decreased to 14.44 ± 1.25 (mean reduction: 3.06 ± 1.12 points). The greater improvement observed in Group I is likely due to the simultaneous use of auricular acupuncture targeting both insomnia and pain. This suggests a pathological relationship between pain and sleep disturbance, where pain reduction contributes to improved sleep outcomes clinically.

The reduction in PSQI scores did not differ significantly according to age, sex, types of chronic pain conditions, and different traditional medicine patterns ($p > 0.05$), but differed according to pain intensity. This suggests that auricular acupuncture is effective in improving sleep across all age groups, both sexes, various chronic pain conditions, and different traditional medicine patterns. Patients with severe pain demonstrated a greater reduction in PSQI scores (9.03 ± 1.33 points) compared with those with moderate pain (7.50 ± 1.52 points), and this difference was statistically significant ($p < 0.05$). In addition, a moderate positive correlation was observed between improvements in VAS scores and PSQI scores ($r = 0.417$; $p < 0.05$).

These findings suggest that, in most medical interventions, pain and insomnia progress in a mutually reinforcing manner. Therefore, in patients with chronic pain, effective prevention and treatment of pain may also serve as an important strategy for

the prevention and management of insomnia, and vice versa.

Currently, many modern studies indicate that auricular acupuncture has antipsychotic effects and significantly improves sleepiness and sleep satisfaction. Furthermore, the auricular points formula includes Shenmen, which calms the mind and facilitates patient receptivity to treatment; the Heart, which stores the spirit and governs blood circulation according to the Zang–Fu theory; the Kidney, which supports deep breathing and promotes relaxation; and the Brain, which regulates body systems, including pain perception and organ function. This combination forms a comprehensive protocol to address Zang–Fu imbalances causing insomnia [6].

Throughout the treatment course, no adverse events such as acupuncture-related syncope, auricular skin infection, or perichondritis were recorded, indicating that auricular acupuncture is a safe and appropriate modality for clinical practice [10].

5. CONCLUSIONS

This study of 72 patients with chronic pain and comorbid insomnia showed a mean age of 62.68 ± 10.95 years, with patients older than 60 years accounting for 63.9%. Female patients comprised 68.1% of the study population. Retired/elderly individuals accounted for 63.9%. The majority of patients were married (66.7% in Group I and 55.6% in Group II), and most lived with their spouse and/or children (86.1% and 83.3%, respectively). The mean duration of insomnia was 10.61 ± 3.27 months; gradual onset accounted for 83.3% of cases, and stress was present in 69.4%. The mean baseline pain score was 7.18 ± 1.17, with low back pain being the most common condition (30.6%). According to Traditional Chinese Medicine pattern differentiation, Heart–Spleen deficiency was the predominant pattern (68.1%).

After 15 days of auricular acupuncture, the mean VAS score decreased from 7.36 ± 1.15 to 3.53 ± 0.51; sleep onset latency decreased from 63.33 ± 13.78 to 24.72 ± 3.77 minutes; mean nightly sleep duration increased from 3.19 ± 0.67 to 5.65 ± 0.46 hours; and the PSQI score decreased from 16.86 ± 1.85 to 8.08 ± 1.27. Improvement in PSQI scores did not differ according to age, sex, or types of chronic pain conditions, but increased with greater pain intensity. A positive correlation was observed between reductions in VAS and PSQI scores ($r = 0.417$; $p < 0.05$). No adverse events were recorded.

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