

# Non-Pharmacological Methods and Techniques in the Treatment of Cancer Pain: Literature Systematic Review

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*Métodos e Técnicas não Farmacológicas no Tratamento da Dor Oncológica: Revisão Sistemática da Literatura*

*Métodos y Técnicas no Farmacológicas en el Tratamiento del Dolor por Cáncer: Revisión Sistemática de la Literatura*

Natali dos Santos Nascimento<sup>1</sup>; Amanda Tinôco Neto Santos<sup>2</sup>; Priscila Godoy Januário Martins Alves<sup>3</sup>

## ABSTRACT

**Introduction:** Pain is an unpleasant sensation and responsible for several harms in the lives of cancer patients. This symptom can be related to several factors, has multiple levels of intensity and time of onset, it may be associated with the invasive spread of cancer cells in the body or as a result of anticancer treatment. **Objective:** Check which are the non-pharmacological techniques and methods adopted in the treatment of cancer pain, as well as describe their therapeutic efficacy. **Method:** Systematic literature review registered at PROSPERO, number CRD42021244286. Scientific articles on the subject were searched in electronic databases LILACS: PubMed, PEDro, Cochrane/CENTRAL, in Portuguese, English and Spanish, from 2010 to 2020, according to the inclusion criteria; randomized controlled clinical trials, whose sample consisted of adults over 18 years old, of both sexes, with cancer-related pain, who used non-pharmacological methods and techniques to treat the pain. **Results:** Twelve articles were included for analysis with a total sample of 885 patients submitted to protocols of non-pharmacological techniques with acupuncture, auricular acupuncture, acupressure, electrotherapy, yoga, manual therapy exercises, reflexology, massage and education program for pain management. All articles analyzed showed good results in the treatment of cancer pain. **Conclusion:** The modalities of complementary therapies, health literacy and electrical stimulation can contribute to reduce pain, however, exercise programs are effective only during the treatment period.

**Key words:** cancer pain; pain management; complementary therapies; treatment outcome.

## RESUMO

**Introdução:** A dor é uma sensação desagradável e responsável por diversos prejuízos na vida dos pacientes oncológicos. Esse sintoma pode estar relacionado a diversos fatores, ter múltiplos níveis de intensidade e tempo de aparecimento, podendo ser associada à disseminação invasiva de células cancerosas no corpo ou em decorrência do tratamento antineoplásico.

**Objetivo:** Verificar quais são as técnicas e os métodos não farmacológicos utilizados no tratamento da dor do câncer, assim como descrever sua eficácia terapêutica. **Método:** Revisão sistemática da literatura, registrada com o número CRD42021244286 no PROSPERO. Os artigos científicos sobre a temática foram pesquisados nas bases de dados eletrônicas: LILACS, PubMed, PEDro, Cochrane/CENTRAL, em português, inglês e espanhol, de 2010 a 2020, de acordo com os critérios de inclusão: ensaios clínicos randomizados controlados, com amostra composta por adultos com mais de 18 anos, de ambos os sexos, com dor relacionada ao câncer, que utilizaram métodos e técnicas não farmacológicas para tratar o quadro algíco.

**Resultados:** Foram incluídos para análise 12 artigos com amostra total de 885 pacientes submetidos a protocolos de técnicas não farmacológicas com acupuntura, acupuntura auricular, acupressão, eletroterapia, *yoga*, exercícios de terapia manual, reflexologia, massagem, programa de educação para gerenciamento da dor. Todos os artigos analisados apresentaram bons resultados no tratamento da dor do câncer. **Conclusão:** As modalidades de terapias complementares, educação em saúde e a eletroestimulação podem contribuir na redução do quadro algíco; no entanto, programas de exercícios só possibilitam melhorias durante o período do tratamento.

**Palavras-chave:** dor do câncer; manejo da dor; terapias complementares; resultado do tratamento.

## RESUMEN

**Introducción:** El dolor es una sensación desagradable y responsable de varios daños en la vida de los pacientes con cáncer. Este síntoma puede estar relacionado con varios factores, tener múltiples niveles de intensidad y tiempo de aparición, y puede estar asociado con la diseminación invasiva de células cancerosas en el cuerpo o como resultado de un tratamiento contra el cáncer. **Objetivo:** Comprobar cuáles son las técnicas y los métodos no farmacológicos empleados en el tratamiento del dolor oncológico, así como describir su eficacia terapéutica. **Método:** Revisión sistemática de la literatura, registrada con el número CRD42021244286 nel PROSPERO. Se realizaron búsquedas de artículos científicos sobre el tema en las bases de datos electrónicas: LILACS, PubMed, PEDro, Cochrane/CENTRAL, en los idiomas portugués, inglés y español, desde 2010 hasta 2020, según los criterios de inclusión; ensayos clínicos controlados aleatorizados, cuya muestra estuvo constituida por adultos mayores de 18 años, de ambos sexos, con dolor relacionado con el cáncer, que utilizaron métodos y técnicas no farmacológicas para el tratamiento del dolor. **Resultados:** Se incluyeron para el análisis 12 artículos con una muestra total de 885 pacientes sometidos a protocolos de técnicas no farmacológicas con: acupuntura, acupuntura auricular, acupresión, electroterapia, *yoga*, ejercicios de terapia manual, reflexología, masaje, programa de educación para el manejo del dolor. Todos los artículos analizados mostraron buenos resultados en el tratamiento del dolor oncológico. **Conclusión:** Las modalidades de terapia complementaria, educación para la salud y estimulación eléctrica pueden contribuir a la reducción del dolor, sin embargo, los programas de ejercicio solo permiten mejoras durante el período de tratamiento.

**Palabras clave:** dolor en cáncer; manejo del dolor; terapias complementarias; resultado del tratamiento.

<sup>1-3</sup>Universidade do Estado da Bahia (UNEB). Salvador (BA), Brazil.

<sup>1</sup>E-mail: natali.nascimento16@gmail.com. Orcid iD: <https://orcid.org/0000-0002-3473-4921>

<sup>2</sup>E-mail: amandatms@gmail.com. Orcid iD: <https://orcid.org/0000-0003-0529-8742>

<sup>3</sup>E-mail: pgjmalves@uneb.br. Orcid iD: <https://orcid.org/0000-0002-5992-2443>

**Corresponding author:** Natali dos Santos Nascimento. Departamento de Fisioterapia da UNEB. Rua Silveira Martins, s/nº – Cabula. Salvador (BA), Brazil. CEP 41180-045. E-mail: natali.nascimento16@gmail.com



## INTRODUCTION

Pain is a common problem affecting individuals worldwide with different descriptions and characteristics and managed as subjective sensations related with the extension of the human life<sup>1</sup>. The International Association for the Study of Pain – IASP<sup>2</sup> defines pain as an unpleasant sensory and emotional experience associated with or resembling that associated with actual or potential tissue damage.

Patients with cancer report constant sensory pain, a symptom possibly related to innumerable factors with different intensities and time of onset. In addition, it can be associated with invasive spread of cancer cells in the body or resulting from antineoplastic treatment as chemotherapy, radiotherapy and tumor metastasis<sup>3</sup>.

A disease modifies the way of living of many different individuals, most of all if life-threatening as cancer, a challenge for health-professionals. Cancer pain is described as indeterminate and frightening, something that hurts, causes an unbearable sensation with sleeping disorders, difficulties to perform activities of the daily life, suffering, isolation and hopelessness<sup>3-5</sup>.

The therapeutic plan for a person with pain requires multiprofessional action and determination involving the caregiver and the patient, further to cultural, affectionate, emotional, educational, psychological, environment, religious and cognitive aspects<sup>6</sup>.

Alternative or accessory ways to treat pain can help the scientific community and impact the clinical practice in decision-taking and quality-of-life of persons with cancer. The objective of this review is to investigate scientific evidences about non-pharmacological methods to treat cancer pain and respond to the research question: How effective are non-pharmacological methods and techniques applied to treat cancer pain?

## METHOD

Systematic literature review registered as CRD 42021244286 at the International Prospective Register of Systematic Reviews (PROSPERO), conducted according to the recommendations of Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA)<sup>7</sup>.

Articles in Portuguese, English and Spanish were searched at the following databases from 2010 to 2020: LILACS, PubMed, PEDro, Cochrane/CENTRAL.

The study followed the PICOS framework: Population, Intervention, Comparison, Outcomes and Study Design shown in Chart 1. The item Control was not applicable.

The Health Sciences Descriptors (DeCS) and Medical Subject Headings (MeSH) in Portuguese and English were

Chart 1. Definition of the acronym PICOS

Acronym	Definition
P	Population of adult patients with cancer pain
I	Intervention: non-pharmacological techniques
C	Comparison: not applicable
O	Outcome: pain-relief/reduction
S	Study design: randomized clinical trials

utilized – pain cancer (*dor oncológica*); pain management (*manejo da dor*) with the Boolean descriptors *AND OR*.

The title and abstracts of the articles identified were evaluated by two blinded investigators independently according to the inclusion criteria: controlled randomized clinical trials with a sample with adults older than 18 years of age, both sexes, with cancer pain, utilizing non-pharmacological methods and techniques to manage cancer pain and full articles. The exclusion criteria were: studies with analgesic drug exclusively, hormone and/or anti-inflammatory drugs for pain management, invasive techniques, articles about pain management in patients with advanced cancer/terminal palliative care; articles addressing the utilization of apps for pain control; secondary analysis of clinical trials, studies with techniques applied by the caregiver; duplicate articles; reviews; case-reports; retrospective studies; pilot-study; experimental studies with animals; studies not available in full.

Initially, the articles found were excluded if the title failed to address the research question; the abstracts were read and excluded if the study's objectives were unmet. Those which did not meet the inclusion criteria were discarded after full reading.

The Collaboration Cochrane tool for systematic reviews was applied to detect risk of bias in the clinical trials selected. This tool is divided in two parts, a description of the study content and the risk of bias for each one of the domains analyzed, which allowed the evaluation of the articles published in three categories: high risk of bias, low risk of bias or uncertain risk of bias/some concerns<sup>8</sup>. The Risk-of-bias Visualization (Robvis), of the Risk of Bias Tools was applied to elaborate the chart of risk of bias<sup>9</sup>, not applied, however, as inclusion or exclusion criteria.

A flowchart with three steps was designed with the description of the identification process and selection of the articles investigated: identification, selection and inclusion.

The studies selected for this review were listed in alphabetic order according to: author (year of publication),

country, method, sample, non-pharmacological intervention for pain management, most prevalent neoplasm and significant outcomes (Chart 2).

## RESULTS

The search at the electronic databases identified 319 articles, 79 selected by the abstract and of these, 44 were excluded for not meeting the inclusion criteria.

The next step was full reading of 30 articles, 12 were eligible because they responded the research question<sup>3,10-20</sup>. Figure 1 portrays the process of identification and selection. The risk of bias of randomized clinical trials is shown in Graph 1.

From all the studies compiled, the final sample consisted in 885 patients with several types of neoplasm with some type of intervention of pain relief. The methods applied are presented in Table 2.

Chart 2. Randomized clinical trials of non-pharmacological methods and techniques for cancer pain

Author/Year	Country	Type of non-pharmacological intervention	Method	Sample	Prevalent cancer	Outcomes	Risk of bias
Ruela et al., 2018 <sup>3</sup>	Brazil	AA	IG: needles in Shenmen points, kidneys, sympathetic, muscle relaxation and points of energetic balance. Each session lasted 40 minutes CG: points: eye and trachea with 20-minute sessions Both groups: needles remain in the auricular pavilion for 7 days. 8 sessions once a week every 7 weeks Scale utilized: visual analogue	23 participants IG: 11 CG: 12	Breast CA	AA was effective in reducing the intensity of pain of patients in chemotherapy treatment in addition to reduction of analgesics	Some concerns
Elgohary et al., 2018 <sup>10</sup>	Egypt	LLLT versus LIUS versus TET	LIUS Group: frequency 1 MHz pulsed mode 60% and a dose of 1.0 W/cm <sup>2</sup> for 5 times a week for 4 weeks LLLT Group: the infrared laser of wavelength (950 nm), output power 15 mW, pulsed 80%, at a dose of 4.3 J/cm <sup>2</sup> , for 6 minutes, 5 times a week for 4 weeks TET Group: passive and active movement, stretching and resistance exercises repeated 10 times. Twice a day, 5 times a week for 4 consecutive weeks. All the groups performed the exercises. Scale utilized: visual analogue	60 patients GA: 20 GB: 20 GC1: 20	Head and neck CA	The group submitted to LIUS and TET had better results in reducing pain	Low
Eyigor et al., 2018 <sup>11</sup>	Turkey	Yoga versus placebo	IG: Yoga twice a week for 10 weeks, lasting one hour CG: no intervention and usual care Scale utilized: visual analogue	42 patients IG: 22 CG: 20	Breast CA	IG improved the intensity of the pain (shoulder and arm). No significant differences were found in both groups	Some concerns
De Groef et al., 2017 <sup>12</sup>	Belgium	Program of exercises and manual therapy	IG: standard therapy (30 minutes) and 8 sessions of myofascial therapy (30 minutes), once a week CG: standard physiotherapy (30 minutes) and 8 sessions of placebo intervention (30 minutes), once a week Scales utilized: visual analogue and questionnaire McGill Pain	145 patients IG: 70 CG: 75	Breast CA	The association of techniques has no additional benefits on prevalence, intensity and quality of the pain	Low

to be continued

Chart 2. continuation

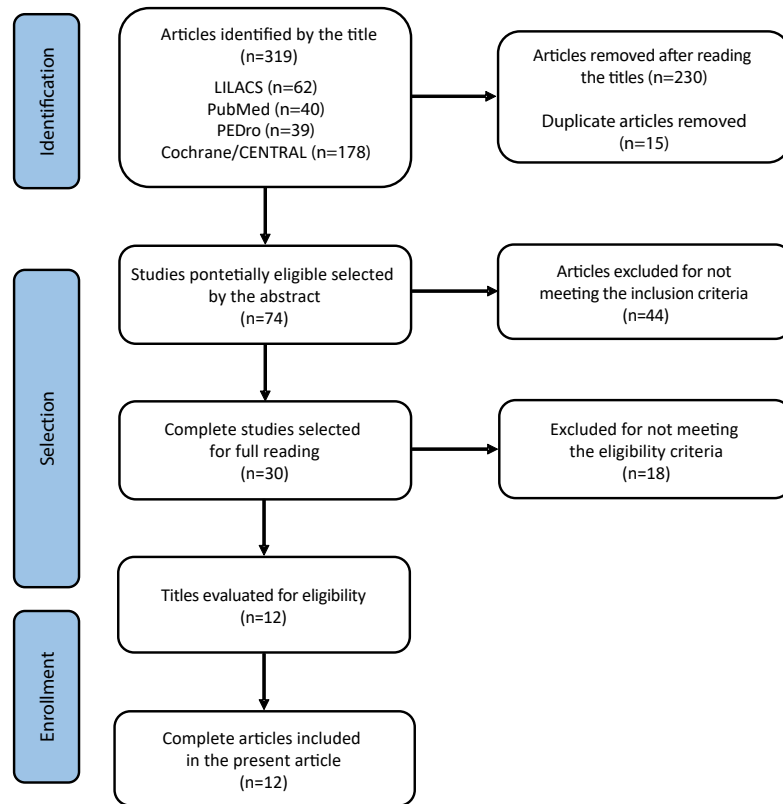
Author/ Year	Country	Type of non-pharmacological intervention	Method	Sample	Prevalent cancer	Outcomes	Risk of bias
Ibrahim et al., 2018 <sup>13</sup>	Egypt	tDCS	IG: 10 daily sessions of 2 mA, 30 minutes, target of tDCS M1 CG: the stimulation lasted 30 seconds with identical parameters but stopped unbeknownst to the patient. Scales utilized: visual analogue and verbal descriptor	40 patients IG: 20 CG: 20	Liver CA	The effect started in the fifth session in the IG and continued for one month	Low
Kashyap et al., 2020 <sup>14</sup>	India	ST	IG: ST for 40 minutes on each day and pain medications CG: only pain medications In both groups, the pain was evaluated 5 days a week for 2 weeks Scale utilized: numerical rating scale (NRS-11)	80 patients IG: 40 GC1: 40	Head and neck CA	Pain intensity reduced in both groups. Rates became significantly lower from the day 3 onward in IG. Morphine dose decreased from day 7 onward in the IG	Some concerns
Molassiotis et al., 2019 <sup>15</sup>	China	Acupuncture	IG: 8 30-minute sessions twice a week, bilateral acupuncture CG: standard treatment Scale utilized: brief pain inventory	87 patients IG: 44 CG: 43	Breast CA	Better improvement of pain intensity in IG than in CG at the end of the intervention	High
Nia et al., 2017 <sup>16</sup>	Iran	Acupressure	IG: acupressure techniques repeated 12 times in four weeks (3 sessions a week), lasting eight minutes. Bilateral stimulation for two minutes CG: usual treatment for patients with leukemia Scale utilized: visual analogue	79 patients IG: 41 CG: 38	Leukemia	Reduction of pain intensity experienced by IG compared with CG	High
Rambod et al., 2019 <sup>17</sup>	Iran	Reflexology	IG: reflexology for 15 minutes on each foot. Points: cervical spine, thorax, sacrum, legs, knees, arms and shoulder, sciatic nerve for 5 consecutive days and usual care CG: usual care Scale utilized: numerical rating scale of pain	72 patients IG: 36 CG: 36	Non-Hodgkin's Lymphoma	Relief of pain intensity in IG	Some concerns
Tse et al., 2012 <sup>18</sup>	China	Education and pain management	IG: routine instruction and PMP with 21-page instructive book on pain management Follow-up sessions for each participant in days 3 and 5 for 15 minutes CG: routine instruction on pain management with 1-page leaflet about pain. Friendly research team visit every two days but without PMP Scales utilized: numerical rating scale	38 patients IG: 20 CG: 18	GI CA (gastrointestinal)	Pain significantly reduced in the two groups. IG significantly increased the use of pain medication and non-pharmacological strategies	High

to be continued

Chart 2. continuation

Author/Year	Country	Type of non-pharmacological intervention	Method	Sample	Prevalent cancer	Outcomes	Risk of bias
Uysal et al., 2017 <sup>19</sup>	Turkey	Feet massage	IGM: massage effleurage, pétrissage, friction and vibration for 10 minutes in each foot, including instep and soles at minimum 1-day intervals for 20 minutes, twice a week lasting 5 weeks IGR: points of the lymphatic system; stomach, liver, spleen, spinal cord, colon and rectal orifice; sciatic, brain, pituitary gland, hypothalamus, pineal gland and solar plexus administered for 20 minutes at the right foot and 10 minutes at the left foot at minimum 1-day intervals for 30 minutes, twice a week lasting 5 weeks. CG: were not given classic massage or reflexology Scales utilized: EORTC-CTCAE (European Organisation for Research and Treatment of Cancer – Common Terminology Criteria for Adverse Events) form with introduction, and C30 and CR29	60 patients IGM: 20 IGR: 20 GC: 20	Colorectal CA	Foot massage was effective in reducing pain levels and incidence of distension Reflexology was effective in reducing the levels of pain and fatigue	High
Xu et al., 2020 <sup>20</sup>	China	WAA combined with AA	GA: single conventional analgesia with opioids GB: WAA on corresponding points at wrist or ankle and treatment given to group A GC: AA: intestines e viscera on one ear. After 2-3 days, the treatment was applied on the other ear in addition to the treatment given to GA GD: WAA combined with AA. The needle remained for 2-12h on intestine and viscera. After 2-3 days, the treatment was applied on the other ear in addition to the treatment given to GA Scale utilized: numerical rating	159 patients Groups A, C, D: 40 each Group B: 39	GI CA	WAA combined with AA can reduce faster the pain symptoms with lasting analgesic effects and effectively reduce the use of pain relief medications	Some concerns

**Captions:** IG = intervention group; CG = control group; CA = cancer; UL = upper limbs; LL = lower limbs; IGM = intervention group massage; IGR = intervention group reflexology; GA = group A; GB = group B; GC1 = group C; GD = group D; WAA = wrist-ankle acupuncture; AA = auricular acupuncture; PMP = pain management program; tDCS M1 = transcranial direct current stimulation over the left motor cortex; LLLT = low level laser therapy; LIUS = low intensity ultrasound; TET = traditional exercise therapy; ST = Scrambler therapy.



**Figure 1.** Flowchart PRISMA with the process of identification and selection of articles of the systematic review: non-pharmacological methods and techniques to treat cancer pain from 2010 to 2020. Salvador, BA, Brazil

		Risk of bias domains				
		D1	D2	D3	D4	D5
Study	Elgohary et al., (2018)	+	+	+	+	+
	Eyigor et al., (2018)	+	+	-	-	+
	Groef et al., (2017)	+	+	+	+	+
	Ibrahim et al., (2018)	+	+	+	+	+
	Kashyap et al., 2020	+	+	-	X	+
	Molassiotis et al, (2019)	+	-	-	-	-
	Nia et al., (2017)	+	X	-	-	+
	Rambod et al., (2019)	+	+	-	+	+
	Ruela et al., (2018)	+	-	+	-	+
	Tse et al., 2012	-	-	-	-	+
	Uysal et al., (2017)	X	X	-	-	+
	Xu LP, et al., (2020)	+	-	-	+	+

Domains:  
 D1: Bias arising from the randomization process.  
 D2: Bias due to deviations from intended intervention.  
 D3: Bias due to missing outcome data.  
 D4: Bias in measurement of the outcome.  
 D5: Bias in selection of the reported result.

Judgement  
 X High  
 - Some concerns  
 + Low

**Graph 1.** Risk of bias of the systematic review: non-pharmacological methods and techniques to treat cancer pain, 2022



## DISCUSSION

Pain is an individual perception that affects many individuals with neoplasm that appears in different ways and can be responsible for physical, psychological, social and spiritual changes, in addition to interfering in activities-related areas and participation of the individual in the society<sup>2,21</sup>. Non-invasive approaches to control pain conditions are increasing and can contribute effectively to improve functioning<sup>18</sup> to meet the population demands.

The specific cause of cancer pain is not yet determined, requiring a full approach to control the symptom as quite often it can require the continuous use of analgesic drugs for longer periods. However, analgesia can cause adverse events, directly interfering in the patient's daily routine<sup>22</sup>. With the present systematic literature review, 12 studies which list five alternative techniques to corroborate the therapeutic approach were included.

Pain evaluation is challenging for health professionals because it is subjective, requiring more attention to many symptom-related factors. Literature already presents several rating methods, among them, specific scales to analyze cancer pain, some easy to apply as the verbal scale the patient utilizes to rate the intensity of the pain in mild, moderate and strong and the brief pain inventory, a difficult to apply scale translated into several languages with nine items organized in two dimensions which addresses pain intensity and severity, in addition to interference in the patient's daily life<sup>23</sup>.

Most of the clinical trials included achieved good rates by the scale of risk of bias according to Cochrane<sup>8</sup>, but they are heterogeneous in relation to the type of neoplasms investigated.

Seven randomized clinical trials addressed complementary, alternative and integrative medicine practices (CAM) whose aim was to develop a new panorama of the human being and treatments utilized for several purposes, based in integrality and health-disease concepts<sup>24</sup>. In Brazil, the inclusion of CAM in the National Health System (SUS) is satisfactory at every level of health attention, standing out basic attention in the perspective of prevention of harms and recovery of health, favoring a continuous, humanized and full care mainly to the individual and its issues, considering the social context<sup>25</sup> further to the disease itself.

In this scenario, several techniques are applied to offer relief of the physical/emotional suffering, among them, acupuncture, a millenary health treatment based in the Chinese Traditional Treatment which stimulates specific body points to regulate organic functions<sup>26</sup>. The evidences about the effects of acupuncture for pain of

patients with cancer indicated that it actually brought symptoms relief<sup>3,15,20</sup>.

Ruela et al.<sup>3</sup>, in their eight-sessions protocol of auricular acupuncture showed alterations of pain intensity and classification with significant differences between the groups in relation to medications whose mean of intensity of pain in the first and last evaluation of the intervention group reduced from moderate to mild at the end of the study while the control group continued with moderate pain.

Corroborating these findings, Molassiotis et al.<sup>15</sup> investigated a population with multiple types of cancer and reported the reduction of the potency of the pain at the end of the intervention compared with control. Further, they noticed that the 14-day evaluation found that the pain remained low in the intervention group and that the low-cost technique is effective and safe in treating pain.

Analgesia resulting from acupuncture involves small diameter nerves and differentiated threshold which emit information to the spinal cord, activating areas of the brain stem responsible for releasing endogenous opioids<sup>26</sup>.

The ankle-wrist acupuncture therapy combined with auriculotherapy analyzed by Xu et al.<sup>20</sup> in their study had stronger effects and a faster start time, further to reduction of pain medication. Concomitantly, the inference demonstrates that the union of stimulating modalities can be more effective in modifying sensorial stimuli due to the potentialization of their effects.

Massage therapy is a technique known for years due to its rapid analgesic effects and promotion of well-being, making the patient, after stimulation of body tissues, to reach a level of relaxation leading to suffering<sup>27</sup> relief. Uysal et al.<sup>19</sup> utilized a massage protocol of the feet and reported that the technique was effective in reducing pain levels.

The article by Nia et al.<sup>16</sup> about the effects of acupressure in a population with leukemia concluded that pain reduced compared with placebo. Reinforcing these findings, Rambod et al.<sup>17</sup>, who investigated the effects of reflexology in individuals with non-Hodgkin's lymphoma have also found positive effects in relieving pain intensity. As a result, the therapeutic touch is an accessible possibility in the course of the oncologic treatment.

In addition, kinesiotherapy is the movement therapy and can be applied in populations with diverse physical conditions because of its therapeutic finality with benefits associated with availability and low cost<sup>28</sup>. Two clinical trials included in the sample investigated the effects of exercises in improving pain.

Eyigor et al.<sup>11</sup> investigated the effects of the exercises of hatha yoga as alternative in reducing painful symptoms, its findings suggest that there is no difference of pain

intensity in the intervention and placebo groups, the latter did not perform any exercise. Concurring with this finding, De Groef et al.<sup>12</sup>, while analyzing a combination of myofascial therapy with a physiotherapy program did not find additional benefits. In addition, some type of improvement occurred only while the patient was participating of a physiotherapy program whose effects stopped when discontinued.

An article which analyzed transcranial electrostimulation<sup>13</sup> emphasized there was good analgesic response with the technique after the fifth session with effects for one month. However, while comparing with control group who was given stimulation for a short period, it was noticed a good analgesic response as well which can be correlated to the placebo effect, but for a shorter period. In that sense, the authors suggest that this transcranial stimulation in specific areas consists in a relevant strategy in clinical practice.

According to Lee et al.<sup>28</sup>, electrostimulation is an adjuvant intervention to treat several symptoms, including pain, but its mechanisms remain unknown. It is believed that microcurrents activate specific neurons on the brainstem, which on its turn produce neurotransmitters restructuring the normal homeostasis of the brain, inducing relaxation, stabilizing the mood and regulating the awareness and perception of specific types of pain<sup>28</sup>.

Likewise, Kashyap et al.<sup>14</sup> showed pain improvement with Scrambler therapy from day 3 onward in the intervention group compared with the control group with better effects after the tenth day. Furthermore, morphine dose reduced in the intervention group after the seventh day at the same time that dose increased in the control group.

New innovative modalities of therapy are proposed in the scope of the measures adopted for symptomatology and sickening. Scrambler therapy is utilized for pain relief through an electrocutaneous device of nerve stimulation encompassing 16 potential types of action that prompts non-pain information on a transmission route of cutaneous nerve, converting information that will be sent to the central nervous system<sup>29</sup>.

Another study about the association of electrotherapy with exercises<sup>10</sup> concluded that the association with low-intensity ultrasound was more beneficial in managing dysfunctions, including temporomandibular joint pain in patients with head and neck cancer. Concomitantly, ultrasound therapy can be applied for several finalities since it generates physiologic effects and alleviates painful conditions due to the deep penetration into the tissues that modifies the interior of the cells<sup>30</sup>. In addition, magnetic resonance-guided focused ultrasound is effective in tissue denervation, reduction of tumor mass

and neuromodulation. The latter is a technique that can impact pathways of the origin of the pain, in addition to being non-invasive but with inaccurate parameters because, depending on the modification, can increase the risk of fractures and third-degree skin burns<sup>31</sup>.

Education in health is positive to the individual because it ensures longer effects of the therapy. Tse et al.<sup>18</sup> investigated the effects of a program of education and pain management and noticed its efficacy because it expands the patients' knowledge. The variables analyzed were pain intensity, obstacles for cancer pain management and utilization of a pain control program and the use of analgesia and non-pharmacological methods for pain relief. The participants of this study<sup>18</sup>, both the control and intervention groups were instructed about pain management with a one-page flyer addressing non-pharmacological methods for pain relief but only the intervention group, in addition to this initial guideline, has also received the booklet of the pain management program.

However, while comparing both groups upon the conclusion of the 7-day pain management program, no statistically significant difference was found for the variables investigated as pain was reduced in the two groups<sup>18</sup>. Great reduction of the pain, although, was found in the intervention group possibly associated with more use of analgesics combined with non-pharmacological methods, making the approach beneficial since the most educated group searched for strategies to relieve their suffering. The authors<sup>18</sup> suggest consequently that the patients with neoplasms should be educated to correct the errors about cancer pain management.

This review attempted to address the non-pharmacological methods and techniques found in the literature and their efficacy to relieve or treat cancer pain according to PRISMA. However, the heterogeneity of the types of neoplasm described in the studies, the sample size of each study and several non-pharmacological methods to manage cancer pain restricted the comparison among them, a clear limitation of the article. In addition, the time of application and duration of each technique may have impacted the results. Most of the studies presented some concerns or high risk of bias with the application of the tool Cochrane, potentially influencing the methodological quality.

## CONCLUSION

In the last ten years it was possible to infer that there are many methods adopted as adjuvant measures to treat oncologic pain according to the findings of this study. However, the integrative practices cause an important



analgesic effect, are easily applied, low-cost and safe in terms of the therapeutic effect. Electrostimulation and education programs with pain relief measures are effective as well. Nevertheless, the benefits of physical exercises cease once finished and occur while they are being exerted. The studies indicate good results for pain relief which favors cost reduction with medications and improves the patients' quality-of-life. However, more studies with larger samples are necessary to implement the investigation of non-pharmacological methods and techniques for oncologic pain.

Non-pharmacological interventions can be effective for all types and intensity of pain and can be recommended as an additional alternative to treat cancer pain or utilized concomitantly with regular drugs according to the prescriptions of intervention protocols to treat pain.

### CONTRIBUTIONS

Natali dos Santos Nascimento and Amanda Tinôco Neto Santos contributed substantially to the study design, acquisition and interpretation of the data, wording and critical review. All the authors approved the final version to be published.

### DECLARATION OF CONFLICT OF INTERESTS

There is no conflict of interests to declare.

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