

# Auriculotherapy and sleep quality in nursing professionals with stress: a pilot study

*Auriculoterapia e qualidade do sono em profissionais de enfermagem com estresse: estudo piloto*

*Auriculoterapia y calidad del sueño en profesionales de enfermería con estrés: estudio piloto*

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**ABSTRACT: Objective:** To evaluate the effect of an auricular protocol on the quality of sleep of nursing professionals at an oncology hospital with symptoms of stress. **Method:** Randomized pilot study with two arms, sample of 80 volunteers (40 in the control group and 40 in the intervention group). The intervention was Chinese auriculotherapy with Shenmen, Brainstem, Kidney, and Insomnia points, with weekly sessions for six weeks. The Pittsburgh Sleep Quality Index (PSQI) was used to assess the outcome. Comparative analysis performed by the mixed effects model and effect size by d-Cohen. **Results:** Predominance of women (92.5%), 47.5% single, 62.5% with children, and mean age of 35 years, most professionals in the operating room, mean stress score of 82.6 according to the List of Stress Symptoms. As for the outcome, there was a significant reduction in the total PSQI score ( $p = 0.035$ ), in the components of sleep quality ( $p = 0.041$ ), latency ( $p = 0.022$ ), and sleep disturbance ( $p = 0.002$ ), favorable to the intervention group. **Conclusion:** Auriculotherapy contributed to sleep quality. **Keywords:** Auriculotherapy. Sleep wake disorders. Nursing, team. Stress, psychological.

**RESUMO: Objetivo:** Avaliar o efeito de protocolo auricular sobre a qualidade do sono em profissionais de enfermagem de hospital oncológico com sintomas de estresse. **Método:** Estudo piloto randomizado com dois braços, amostra de 80 voluntários (40 no grupo controle e 40 no grupo intervenção). A intervenção foi a auriculoterapia chinesa com os pontos Shenmen, Tronco Cerebral, Rim e Insônia, com sessões semanais por seis semanas. O Índice de Qualidade do Sono de Pittsburg (IQSP) foi utilizado para avaliar o desfecho. Análise comparativa feita pelo modelo de efeitos mistos e tamanho do efeito pelo d-Cohen. **Resultados:** Predomínio de mulheres (92,5%), 47,5% solteiras, 62,5% com filhos e idade média de 35 anos, a maioria profissionais do centro cirúrgico, escore médio de estresse de 82,6 pela Lista de Sintomas de Estresse. Quanto ao desfecho, houve redução significativa do escore total do IQSP ( $p = 0,035$ ), nos componentes qualidade do sono ( $p = 0,041$ ), latência ( $p = 0,022$ ) e distúrbio do sono ( $p = 0,002$ ) favorável ao grupo intervenção. **Conclusão:** A auriculoterapia contribuiu para a qualidade do sono.

**Palavras-chave:** Auriculoterapia. Transtornos do sono-vigília. Equipe de enfermagem. Estresse psicológico.

**RESUMEN Objetivo:** Evaluar el efecto de un protocolo auricular sobre la calidad del sueño de profesionales de enfermería de un hospital oncológico con síntomas de estrés. **Método:** Estudio piloto aleatorizado con dos brazos, muestra de 80 voluntarios (40 en el grupo control y 40 en el grupo intervención). La intervención fue auriculoterapia china con puntos Shenmen, Tronco Cerebral, Riñón e Insomnio, con sesiones semanales durante seis semanas. Se utilizó el índice de calidad del sueño de Pittsburg (*Pittsburgh Sleep Quality Index* – PSQI) para evaluar el resultado. Análisis comparativo realizado por el modelo de efectos mixtos y tamaño del efecto por d-Cohen. **Resultados:** Predominio de mujeres (92,5%), 47,5% solteras, 62,5% con niños y edad media de 35 años, la mayoría profesionales en quirófano, puntuación media de estrés de 82,6 según Listado de Síntomas de Estrés. En cuanto al desenlace, hubo reducción significativa en la puntuación total del PSQI ( $p=0,035$ ), en los componentes calidad del sueño ( $p=0,041$ ), latencia ( $p=0,022$ ) y alteración del sueño ( $p=0,002$ ), favorable al grupo de intervención. **Conclusión:** La auriculoterapia contribuyó a la calidad del sueño.

**Palabras clave:** Auriculoterapia. Trastornos del sueño-vigilia. Grupo de enfermería. Estrés psicológico.

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## INTRODUCTION

Occupational stress is a worldwide phenomenon that impacts all areas of an individual's life, in addition to economic, social, political, and health repercussions. In nursing, in particular, it can affect patient safety and the quality of care.

Nursing professionals, predominantly from the intensive care unit, showed, by the Stress Scale at Work, that 74.5% had a medium level and 12.3%, a high level of stress, while, by the List of Stress Symptoms (LSS), 46.1% had a medium level of stress and about 30.0% had a high and very high level of stress<sup>1</sup>.

In Brazil, a study with nurses in the South region observed that those in the surgical center had the highest emotional exhaustion score using the Malasch Burnout Index<sup>2</sup>. The assessment of stressors in the perioperative work process using the Bianchi Stress Scale in a public hospital in the Midwest region showed medium stress among nurses at the expense of activities related to personnel administration and unit operation, while nursing technicians presented medium stress only in the proper functioning of the unit<sup>3</sup>.

Several aspects are involved in the stress of nursing professionals, such as increase in workload, management of critical patients, poor collaboration between the work team, communication failures, inadequate human resources sizing, staff turnover, which implies frequent training, among others<sup>4</sup>. These conditions result in work overload, exhaustion, professional dissatisfaction, and insomnia, observed in a study carried out with Ecuadorian nurses from an emergency unit<sup>5</sup>. Stress and sleep disorders have no defined limits, as they intertwine in a vicious cycle with mutual feedback.

Nursing work takes place in shifts, consequently interfering with the circadian rhythm, with sleep changes, especially for those who work night shifts, impairing attention and contributing to states of depression and anxiety<sup>6</sup>. The effect of shifts and the desynchronization of the circadian rhythm on the health of nurses analyzed in a literature review showed that the duration and frequency of shift rotation, regularity, and predictability, the direction of rotation (morning-afternoon-night), the number of nights and days of rest, and the working hours are aspects that influence sleep disorders<sup>7</sup>. A study carried out in two hospitals with nursing professionals observed the presence of sleep disorders in 76.5% of them<sup>8</sup>, which constitutes a risk for patient safety.

Quality and safe care practice requires competent professionals, who also present a pattern of biosocial-emotional homeostasis, which is not always easy to achieve due to work

dynamics, interpersonal relationships, family and economic aspects that surround the individual in their daily lives. With a holistic look at the well-being of the individual, the Integrative and Complementary Health Practices (IChP), a set of therapeutic practices not contemplated by conventional medicine and usually typical of oriental medicine systems<sup>9</sup>, contribute to the reduction of signs and symptoms and health promotion. Among the IChP, auriculotherapy, one of the therapies of traditional Chinese medicine, has shown good results in improving clinical signs and symptoms, such as, for example, the negative effects of stress.

Chinese auriculotherapy uses specific points on the ear for the treatment of various inflammatory, metabolic, endocrine, painful, chronic conditions, and psychological disorders such as anxiety, depression, anguish, among others<sup>10</sup>. The ear points have reflex connections with other parts of the body through neural pathways in the central nervous system, increase vagal activity and improve the imbalance of the sympathetic and vagal systems<sup>11</sup>. This treatment showed significant results in reducing the levels of stress assessed by the LSS in the nursing team<sup>10</sup>, in a controlled study that used a protocol with Shenmen, Kidney, and Brainstem points for eight weeks. Another quasi-experimental before-and-after study that used auriculotherapy at the Shenmen and Brainstem points for eight weeks in the treatment of stress in nursing professionals observed a significant reduction on the Lipp Stress Scale only in the group of nursing assistants/technicians, being that, in the 15-day follow-up after treatment, they had a score compatible with the absence of stress<sup>12</sup>.

Meta-analysis of systematic reviews based on randomized and controlled clinical trials on the effect of auriculotherapy on insomnia compared to conventional medication, placebo, cognitive-behavioral therapy, exercises or other non-pharmacological therapies showed superior effects of auriculotherapy, but the studies presented poor quality evidence<sup>13</sup>. However, the study did not assess the auricular points used.

Given that poor sleep quality and stress are two frequent events in nursing professionals, the present study was based on an auricular stress protocol previously tested and with good results<sup>10</sup>, in which the point of insomnia was added.

## OBJECTIVE

To evaluate the effect of an auricular protocol on the quality of sleep of nursing professionals at an oncology hospital with symptoms of stress.

## METHOD

### Type of study

Randomized pilot study with two parallel arms, which used Chinese auriculotherapy as an intervention. The study was carried out in a public teaching hospital of tertiary health care, specialized in oncology in the city of São Paulo, from September 2017 to October 2018.

### Sample and eligibility criteria

A convenience sample of 80 participants was recruited from the nursing staff who met the inclusion criteria: at least one year of work in the institution, LSS<sup>14</sup> score above 40 points corresponding to moderate to high stress levels, episode of insomnia or sleep disturbance at least once a week. Exclusion criteria were: simultaneous use of some complementary practice and chronic renal lithiasis due to the risk of stimulating the Kidney point to precipitate the movement of stones. Participants with other health problems or using medication were not excluded, as auriculotherapy is considered a complementary practice.

### Randomization and masking

The total number of eligible volunteers ( $n = 105$ ) was randomized, considering the possibility of losses throughout the study. Simple 1:1 randomization was performed by one of the authors using the Research Randomizer software (<http://www.randomizer.org/form.htm>). To use the generated sequential numerical list, the first participant was drawn, and the others were included in the randomized list as they met the eligibility criteria. There was no blinding of participants in the study.

### Study groups

The Intervention Group (IG) received auriculotherapy applications, and the Control Group (CG) did not receive any intervention. Those eligible were allocated to IG or CG, according to the randomization list.

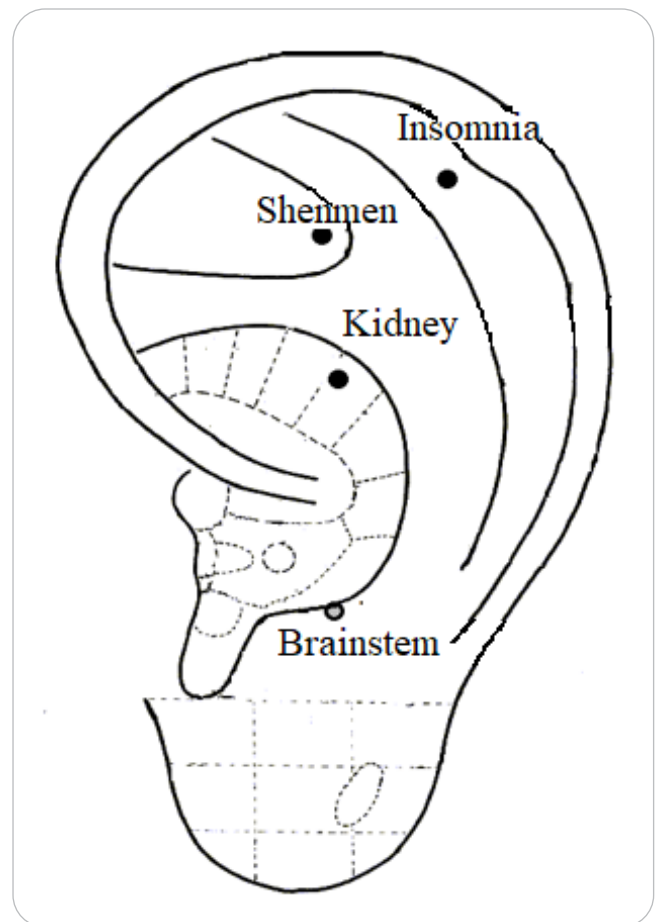
### Outcome

Sleep was assessed using the Pittsburgh Sleep Quality Index (PSQI).

## Intervention with auriculotherapy

The IG received Chinese auriculotherapy with radionic crystals (faceted 1 mm crystal glass spheres), according to a points protocol previously tested in a nursing team to reduce stress (Shenmen, Brainstem, and Kidney points)<sup>10</sup> associated with the point of insomnia (Figure 1). Weekly sessions were held for six weeks, lasting five to ten minutes each in the work sector. Participants were instructed to press the points 15 times, three times a day. Interventions were carried out by trained and supervised nursing students with an auriculotherapy course.

After locating the reactive points with a manual probe, the auricle was cleaned with 70% ethyl alcohol, radionic crystals were applied to the points and fixed with non-allergenic adhesive tape. The radionic crystals remained in place for up to six days, with removal at least one day before the next session, or earlier in the presence of discomfort, itching or



**Figure 1.** Auricular point protocol used in the study.

signs of allergy. At each session, the crystals were placed in the same spots on the opposite ear.

## Instruments

Participants were screened using the LSS, which consisted of 59 psychosociophysiological symptoms of stress to indicate the presence and frequency of each symptom, using a Likert score (from 0 to 3 points). The scale score is obtained by adding the values assigned to each item, ranging from 0 to 177<sup>14</sup>; the higher the score, the greater the perception of stress symptoms.

A biosociodemographic questionnaire (gender, age, marital status, education, underlying diseases, smoking, use of medication, anxiolytics or antidepressants, alcohol, pregnancy and lithiasis) and an occupational one (sector, professional category, other employment relationship, shift and working time) were also applied.

PSQI assesses sleep in the last month and contains ten questions: four open and six objective ones, two of which have sub-items on a Likert-type scale (from 0 to 3), totaling 19 items, six of which about how their partner perceives their sleep and were not analyzed. Twelve items are grouped into seven components: subjective sleep quality, latency, duration, habitual efficiency, sleep disorders, use of sleep medication, and daytime dysfunction. The score is obtained by adding up each component, and the total score ranges from 0 to 21. Scores greater than five indicate that there is great difficulty sleeping in at least two components or moderate difficulty in three components. The PSQI has been translated and validated into Portuguese<sup>15</sup>, with a reliability of 0.82.

## Recruitment and data collection

The study was disseminated with leaflets and in brief meetings with employees in each sector, on the occasion of the shift change. The volunteers were screened using the LSS and the biosociodemographic questionnaire for the other eligibility criteria.

During the study, there was a loss of participants due to shift work dynamics and staff turnover. In order to reach the established sample number, CG participants were replaced (partial crossover), with a minimum wash-out of 30 days, with a new evaluation of eligibility and randomization being carried out. IG participants were not included in the crossover due to lack of knowledge

about the duration of auriculotherapy effects. The sessions were held in a room in the participant's own work sector, and the PSQI was applied by those who carried out the intervention before and after six weeks for participants in both groups.

## Data analysis

Data were entered into an Excel spreadsheet, and all analyses considered the sample size with replacements ( $n = 80$ ). Relative and absolute frequencies were used for qualitative variables and measures of central tendency and variability for quantitative variables. To test the homogeneity of the groups, the chi-square and Student's *t* tests or the Wilcoxon-Mann-Whitney test were used for the analysis of the effect of the intervention, the linear model of mixed effects. The significance level was set at 5%. The d-Cohen test was used to analyze effect size, and the classification parameters were: insignificant ( $< 0.19$ ), small ( $0.20 - 0.49$ ), medium ( $0.50 - 0.79$ ), large ( $0.80 - 1.29$ ), and very large ( $> 1.30$ ). And, for the interpretation of the percentage of change: huge reduction ( $> -75$ ), very large reduction ( $-50 \leq r < -75$ ), large reduction ( $-30 \leq r < -50$ ), medium reduction ( $-15 \leq r < -30$ ), small reduction ( $-5 \leq r < -15$ ), and insignificant change ( $< -5$ ). Positive values mean an increase in the score, that is, worse sleep quality<sup>16</sup>. The analysis was performed by a statistician, who used the R<sup>®</sup> 4.0.4 software.

## Ethical aspects

The study complied with Resolution 466/2012 of the National Health Council, for involving human beings in the research. Participants signed the Informed Consent, and the CG received treatment with auriculotherapy at the end of the study. The research project was approved by the Research Ethics Committee of the School of Nursing of *Universidade de São Paulo* (USP) (CAAE: 63998017.9.0000.5392) and the co-participating institution (CAAE: 63998017.9.3001.0065). The present study presents the results related to the quality of sleep.

## RESULTS

The disclosure aroused the interest of 119 professionals, but 105 met the eligibility criteria, with a mean LSS stress score

of 82.6 (SD ± 27.1), median of 77.5 (range, 40 to 148). Losses occurred due to layoffs, vacations, leave or withdrawal. The study allocation and conduction flowchart, with partial cross-over of controls, is shown in Figure 2.

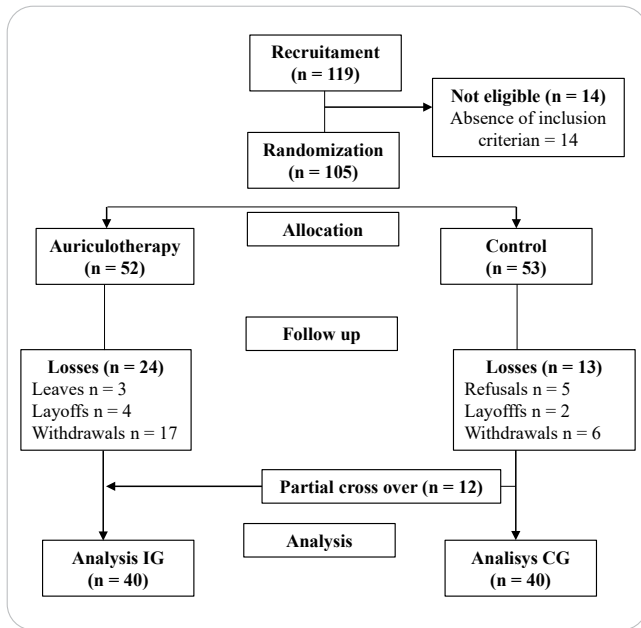
The sample consisted predominantly of women (92.5%), with a mean age of around 35 years (range 20 to 60 years); 47.5% single, 62.5% with children, with an

average of one child each. The average working time at the institution was almost five years for both groups, as well as an 8-hour shift. The groups were homogeneous for these variables (Table 1).

The main professional category of the participants was nursing assistant/technician who worked in different sectors of the hospital, most in the operating room. The groups were homogeneous for biosociodemographic and professional variables (Table 2).

Among those who reported a health problem, high blood pressure (n = 9; 11.3%) and changes in thyroid function (n = 7; 8.8%) stood out. There were also reports of anxiety/depression (n = 2; 2.5%), hypercholesterolemia (n = 2; 2.5%), endometriosis (n = 1; 1.3%), asthma (n = 1; 1.3%), supraventricular tachycardia (n = 1; 1.3%), and scoliosis (n = 1; 1.3%). Some used some medication (n = 29; 33.3%), mainly antidepressants/ anxiolytics (sertraline hydrochlorides, fluoxetine or venlafaxine, citalopram hydrobromide), 22.5% (n = 18), although there was a report of anxiety and depression in each study group. A small number of smokers was identified (n = 12; 15%) and 52.5% (n = 42) drank alcohol socially, except for one reference to alcoholism. For these variables, there was no difference between groups (p > 0.050).

Regarding the LSS items on sleep disturbance, 82.5% (n = 64) scored “insomnia” and 81.3% (n = 65) “feeling very sleepy”, with homogeneous distribution between groups (p > 0.400).



**Figure 2.** Allocation flowchart of research subjects. São Paulo, SP, Brazil, 2018.

**Table 1.** Measures of central tendency and variability of demographic and work data of nursing professionals according to study group. São Paulo, SP, Brazil, 2018.

Characteristic	Group	Mean	SD	Median	Min-Max	p
Age	CG	37.2	8.3	37.5	20 – 60	0.086*
	IG	34.0	6.6	34	20 – 44	
With kids	CG	1.0	0.0	1	0 – 3	0.406†
	IG	0.8	0.9	1	0 – 3	
Institution time (months)	CG	61.3	49.9	52.5	3 – 240	0.5423†
	IG	50.1	30.6	48	36 – 108	
Work shift (hours)	CG	8.2	2.5	8	6 – 12	0.668†
	IG	7.8	2.3	8	6 – 12	
LSS	CG	76.1	23.6	72	41 – 136	0.1332†
	IG	88.5	29.6	87	30 – 131	

\*Student’s t test; †Wilcoxon-Mann-Whitney test. CG: control group; IG: intervention group; SD: standard deviation; LSS: list of stress symptoms.

**Table 2.** Biosociodemographic and professional qualitative variables, according to study groups and p-value. São Paulo, SP, Brazil, 2018.

Characteristic	CG		IG		p*
Categories	n	%	n	%	
Gender					
Female	39	97.5	39	97.5	0.753
Male	1	2.5	1	2.5	
With kids					
No	15	37.5	19	47.5	0.250
Yes	25	62.5	21	52.5	
Marital status					
Married	16	40.0	16	40.0	0.741
Divorced	5	15.5	3	7.5	
Single	19	47.5	21	52.5	
Education					
High School	29	72.5	21	52.5	0.160
Incomplete higher education	1	2.5	3	7.5	
Complete higher education	10	25.0	16	40.0	
Medication					
No	27	67.5	24	60.0	0.321
Yes	13	32.5	16	40.0	
Anxiolytic					
No	34	85.0	28	70.0	0.090
Yes	6	15.0	12	30.0	
Underlying disease					
No	28	70.0	29	72.5	0.500
Yes	12	30.0	11	27.5	
Smoking					
No	34	85.0	33	82.5	0.500
Yes	6	15.0	7	17.5	
Alcohol					
No	28	70.0	26	65.0	0.406
Yes	12	30.0	14	35.0	
Work sector					
Surgical center	16	40.0	18	45.0	0.790
Inpatient unit	11	27.5	9	22.5	
Outpatient clinic/day hospital	10	25.0	8	20.0	
Others <sup>†</sup>	3	7.5	5	12.5	
Profession					
Assistant/technician	21	52.5	19	47.5	0.424
Nurse	11	27.5	16	40.0	
Instrumentator	8	20.0	5	12.5	
Another job					
No	37	92.5	33	82.5	0.155
Yes	3	7.5	7	17.5	

\*Chi-square test; <sup>†</sup>Center for Material and Sterilization, Emergency Care, Continuing Education and Clinical Research. CG: control group; IG: intervention group.

According to the PSQI, only 20% (n = 16) of the participants slept seven or more hours a day, and 97.5% (n = 78) of them had an PSQI > 5, indicative of poor sleep quality.

When comparing the effects throughout the study in the CG and IG, it was observed that, except for component C4-Sleep efficiency, both groups showed a reduction in the PSQI score, that is, an improvement in sleep quality. However, the reduction was significantly greater for IG in components C1-Subjective sleep quality, C2-Sleep latency, and C5-Sleep disturbance, and in the total score of the PSQI (Table 3).

For the other components, despite the greater reduction in IG, except for component C7-Daytime dysfunction, there was no statistical difference in relation to the CG (p > 0.05).

By inserting the variables age, another employment relationship, use of anxiolytics, children, and LSS in the linear model of mixed effects for the total PSQI and components, it was observed that there was an interaction of the LSS variable (p < 0.001) in the outcome with loss of statistical significance (p = 0.063) for the total PSQI model.

**Table 3.** Means and standard deviation before and after the intervention according to study group and Pittsburgh Sleep Quality Index, p-value, effect size by intragroup d-Cohen test. São Paulo, 2018.

Characteristics	Before		After		p*	d-Cohen	Relative variation
	mean	SD±	mean	SD±			
PSQI – Total							
IG	10.93	3.10	8.15	3.08	0.035	0.91	-25
CG	10.95	3.74	9.52	3.14		0.42	-13
C1 – Quality of sleep							
IG	2.59	0.94	1.95	0.87	0.041	0.72	-25
CG	2.58	1.01	2.42	0.9		0.17	-6
C2 – Sleep latency							
IG	1.65	1.10	1.10	0.96	0.022	0.54	-33
CG	1.75	0.93	1.65	1.10		0.10	-6
C3 – Sleep duration							
IG	1.63	0.94	1.30	0.82	0.788	0.38	-20
CG	1.68	1.13	1.30	1.02		0.36	-23
C4 – Sleep efficiency							
IG	0.68	0.94	0.70	1.02	0.905	0.02	+3
CG	0.83	1.13	0.88	1.09		0.05	+6
C5 – Sleep disorders							
IG	1.75	0.54	1.27	0.60	0.002	0.85	-27
CG	1.70	0.61	1.62	0.59		0.14	-5
C6 – Use of medication							
IG	0.88	1.11	0.45	0.86	0.345	0.44	-49
CG	0.68	1.10	0.38	0.81		0.31	-44
C7 – Daytime Dysfunction							
IG	1.83	0.78	1.50	0.78	0.534	0.43	-18
CG	1.75	0.87	1.27	0.68		0.62	-27

\* Linear mixed-effects model, p-value for group and time interaction. SD: standard deviation; CG: control group; IG: intervention group.

## DISCUSSION

More than two thirds of the professionals mentioned some sleep alteration through the LSS. Considering the PSQI cut-off point lower than 5<sup>15</sup>, only 2.5% of them had good sleep quality. The mean PSQI score observed was higher than that found in a study with nursing professionals from a teaching hospital in the countryside of the state of São Paulo, in Brazil<sup>16</sup>, but lower than that found in nurses from the region of Andalusia, in Spain<sup>17</sup>.

A reduction in PSQI scores was observed in both intervention groups, but auriculotherapy was more effective in improving sleep quality in three components of the PSQI (subjective sleep quality, sleep latency, and sleep disturbance) and in the total score of the PSQI. By inserting some control variables in the linear model of mixed effects, there was an interaction of the level of stress on the result of the total PSQI and the study groups started to have a similar effect.

Any change in family and occupational routine, emotional experiences, life habits can interfere with sleep quality, which would explain the reductions in PSQI scores also in the CG, although in different proportions. The study with Spanish nurses showed that the PSQI was negatively correlated with stress management, adaptability, mood, and self-esteem<sup>17</sup>.

A systematic review with meta-analysis observed that the treatment of insomnia with acupuncture or auriculotherapy was effective in several studies compared to the use of conventional medications, sleep hygiene measures or sham, although only almost a third of the studies presented moderate quality of evidence<sup>18</sup>.

The Heart, Sympathetic, Shemen, and Subcortex<sup>19</sup> points are usually used in the treatment of insomnia, but the studies use a variety of points: Shemen, Kidney, Liver, Spleen, Heart, Subcortex, Occipital<sup>20</sup>; Shenmen, Kidney, Sympathetic, Heart, Lung, Subcortex, Endocrine, Zero point, and Adrenal<sup>21</sup>. The study that used only the Brainstem and Shemen obtained results only for participants in one of the nursing professional categories<sup>12</sup>. The present study used four points, Insomnia, Kidney, Shemen, and Brainstem, with the aim of regularizing sleep, improving energy flow, and calming the mind, obtaining satisfactory results, which shows the effectiveness of the protocol and that a well-focused protocol does not need to stimulate many points.

A study on aged people, which compared laser auriculotherapy with magneto-auriculotherapy in the treatment of insomnia with a seven-point stimulus, observed an

improvement in sleep efficiency, although below 85%, and a reduction in the time to wake up after the onset of sleep in the group of magneto-auriculotherapy<sup>20</sup>. However, the PSQI did not show differences between groups.

Chinese auriculotherapy was applied to improve sleep in nursing professionals with PSQI greater than 5 during the COVID pandemic, observing a significant reduction in scores on the global PSQI and its components. The single-arm intervention study applied weekly sessions for four weeks with point stimulation with neutral crystals<sup>21</sup>.

The duration of treatment is also variable in the literature — three<sup>21</sup>, six<sup>20</sup> or eight<sup>12</sup> weeks were observed — as well as the frequency of sessions — weekly<sup>12,21</sup> and three times a week<sup>20</sup>.

During the consultations, complaints were reported regarding excessive sleep after the start of therapy, which was regularized throughout the treatment, and, at the end of the study, there were reports of improvement in the quality of sleep during the nights that remained with the auricular stimulation by the radionic crystals.

## Limitations

The study had limitations regarding the difficulty in recruiting participants during work activities, the commitment to weekly intervention sessions and the quality of the PSQI information, especially with regard to the quantification of latency hours. The stimulation of the points by the participants was not monitored, although, empirically, radionic crystals do not require stimulation. It was not possible to observe how long the effects of auriculotherapy were maintained after the end of the intervention. The non-inclusion of losses in the analysis may have allowed the presence of biases in the results obtained.

As for the implications for clinical practice, the study showed that it is possible to use auriculotherapy to improve the quality of sleep in nursing professionals with symptoms of stress and it is a quick intervention that can be applied in the work sector. Quality sleep can positively affect the quality of work and interpersonal relationships, thus improving the quality of life and work.

## CONCLUSION

The study showed that nursing professionals from the oncology service have poor sleep quality and the auriculotherapy



protocol with radionic crystals had a positive effect on the components of sleep quality, sleep latency, and sleep disorders of the PSQI in nursing professionals. Although the auriculotherapy protocol contemplated stress points, there was interference of stress levels in the outcome of sleep quality in the total score of the PSQI.

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## CONFLICT OF INTERESTS

The authors declare there is no conflict of interests.

## AUTHORS' CONTRIBUTION

ESC: Conceptualization, Data curation, Investigation, Methodology, Writing – first draft. GK: Conceptualization, Data curation, Investigation, Methodology, Writing – first draft, Supervision. RNTT: Project management, Formal analysis, Conceptualization, Data curation, Methodology, Writing – first draft, Supervision.

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