

# Effects of acupuncture in patients with chronic kidney disease: a systematic review

*Efeitos da acupuntura em pacientes com insuficiência renal crônica: revisão sistemática*

*Efectos de la acupuntura en pacientes con insuficiencia renal crónica: revisión sistemática*

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## ABSTRACT

**Objectives:** to analyze the effects of acupuncture techniques in patients with chronic kidney disease. **Methods:** a systematic review conducted in six databases, from September to December 2017, following the Preferred Reporting Items for Systematic Reviews and Meta-Analyses' criteria. The following descriptors were used: Acupuncture AND Chronic Renal Insufficiency AND Clinical Trial. **Results:** nine studies were selected; the acupuncture techniques used were auriculotherapy, electroacupuncture and acupressure aimed at improving quality of life, fatigue, sleep and clinical variables of the disease. The studies that assessed quality of life, sleep and fatigue presented significant benefits. Studies that assessed quality of life, sleep and fatigue presented significant benefits. There was no statistical significance in the improvement of serum creatinine levels and glomerular filtration rate. Methodological and assessment tools' divergence made impossible meta-analysis **Conclusions:** studies reinforce the positive effect of acupuncture in improving quality of life, fatigue and sleep in patients.

**Descriptors:** Acupuncture; Renal Insufficiency, Chronic; Review; Complementary Therapies; Nursing.

## RESUMO

**Objetivos:** analisar os efeitos das técnicas de aplicação da acupuntura em pacientes com insuficiência renal crônica. **Métodos:** revisão sistemática, conduzida em seis bases de dados, de setembro a dezembro de 2017, seguindo critérios do Preferred Reporting Items for Systematic Reviews and Meta-Analyses. Utilizaram-se descritores: Acupuntura AND Doença Renal Crônica AND Ensaio Clínico, e suas respectivas traduções para o inglês. **Resultados:** foram selecionados nove estudos, nos quais as técnicas de acupuntura empregadas foram: auriculoterapia, eletroacupuntura e acupressão dos pontos direcionada à melhoria da qualidade de vida, fadiga, sono e variáveis clínicas da doença. Os estudos que avaliaram qualidade de vida, sono e fadiga apresentaram benefícios significativos. Não houve significância estatística na melhora dos níveis de creatinina sérica e taxa de filtração glomerular. A divergência metodológica e dos instrumentos de avaliação impossibilitou a meta-análise. **Conclusões:** os estudos reforçam efeito o positivo da acupuntura na melhora da qualidade de vida, fadiga e sono em pacientes renais crônicos.

**Descritores:** Acupuntura; Insuficiência Renal Crônica; Revisão; Terapias Complementares; Enfermagem.

## RESUMEN

**Objetivos:** analizar los efectos de las técnicas de aplicación de la acupuntura en pacientes con insuficiencia renal crónica. **Métodos:** revisión sistemática, conducida en seis bases de datos, de septiembre a diciembre de 2017, siguiendo criterios del Preferred Reporting Items for Systematic Reviews and Meta-Analyses. Se utilizaron descriptores: Acupuntura AND Insuficiencia Renal Crónica AND Ensayo Clínico, y sus respectivas traducciones al inglés. **Resultados:** fueron seleccionados nueve estudios, en los cuales las técnicas de acupuntura empleadas fueron: auriculoterapia, electroacupuntura y acupresión de los puntos dirigida a la mejora de la calidad de vida, fatiga, sueño y variables clínicas de la enfermedad. Los estudios que evaluaron calidad de vida, sueño y fatiga presentaron beneficios significativos. No hubo significancia estadística en la mejora de los niveles de creatinina sérica y tasa de filtración glomerular. La divergencia metodológica y de los instrumentos de evaluación imposibilitó el meta-análisis. **Conclusiones:** los estudios refuerzan el efecto positivo de la acupuntura en la mejora de la calidad de vida, fatiga y sueño en pacientes renales crónicos.

**Descritores:** Acupuntura; Insuficiencia Renal Crónica; Revisión; Terapias Complementarias; Enfermería.

## INTRODUCTION

Acupuncture is a complementary nonpharmacological intervention, with millenarian technique that uses the dualistic cosmic theory, whose balance of yin and yang favors human balance<sup>(1)</sup>. It has been used to control chronic diseases symptoms such as pain, fatigue, nausea, vomiting, depression, anxiety and improvement of quality of life among dialysis patients and other chronic conditions<sup>(2-3)</sup>.

In the context of kidney diseases, Traditional Chinese Medicine explains that the kidneys are responsible for the cycle initial energy and that controls the element Fire (Heart). Therefore, with the development of kidney disease, there is less energy flow available for all other elements, leading to relevant physiological changes. Through acupuncture treatment, it is possible to stimulate points of the Kidney meridian, minimizing the dysfunctions effects generated by these alterations, leading the organism to better functional conditions<sup>(4)</sup>.

The World Health Organization encourages the use of traditional medicines as therapeutics, including Traditional Chinese Medicine (TCM), no longer as a punctual therapeutic resource, but as a complex treatment system. In this context, acupuncture stands out for the satisfactory results in the treatment of several diseases and for the significant cost-benefit, since it is a non-toxic and low-cost therapy<sup>(5)</sup>.

Acupuncture is not limited to the application of needles, having variations according to philosophical basis. Among the techniques used, the following stand out: systemic acupuncture, with the use of needles in specific points throughout the body; electroacupuncture, association of electrical stimulation to needles applied to acupuncture points; laser acupuncture, which applies low intensity laser on acupuncture points, dispensing with needles; acupuncture, using acupuncture needles or crystal beads, mustard, gold or silver at points located in microsystems, such as the skull, atrial (auriculoacupuncture) and hands.

As a way of regulating integrative and complementary practices, in the Brazilian health system, was published Ordinance 971/2006 that regulates the Brazilian National Policy of Integrative and Complementary Practices (PNPIC - *Política Nacional de Práticas Integrativas e Complementares*). Thus, the inclusion of practices such as TCM/Acupuncture, Homeopathic Medicine, Phytotherapy and Thermalism in the Brazilian Unified Health System (SUS - *Sistema Único de Saúde*)<sup>(6)</sup>.

In 2018, new Integrative and Complementary Practices (PICS - *Práticas Integrativas e Complementares*) were incorporated as a modality of care. Currently, SUS has 29 recognized PICS: ayurveda, homeopathy, TCM, anthroposophic medicine, medicinal plants/phytotherapy, art therapy, biodance, circular dance, meditation, music therapy, naturopathy, osteopathy, chiropractic, reflexotherapy, reiki, shantala, integrative community therapy, social therapy/chiropractic, yoga, apitherapy, aromatherapy, bioenergetics, family constellation, chromotherapy, geotherapy, hypnotherapy, hand laying, ozonotherapy and floral therapy<sup>(7)</sup>.

With this incorporation, Brazil becomes the country that leads this offer of modality in Primary Care, with a view to investing in health promotion<sup>(7)</sup>. In this sense, the Federal Nursing Board (COFEN - *Conselho Federal de Enfermagem*), through Resolution

326/2008, establishes and recognizes the autonomy of nurses to use acupuncture in professional conducts, as well as the minimum training parameters for nurse qualification<sup>(8)</sup>.

In 2015, COFEN, through Resolution 500/2015, revokes Resolution 197/1997, which establishes and recognizes integrative practices as a specialty and/or qualification of nursing professionals. However, in 2018, it is updated with Resolution 581/2018 and acupuncture is recognized as a nursing specialty. With Resolution 585/2018, nurses are entitled to practice acupuncture<sup>(8)</sup>.

It is worth noting that acupuncture is recognized as a nursing intervention defined by the Classification Intervention of Nursing, which can be performed and directed to modify innumerable human responses, being expressed through the diagnostic concepts: acute pain, chronic pain, impaired physical mobility, risk of electrolyte imbalance, nausea, diarrhea, constipation, anxiety, insomnia, fatigue, activity intolerance, spiritual distress and unbalanced energy field<sup>(9)</sup>. Therefore, acupuncture as a tool/technology of care for nurses in the search for solutions of human needs faced by individuals in sickness<sup>(2,10)</sup>.

In this context, chronic kidney patients, vulnerable to physical, psychic, social and spiritual changes stand out<sup>(1)</sup>. Therefore, it becomes current and relevant that nurses have the understanding and knowledge of acupuncture as a care technology that is effective in solving these human needs<sup>(3-4)</sup>.

At the present time, there is a timid scientific production in search of evidence that assesses the effects of acupuncture in CKD patients. Therefore, recognizing acupuncture as an effective and effective intervention that optimizes nursing practices in holistic care, based on robust scientific evidence, provides the promotion of health and well-being<sup>(11)</sup>.

Thus, it is necessary to search for evidence of studies on this subject, in order to support acupuncture in CKD patients, as well as to facilitate the choice of techniques, points, length of stay, interval between sessions and indications of therapy.

## OBJECTIVES

To analyze the effects of acupuncture techniques in patients with CKD.

## METHODS

In order to verify the applicability and benefits of acupuncture and its application techniques in CKD patients, a systematic review of the literature<sup>(12)</sup>. This study was guided by the research question elaborated from the PICO strategy, considering "P" (patient) as chronic kidney patients, "I" (intervention) as acupuncture intervention techniques, "C" (control) as care usual or standard and "O" (outcome) effectiveness of acupuncture. Thus, the guiding question of this review was: what are the effects of acupuncture in the treatment of people with chronic kidney disease?

The study was carried out by the National Library of Medicine, National Institutes of Health (PubMed/MEDLINE), Cochrane Central Register of Controlled Trials (Cochrane Central), Web of Science, Scopus, Cumulative Index to Nursing and Allied Health Literature (CINAHL) databases search, from September to December 2017.

Controlled descriptors were used, from the Health Sciences Descriptors (DeCs – *Descritores em Ciências da Saúde*), in order to maximize the search: Acupuncture AND “Chronic Renal Insufficiency”; Acupuncture AND “Chronic Kidney Disease” AND “Clinical Trial”.

Randomized clinical trials with CKD patients, whether dialytic or not, irrespective of gender, ethnicity, or associated comorbidities receiving acupuncture intervention and its variations were established as inclusion criteria. Among them are electroacupuncture, acupressure and auriculotherapy, with techniques derived from the theoretical and philosophical principles of the MTC and the French school from the studies of Paul Nogier, published in English, Portuguese and Spanish; There was exclusion of studies classified with a level of evidence lower than three by the Jadad scores<sup>(13)</sup> and those performed in a laboratory with animals. No time limit was established for the date of publication of the studies.

In order to guarantee the quality of this step and to avoid selection biases, a search and consensus between two evaluators was carried out for inclusion and exclusion, independently. In the articles that there was disagreement between the two reviewers, we counted with the collaboration of a third reviewer. The selection was composed of two phases: a) screening: assessment of titles and abstracts of all identified studies; b) reading in full: assessment of the full text. The articles were assessed regarding the methodological quality of the randomized clinical trials, based on the Jadad scores<sup>(13)</sup>.

For data extraction of the articles, a tool containing the following information was used: title, author, journal, year, author training, blinding, randomization, country of publication, research objectives, methodological design, tools used for data collection, sample, type of acupuncture intervention techniques, acupoints used and their respective functions according to TCM, length of stay, interval between sessions, main results and conclusions.

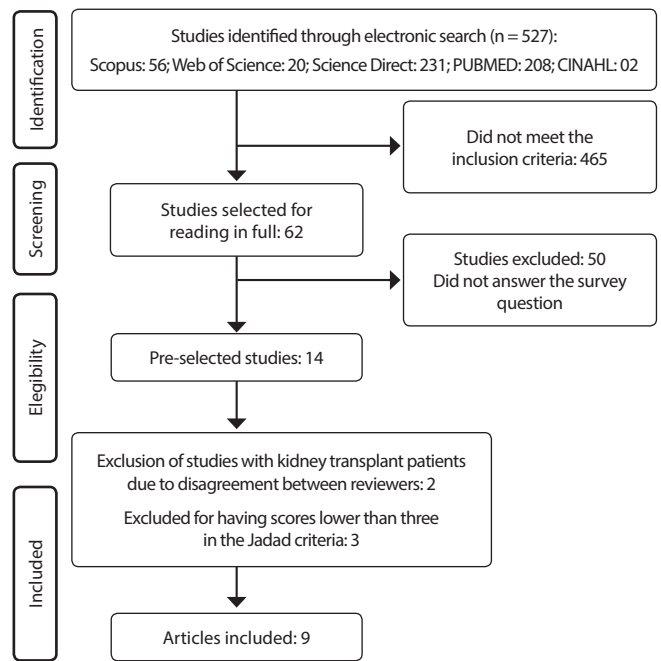
The articles were also assessed for methodological quality, selection, randomization, gauging and confounding bias, as well as the losses during follow-up.

## RESULTS

Through the search strategy, 527 studies were identified, with titles and abstracts read. In the first analysis, 465 studies were excluded because they did not fit the inclusion criteria. Thus, the two reviewers independently read the 62 studies in their entirety.

In this stage, 14 articles were selected for further discussion. After critical reading, there was inconsistency between the analyzes, requiring participation of a third evaluator. Thus, there were two studies involving patients after kidney transplantation, in the search performed by the second evaluator. Under consensus, it was decided to exclude these articles, since kidney transplantation is the most effective substitutive therapeutic modality that significantly affects the improvement of clinical parameters and patients' quality of life.

After a group discussion, and in order to guarantee the methodological quality of the review, consensus was established, and the final sample consisted of nine studies that assessed the effects of acupuncture intervention techniques in patients with chronic kidney disease (CKD). The selection process of the articles is illustrated in Figure 1 by the PRISMA's guideline.



**Figure 1**—Flowchart of the search process, selection and analysis of review articles, Fortaleza, Ceará, Brazil, 2017

The final sample comprised nine articles, being six from Scopus, two from Pubmed/MEDLINE and one from the Web of Science. To better identify the included studies, Chart 1 presents authors, year, objectives, tools used, methodological quality and subjects of the research.

According to the year of publication, the articles were produced as of 2012, and the latest publications were in 2017. When analyzing professional training, five studies were developed by professional nurses and four by doctors. As for the development site, one article was developed in Australia, two in the United States, one in Taiwan, one in Turkey and four in Iran. Therefore, it is perceived that the theme is discussed as a common problem among the countries, however incipience is observed with regard to publications both in Brazil and in Western countries. The surveys were published in English.

Regarding the tools of data collection, we observed the use of the Medical Outcomes Study 36 – Item Short – Form Health Survey (SF-36)<sup>(14)</sup>; Kidney Disease Quality of Life Short Form (KDQOL-SF)<sup>(14)</sup>; Sociodemographic<sup>(15)</sup>, clinical<sup>(15,18,20-21)</sup> questionnaire and laboratory tests<sup>(15)</sup>; Brief Fatigue Inventory (BFI)<sup>(16)</sup>; Sleep diary<sup>(17)</sup>; Pittsburgh Sleep Quality Index (PSQI)<sup>(17-18,20-21)</sup>; SF-8 Health Survey<sup>(17)</sup>; Fatigue Severity Scale (FSS)<sup>(19)</sup>; Piper Fatigue Scale (PFS)<sup>(19,22)</sup>; visual analog scale for fatigue<sup>(22)</sup>.

From the analysis of the objectives of the studies, four assessed the effects of acupuncture on sleep quality; three assessed the effect of acupuncture on fatigue; one assessed the effects of atrial acupuncture on quality of life; and one assessed the effect of acupuncture on kidney function (creatinine and glomerular filtration rate). The studies were performed with a minimum sample size of 42 and a maximum of 118 patients. Chart 2 presents data on clinical outcomes.

As for the acupuncture technique used, two articles (01, 05) used atrial acupuncture points (*Shenmen*, kidney, spleen and heart, *Shenmen*, sympathetic, subcortex, heart and endocrine). Three (02, 03 and 09) used electroacupuncture, and the others (04, 06, 07 and 08), acupressure.

**Chart 1-** Identification of the articles included in the integrative review, Fortaleza, Ceará, Brazil, 2017

Code, author, reference and year	Study objectives and research subjects (N)	Methodological Quality
(01) Wang et al. <sup>(14)</sup> , 2014	To assess the effectiveness of auricular acupuncture for improving the quality of life of diabetic patients with CKD. N=62	Double-blind, adequately selected and randomized in GE (auriculotherapy) and GC (routine care). It describes follow-up losses and presents necessary information on data collection and analysis.
(02) Yu et al. <sup>(15)</sup> , 2017	To verify the viability effect of acupuncture on kidney function in patients with CKD. N=59	Blind, adequately selected and randomized DR GE (systemic acupuncture) and GC (needles inserted outside the acupuncture point). It describes follow-up losses and presents necessary information on data collection and analysis.
(03) Hadadian et al. <sup>(16)</sup> , 2016	To analyze the effects of Transcutaneous Electrical Acupoint Stimulation (TEAS) on CKD fatigue. N=56	Blind. It does not describe selection and randomization technique. Patients were divided into GE (TEAS) and GC (TEAS off the acupuncture point). It describes follow-up losses and presents necessary information on data collection and analysis.
(04) Shen et al. <sup>(17)</sup> , 2017	To investigate the effect of acupuncture on the sleep quality of patients underdialysis. N=42	Double-blind, adequately selected and randomized in GE (systemic acupuncture) and GC (needles inserted outside the acupuncture point). It describes follow-up losses and presents necessary information on data collection and analysis.
(05) Zou et al. <sup>(18)</sup> , 2015	To assess the effects of auriculotherapy in patients with insomnia. N=63	Double-blind, adequately selected and randomized in GE (auriculotherapy), GC (routine care). It describes follow-up losses and presents necessary information on data collection and analysis.
(06) Sabouhi et al. <sup>(19)</sup> , 2013	To ascertain the effect of acupressure on the fatigue of patients with CKD. N=96	Patients appropriately selected. It does not describe technique of randomization and blinding. Patients were divided into GE (acupressure), Placebo (acupressure outside the acupuncture point) and GC (routine care). It does not describe follow-up losses and presents necessary information on data collection and analysis.
(07) Arab et al. <sup>(20)</sup> , 2015	To investigate the effect of acupuncture on the sleep quality of patients with CKD. N=108	Blind, appropriately selected and randomized in GE (auriculotherapy), Placebo (acupuncture auriculotherapy out of the acupoint) and GC (routine care). It does not describe follow-up losses. Provides necessary information on data collection and analysis.
(08) Shariati et al. <sup>(21)</sup> , 2012	To search the effect of acupuncture on the sleep quality of patients with CKD. N=48	Double-blind, adequately selected and randomized in GE (systemic acupuncture) and GC (routine care). It describes follow-up losses and presents necessary information on data collection and analysis.
(09) Eglence et al. <sup>(22)</sup> , 2013	To determine the effect of acupuncture on the level of fatigue in CKD. N=118	Patients adequately selected and randomized. It does not describe blinding technique. The patients were divided into GE (systemic acupuncture) and GC (routine care). It describes follow-up losses and presents necessary information on data collection and analysis.

**Chart 2-** Distribution of studies included in the review on clinical outcomes, Fortaleza, Ceará, Brazil, 2017

Nº	Type of therapy and time of intervention	Clinical outcomes
01	Auriculotherapy once a week/three months. <i>Shenmen</i> , Kidney, Heart and Spleen stimulation from three to five times/day/two minutes.	Patients in the experimental group presented better quality of life (60.2 versus 76.6, $p < 0.001$ ); in the control group, there was no significant improvement (58.9 and 61.8, $p = 0.274$ ).
02	Electroacupuncture once a week for 12 weeks, with electrical stimulation for 20 minutes in LI4, S36 and K3.	Baseline serum creatinine levels were 1.45 mg/dL in GI and 1.67 mg/dL in GC ( $p = 0.128$ ). After treatment with acupuncture, it was 1.41 mg/dL in the GI; 1.65 mg/dL, in the GC ( $p = 0.0489$ ). The baseline GFR was 51.85 mL/min/1.73 m <sup>2</sup> in the GI; 42.50 mL/min/1.73 m <sup>2</sup> , in GC ( $p = 0.0855$ ). After treatment with acupuncture, it was 54.50 mL/min/1.73m <sup>2</sup> , in GI; 43.60 mL/min/1.73m <sup>2</sup> , in GC ( $p = 0.0470$ ).
03	Electroacupuncture for five consecutive weeks, for 50 seconds. Ten sessions two to three times a week in S36, SP6 and LI4.	The mean fatigue score in the GI and CG groups was 30.68 and 26.32, respectively ( $p = 0.317$ ), at the baseline. Significant differences were found between the IG and GC groups, 21.68 and 35.32, respectively, after intervention ( $p = 0.002$ ). When comparing the within groups averages, in GI, there was a statistically significant reduction ( $p < 0.001$ ), when the two moments were compared, whereas in the CG group, there was no significant improvement ( $p = 0.731$ ).
04	Acupressure three times a week, for three minutes, for four weeks in H7, K11, L3.	Both groups demonstrated a reduction in the scores of the Global Sleep Quality Index when compared to the baseline with the fourth week. However, they were not statistically significant (GI: 0.52 to 0.61, $p = 0.35$ , GC: 0.74 to 0.43, $p = 0.20$ ). The differences between GI and GC in the overall PSQI score (0.19 versus 1.70, $p = 0.8$ ) and on the subscales were small.

To be continued

Chart 2 (concluded)

Nº	Type of therapy and time of intervention	Clinical outcomes
05	Auriculotherapy three to five times a day for four weeks in <i>ShenMen</i> , Sympathetic, Subcortex, Heart, Endocrine.	The overall sleep quality index decreased by $3.75 \pm 4.36$ and $2.26 \pm 3.89$ , after treatment in the IG and CG groups. The results of analyzes of variance of the measures for the global PSQI score showed a reduction over time in the GI group ( $F=8.47$ , $p < 0.01$ ) and in the CG group ( $F=4.09$ , $p < 0.01$ ). Decrease was also found in all seven domains, except sleep disorders after treatment in the GI group. After the treatment between two groups (follow-up) ( $\chi^2=9.63$ , $p < 0.01$ ), there was no significant difference between the two groups ( $\chi^2=0.77$ , $p=0.38$ ); and at the end of follow-up between two groups ( $\chi^2=4.59$ , $p=0.03$ ).
06	Acupressure lasting 20 minutes, three weekly sessions, for four weeks in K1, GB34, S36, SP6, SPL23, H7.	The mean total score and mean fatigue scores in the sensory, behavioral, cognitive and emotional dimensions in both study groups and placebo were lower after intervention ( $p < 0.05$ ). There was a significant difference in the total variation of the mean fatigue score before and after intervention within groups (GI: 6.5 versus 4.6 ( $p < 0.001$ ), GP: 6.4 versus 5.9 ( $p < 0.001$ ), and GC: 6.4 versus 6.3 ( $p=0.43$ )) and after intervention between the three groups ANOVA $F = 60,012$ and $p < 0.001$ .
07	Acupressure lasting eight minutes three times a week for four weeks in H7.	The total score was not different between the groups before the study ( $p > 0.05$ , ANOVA). The Pittsburgh Sleep Quality Score decreased significantly: from $11.9 \pm 3.13$ to $6.2 \pm 1.93$ for GI, from $11.3 \pm 3.69$ to $10.6 \pm 3.82$ in the GP, and from $10.9 \pm 4.10$ to $10.7 \pm 3.94$ in GC. There was a significant difference between groups ( $p < 0.001$ ). There was a significant difference between the three groups in the number of nocturnal awakenings, before and after the study ( $p < 0.001$ ).
08	Acupressure three times a week for four weeks for 15 minutes in H7, LI4 and SP6.	The results showed significant differences in the overall score ( $p < 0.001$ ) and all sleep quality indices: subjective sleep quality ( $p < 0.001$ ), sleep latency ( $p < 0.001$ ), sleep duration ( $p < 0.001$ ), ( $p=0.028$ ), and diurnal dysfunction ( $p < 0.001$ ), when the two groups were compared.
09	Electroacupuncture three times a week for four weeks at points S36, GB34, K1 and SP6.	The mean score on the visual analogue scale for fatigue in EG decreased from 7.6 at baseline to 5.0 at follow-up; while for GC, the mean fatigue score increased from 6.7 at baseline to 8.0, with $p < 0.01$ .

The articles mentioned the acupuncture points used for treatment. Five studies highlight the meridian of Kidney (R) (K1, K3, K11 and Kidney in auriculotherapy); six the Heart meridian (H), in which four used the H7 and two used the heart point in auriculotherapy; four o'clock Stomach (S) 36; four the Spleen-Pancreas (SP) point 6; three point the Large Intestine (LI) 4; and two-point Gallbladder (GB) 34. SPL23 and L3 were also mentioned in a single study. The most commonly used points were S36, SP6 and H7.

S36, SP6, GB34 and K1 were more used in the studies on fatigue; while H7 was more commonly used in sleep studies. LI4 was used in studies on sleep, fatigue and clinical conditions.

In relation to the number of acupuncture sessions, eight studies (01, 02, 04, 05, 06, 07, 08 and 09) did 12 sessions and one study (03), 10 sessions. There was variation in the time interval between sessions. Two studies (01 and 02) did once a week, while the others, three times a week. Studies 01 and 05 used the auriculotherapy technique and both did 12 sessions. However, study 01 performed the therapy once a week for three months, while the 05 did three times a week for a month.

Regarding studies results, it was observed that the articles that used acupuncture therapy for quality of life and fatigue were successful, with statistically significant improvement within and between groups (01, 03, 06 and 09). However, in a study that assessed serum creatinine and glomerular filtration rate (02), a within group improvement was observed, without statistical significance when compared to the control group.

The studies that verified the use of acupuncture to improve sleep quality differed in the results. Two studies showed significant improvement in within groups and between groups (07 and 08), while two studies (04 and 05) had decreased rates when compared to the baseline (within groups), without the difference being statistically significant between the two groups. The four

studies were analyzed in isolation, without the calculation of meta-analysis between them.

Among those who did not show significant improvement between groups, one used auriculotherapy (05) and another (04), points H7, K11 and L3. K11 and L3 were used only in this study. However, point H7 was used in another in an isolated way to improve sleep quality (07), with statistical significance, and in both the same acupressure technique was used. Although the studies used the same H7 point and technique, the acupressure time was different between these. Study 04 performed acupressure for three minutes, while the 07 performed acupressure for eight minutes.

The systemic points used in study 08 to improve sleep quality were similar to those used in article 03 to improve fatigue (LI4 and SP6). Both presented a statistically significant improvement between GE and GC, which can be inferred good results when handling these energy channels.

Three studies assessed improvement of fatigue. One study (03) did 10 sessions (2-3 times a week), while the other two (06 and 09) did 12 sessions (3 times a week for a week). 03 used three points (LI4, SP6 and S36), the 06 used six points (K1, GB34, S36, SP6, SPL23 and H7) and the 09 used four points (S36, GB34, K1 and SP6). There was intercession at points S36, SP6, GB34 and K1 between the studies.

## DISCUSSION

In the Western context, acupuncture has consolidated as a therapeutic resource, in which it must be stimulated the guarantee of the continuity of this use, from the strengthening of the PNPIC, encouraging and encouraging the research. Thus, it is indispensable to insert this technology in all services of Brazilian health care networks, especially in renal therapy services. Thus,

this intervention, based on holistic principles, when used alone or in combination with other treatment modalities, approaches the patient throughout the health-disease process in a comprehensive and dynamic way<sup>(23)</sup>.

This review points out as therapies that presented good therapeutic response in the management of CKD: auriculotherapy<sup>(14,18)</sup>; acupressure<sup>(17-21)</sup>; and electrical stimulation<sup>(15-16,22)</sup>. It should be emphasized that the techniques used and stimulated points were tested for overall improvement in quality of life<sup>(14)</sup>; reduction of serum creatinine<sup>(15)</sup>; reduction of fatigue<sup>(16,19,22)</sup>; and improvement in quality and quantity of sleep<sup>(17-18,20-21)</sup>.

The most used acupressure points in the studies of this review were: H7 (*Shenmen*), for improving the quality of sleep and fatigue<sup>(14,17-21)</sup>; LI4, aiming to improve sleep, fatigue and clinical parameters<sup>(15-16,21)</sup>; S36, to improve clinical parameters and fatigue<sup>(15-16,19,21)</sup>; and SP6 that was used to treat fatigue and improve sleep<sup>(16,19,21-22)</sup>.

It is important to consider that the studies included in this review were submitted to the stratification of the quality of scientific evidence, using the Jadad Scale score, considering that all the researches are clinical trials. In this sense, it was detected that all the studies presented high quality of evidence, being four studies<sup>(14,17-18,21)</sup> with a five and five score<sup>(15-16,19-20,22)</sup> with a score of three, which were not double-blind between groups.

In this study, it was observed that the systematic review studies were considered of high scientific evidence, through the blinding and randomization procedures, as well as the assessment of selection biases, confounding and data collection information. Other reviews with varying levels of scientific evidence have illustrated the effectiveness of acupuncture in the clinical practice of nurses, such as acupressure at point LI4 during labor to reduce the perception of pain<sup>(24)</sup>; reduction of symptoms such as fatigue, pain, sleep disorders and increased performance in activities of daily living in women with breast cancer<sup>(25)</sup>; and in reduction of typical symptoms of irritable bowel syndrome, through the application of acupuncture and associated moxibustion<sup>(26)</sup>.

As for the effects caused by the use of acupuncture in chronic conditions, research presents results that allow it to be announced as a therapeutic possibility in nursing care, as well as in the acute control of blood pressure, with a mean reduction of 20 mmHg in systolic blood pressure and 15 mmHg in diastolic<sup>(27)</sup>; in obesity treatment, with a reduction in the Body Mass Index (BMI) by 67% and abdominal circumference in 78%<sup>(28)</sup>; and in the control of blood glucose levels and lipid metabolism in young women with Diabetes Mellitus<sup>(29)</sup>.

Regarding the applicability of acupuncture as a possible resource in the treatment of CKD and its clinical consequences, it has been demonstrated that it improves the patient's clinical parameters, such as serum and urinary creatinine, cystatin C levels and glomerular filtration rate, through stimulation at points LI4, S36 and K3<sup>(30)</sup>.

It is also argued that acupuncture is capable of generating anti-inflammatory and antihypertensive benefits in people with CKD, mainly by reducing TNF, IL-1 $\beta$ , IL-6 and IL-8 levels, as well as in the increase of IL-10 and of Nitrous Oxide (NO), besides favoring the vascular dilatation<sup>(31)</sup>.

Many patients, when diagnosed with kidney disease and from the insertion of these in the dialysis therapy, undergo several psychological problems. Studies highlight the correlation between

chronic kidney disease and the development of psychological illnesses, such as sleep disturbances<sup>(32)</sup>, anxiety and stress<sup>(33)</sup>, which lead to poor quality of life in these patients<sup>(34)</sup>. Thus, it is important to invest in interventional research involving treatments that work the patient holistically.

Specifically regarding sleep disorders, the meta-analysis quantified the effects of non-pharmacological interventions on the improvement of sleep quality in uremic patients on dialysis. It also assessed changes in sleep quality before and after interventions, concluding that acupressure and exercise are promising interventions for improving sleep quality<sup>(35)</sup>. The points worked were H7, LI4 and SP6, added to K11, L3, Heart and Endocrine.

The most used acupressure points in the studies of this review were the H7 (*Shenmen*), being used in four studies to improve the quality of sleep and fatigue, which is located in the internal border of pisiform bone. It is considered the door of the spirit, and its function is to calm the mind, with indications to treat insomnia, anxiety, weak memory, nervous palpitation, tachycardia, excitation insomnia, hypertension and urinary incontinence<sup>(36)</sup>.

LI4 was also used in four other studies aimed at improving sleep, fatigue and clinical parameters. It is located on the dorsal side of the hand and is indicated for headache, migraine, generalized muscle tension, anxiety, dysmenorrhea, general pain, chills, cranial neuralgia, insomnia<sup>(37-38)</sup>.

S36 was also used in four studies to improve clinical parameters and fatigue. It is located in the anterolateral portion of the tuberosity of the tibia, serves for disorders of the stomach and has been used in research for cardiovascular outcomes due to the bradycardic and hypotensive effects<sup>(39)</sup>. It is used for the affections of the nervous system, since it deals with energy insufficiency, for people with physical and/or psychic exhaustion<sup>(37)</sup>.

SP6 was used in four studies on fatigue and sleep. It is located behind the medial border of the tibia and is indicated for gynecological, urinary, gastrointestinal, circulatory, pain, palpitation, insomnia, restlessness, tiredness, weakness, appetite reduction, dry skin, and weight control<sup>(38)</sup>. The other points stimulated during the treatment of the cited research are considered positive, from the point of view of providing specific effects that can decrease pain, tone the kidney, calm the mind, benefit the tendons, joints and move energy/blood<sup>(39)</sup>, thus generating health improvements.

Thus, it is verified that acupuncture performed through well-defined and consolidated protocols, derived from empirical experience, when transferred to clinical knowledge, can contribute greatly to the increase of quality of life in patients with CKD. It has also been observed in the studies that the use of the anatomical location of the points will depend on the emotions, affections and feelings that patients experience during the health-disease process<sup>(9)</sup>. Therefore, the individual and comprehensive approach should be considered in the search for relief from conditions experienced by CKD patients<sup>(11,40)</sup>.

However, one should reflect on the real possibility of acupuncture by nephrologist nurses in the Brazilian reality, considering that the training of these professionals is still timid regarding the introduction of complementary integrative practices in the management of CKD<sup>(40)</sup>, as well as the possibilities offered by SUS, regarding the performance of nurses, in care for CKD patients in the various levels of health care, through acupuncture.

## Study limitations

This systematic review needs to be interpreted with caution because of the included clinical trials and their limitations. In five studies, it was not possible to mask the intervention of participants and professionals, although it is unlikely that there are biases in the results, as evidenced by the analysis of the mean difference tests between and within groups. There was, as a limitation, the number of databases that may have minimized the sample of selected studies to compose the systematic review. It is pointed out that the methodological diversity and data collection tools used in each study made it impossible to perform meta-analysis calculations, and the descriptive analysis may have bias in the results of the review.

## Contributions to Nursing, Public Health or Public Policy

Despite the small scientific production coming from nursing professionals, especially the Latin American ones, the studies point to acupuncture as a possibility for intervention by nursing professionals, in the care of the CKD patient, in order to reduce the negative effects of renal replacement therapy and coexistence with the disease. Therefore, it becomes relevant to stimulate the use of this care technology, as a *corpus* of knowledge of the issue, thus favoring a humanistic and comprehensive approach in the

resolution or minimization of human problems and/or needs. Based on these findings, it should be encouraged that renal replacement therapy services are a propitious space to insert and strengthen integrative and complementary practices, such as acupuncture, in nursing care, through the insertion of acupuncturist nurses.

## CONCLUSIONS

Studies that worked on acupuncture in CKD patients used the techniques of auricular acupuncture, electroacupuncture and acupressure. The proposed treatment was effective in improving quality of life, fatigue and sleep, but did not provoke significant effects on the clinical variables of the disease, such as glomerular filtration rate and serum creatinine. The main acupuncture points were, for quality of life: *Shenmen*, Kidney and Heart; for clinical conditions: LI4, S36 and K3; for fatigue: S36, SP6, LI4, K1, GB34, SPL23 e H7; and sleep: H7, K11, L3, LI4, SP6, *Shenmen*, Heart and Endocrine. The intervention time was variable, but there were 12 sessions for one to three times a week.

Further studies with a high level of scientific evidence regarding the effects of acupuncture and their variations, either alone or in combination, are recommended for CKD patients. In addition, it assesses the effects of the main nursing diagnoses related to alterations and loss of kidney function, blood volume and hydroelectrolytic disturbances.

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