Asia-Pacific Journal of Oncology Nursing 12 (2025) 100669

Contents lists available at ScienceDirect

Asia-Pacific Journal of Oncology Nursing

journal homepage: www.apjon.org

Review

The promising application of acupressure for management of cancer-related lymphedema: A scoping review

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ARTICLE INFO

Keywords:
Acupressure
Cancer
Lymphedema
Scoping review

ABSTRACT

Objective: Acupressure is widely used to effectively manage cancer-related symptoms; however, limited evidence has been seen on the application of acupressure in managing cancer-related lymphedema (CRL). This study aims to identify, describe, and map the current evidence that used acupressure for CRL prevention and management.
Methods: This review was conducted following Arksey and O'Malley's methodology and Joanna Briggs Institute guidance for scoping reviews. A systematic search was performed in eight English databases and four Chinese databases from inception to Oct 20, 2023, and updated on July 20, 2024. Reference lists were hand-searched. Two independent reviewers performed study selection and data extraction. Disagreements were solved through discussion or consultation with a third reviewer. A narrative synthesis was performed to summarize and synthesize the findings.
Results: A total of 16 articles published from 2010 to 2023 were included. The majority of the studies ($n = 11$) were from China. There were six randomized controlled trials (RCTs), four quasi-experimental studies, one retrospective cohort study, one qualitative study, three reviews, and one report. Nine studies examined acupressure, one employed tuina, and one utilized Transcutaneous Electrical Acupoint Stimulation. Neiguan (PC 6), Hegu (LI 4), Jianjing (GB 21), Quchi (LI 11), Chize (LU 5) were most commonly used acupoints. The dosage varied among studies. Acupressure was performed by trained nurses or patients. Acupressure showed improvements in lymphedema management, limb function, quality of life, and inflammatory factors.
Conclusions: The review concluded the effectiveness of acupressure in CRL prevention and treatment. Further rigorous research is recommended, particularly well-designed RCTs involving diverse populations.

Introduction

Cancer remains a significant challenge for society, public health, and the economy in the 21st century. According to the GLOBOCAN estimates of incidence and mortality worldwide for 36 cancers in 185 countries, there were close to 20 million new cases of cancer in 2022, and the number will reach 35 million by 2050.[1] With the increasing cancer incidence and improved survival rates, the population of cancer survivors continues to grow. The diagnosis and treatment of cancer will inevitably cause patients a series of physical and psychological symptoms, such as pain, fatigue, insomnia, anxiety, significantly diminishing their quality of life (QoL).[2]

Among these symptoms, cancer-related lymphedema (CRL) is a debilitating and chronic condition characterized by lymphatic fluid retention, resulting in tissue swelling, such as arm lymphedema in breast cancer survivors, or leg lymphedema in cervical cancer patients.[3] Cancer

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https://doi.org/10.1016/j.apjon.2025.100669
Received 6 October 2024; Accepted 10 February 2025

treatments including surgery, radiotherapy and chemotherapy that affect lymph nodes can disrupt lymphatic drainage pathways, leading to the buildup of lymph fluid in surrounding tissues and result in secondary lymphedema (LE).[4] The incidence of CRL has been reported as 10% (95% CI: 7.0%–13.0%) for leg lymphedema, and 27% (95% CI: 20.0%–34.0%) for arm lymphedema.[5] CRL can severely affect cancer survivors' health-related quality of life in multidimensional domains, including functional, physical, emotional, social, and economic domains.[6]

CRL is still incurable, but it can be controlled if detected and treated in the early stage. Current treatments for CRL consist of complete decongestive therapy (CDT), manual lymphatic drainage, compression pump, low-level laser therapy, exercise, acupuncture, Kinesio Taping, and surgery (excisional procedures, liposuction, lymphatic reconstruction, and tissue transfer procedures).[7,8] Among these treatments, CDT has been regarded as the standard treatment of lymphedema; however, the optimal treatment protocol for lymphedema remains controversial.[6] Researchers and health care professionals are still working on exploring effective treatments.

Acupressure is a traditional Chinese medicine therapy that involves applying gentle to moderate pressure administered by a trained therapist with hands, fingers, thumbs, elbows, feet, or various devices on specific acupoints along the body's meridians.[9,10] It has gained popularity as a nonpharmacological treatment, with growing evidence demonstrating its effectiveness in relieving cancer-related symptoms such as pain, fatigue, sleep disturbances, nausea, and vomiting.[10] According to the meridian theory, the application of acupressure is believed to alleviate symptoms by clearing stagnant Qi, thus restoring its natural flow and reducing associated symptoms.[9] Acupuncture, another traditional Chinese medicine therapy that stimulates acupoints with a needle, is similar to acupressure. Acupuncture has been well demonstrated to be effective in the treatment of lymphedema.[11,12] Compared to acupuncture, acupressure is non-invasive, easy to learn, economical, and convenient, and can be administered by patients after quick training.[13] Self-acupressure performed by trained participants has shown promise to alleviate the symptoms of various health problems.[14]

According to the few published studies in the literature, acupressure has the potential to be introduced in the field of CRL prevention and management.[15] However, little is known about how acupressure should be implemented and evaluated in managing CRL, including the acupoints, dosage of treatment, and effects on patient-related outcomes.

These crucial details should be determined before we can apply acupressure in the clinical practice of CRL care. Considering the current limited evidence on this topic, we conducted this scoping review to identify, describe, and map the current research that used acupressure for lymphedema prevention and management among cancer patients. Specifically, the objectives included: (1) examining the effects of acupressure on CRL, (2) exploring the potential mechanism of acupressure on CRL, and (3) characterizing the key features of acupressure interventions for managing CRL, including the acupoints and duration of treatment.

Methods

A scoping review was conducted to comprehensively map the available evidence on the application of acupressure for the management of cancer-related lymphedema. This approach was chosen due to the exploratory nature of the topic, the diversity of study designs in the existing literature, and the need to identify knowledge gaps and potential avenues for future research. By synthesizing a wide range of evidence, this scoping review aims to provide a foundational understanding of the current state of research and clinical applications in this emerging field. This scoping review adhered to the methodological framework proposed by Arksey and O'Malley,[16] along with the methodology guidance outlined in the Joanna Briggs Institute's (JBI) manual for scoping reviews.[17] We reported this scoping review following the PRISMA Extension for Scoping Reviews (PRISMA-ScR) guidelines,[18] The research aimed to answer several questions:

- How effective is acupressure in managing CRL?
- What outcome measures have been used to evaluate the effectiveness of acupressure for managing CRL?
- What are the potential mechanisms of acupressure in managing CRL?
- Which acupoints are commonly chosen and effective in managing CRL?

Eligibility criteria

The inclusion criteria included: (1) studies focused on the application of acupressure to prevent or manage CRL; (2) published in English or Chinese; (3) all study designs including quantitative, qualitative, or mixed method designs, or review studies; (4) both peer-reviewed and non-peer-reviewed articles; (5) all article types including abstracts, dissertations, or expert opinions. The exclusion criteria were: (1) studies that examined auricular acupressure; (2) duplicated publications.

Search strategy

We conducted a three-step search strategy of electronic databases to identify relevant articles. The search strategy was developed through an iterative process, with input from the research team and guidance from a health science librarian. The search strategy was first developed following a PCC framework: Population (P) - adult cancer patients diagnosed with lymphedema caused by cancer or cancer-related treatments; Concept (C) - acupressure or acupoint massage; Context (C) - hospital, outpatient clinic or home setting.

Initially, we performed a limited search in PubMed, Google Scholar, CNKI and VIP to analyze and identify potential index terms and keywords. Given the relatively small number of retrieved records during the preliminary search using PCC framework, we used two concepts for searching: population and concept. A search strategy was designed for PubMed and subsequently tailored for the other databases. The following keywords were used in various combination, employing operators to refine the search in English databases: Cancer, neoplasm, tumor, tumour, malignant, carcinoma, oncology, sarcoma; Lymphedema, lymphoedema, swelling, swollen, 'lymphatic flow', 'lymph node'; Acupressure, 'acupoint stimulation', 'Shiatsu', 'Zhi Ya', 'Chih Ya', 'acupoint pressure'. Then, we searched both English databases including PubMed, Embase, CINAHL, Web of Science, Scopus, Cochrane Central Register of Controlled Trials, Clinical Trials.gov, AMED (Allied and Complementary Medicine Database), and Chinese databases including CNKI, VIP, Wan Fang and Sino Med, from inception till from inception to Oct 20, 2023, and updated on July 20, 2024, to include the most recently published studies. The search strategy is presented in Supplementary Table S1. Finally, the reference lists of included articles that were hand-searched to identify relevant studies.

Study selection

All retrieved records were imported into Covidence. Following the removal of duplicates automatically and by hand, two researchers independently conducted the two-step process of study selection. First, all titles and abstracts were screened against the eligibility criteria. Then, potentially eligible records were retrieved for full-text and examined. The reasons for excluding articles during the full-text screening were recorded. To reach consensus during the study selection, disagreements were solved through discussion or consultation with a third reviewer. We used a PRISMA flow diagram to report on the study selection process.

Data extraction and analysis

We developed a predesigned data extraction form, which included details such as authors, year of publication, country, study design,

aims, sample size, participant characteristics, interventions (including durations and frequencies), comparators, measurements, and diagnosis of lymphedema, other outcomes, safety, main findings, and funding resources. Acupoint selections were extracted according to the WHO Standard Acupuncture Point Locations in the Western Pacific Region. The initial data extraction form was pilot-tested and revised as necessary during the process. Data were independently extracted from each eligible study by two researchers, and the extracted data were cross-checked, with any disagreements resolved through discussion.

Data analysis included data reduction, display, comparison, and conclusions. Narrative synthesis involved summarizing and interpreting findings from included studies, guided by the proposed research questions, to note similarities and differences between studies. Additionally, details of the study characteristics and acupressure intervention protocols, including frequency, duration, selection of acupoints, procedures, techniques, and effects of acupressure on lymphedema, were extracted and tabulated according to study design, type of intervention, outcomes, and more. We also described the potential mechanisms of acupressure on lymphedema, identified gaps in the literature, informed implications for clinical practice, policy, and future research, and acknowledged the limitations of the review.

Results

Study selection

A total of 191 records were identified through databases and two additional citations were retrieved from the references of included studies. After removing 78 duplicates, 115 records were assessed for eligibility. Subsequently, 60 studies underwent full-text screening, ultimately resulting in the inclusion of 16 articles[19–34] (Fig. 1).

Study characteristics

The included studies were published from 2010 to 2023, with the majority (81.25%) published within the last decade. Among these, 14 were journal articles[19,21–30,32–34] supplemented by one report[31] and one conference abstract.[20] Most of the studies (11/16) were from China,[19,22–25,28–30,32–34] four were from the US,[20,21,26,31] and one was from the UK.[27] In terms of study design, there were six randomized controlled trials (RCTs),[22,24,28,29,32,34] four quasi-experimental studies[19,23,30,33] (including one pre-post intervention and three non-RCTs), one retrospective cohort study,[25] one qualitative study,[20] two traditional reviews,[21,27] one systematic review,[26] and one report.[31] Only two studies had the study protocol registered.

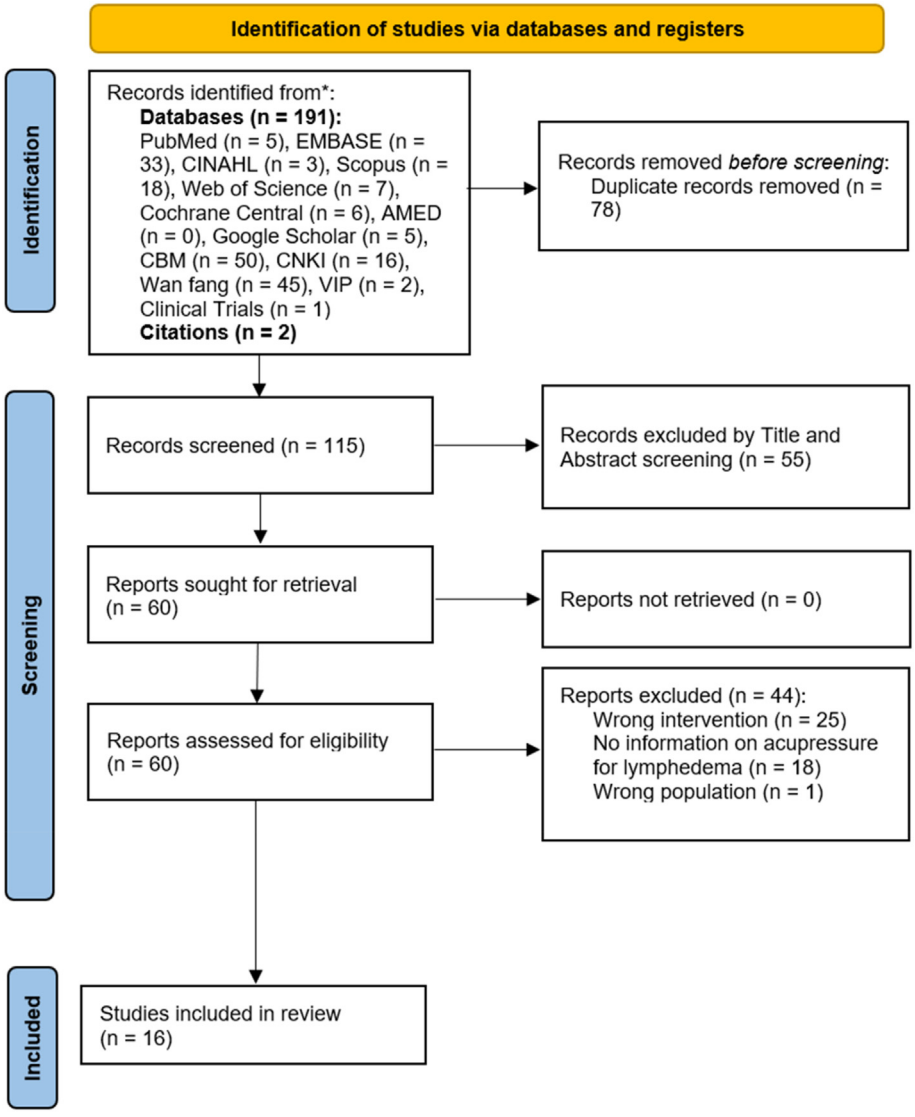

Fig. 1. PRISMA study search and selection flow diagram. PRISMA, Preferred Reporting Items for Systematic Reviews and Meta-Analyses.

All three review articles focused on complementary and alternative medicine therapies. Walters's article examined the use of massage in cancer patients based on 87 articles, noting that lymphatic massage could be effective for secondary CRL; however, this study did not specify acupressure and acupoints for lymphedema management.[32] Rodrick et al. systematically searched and identified 38 studies on complementary and alternative therapies for managing lymphedema.[33] This review concluded that various forms of acupressure could be applied to manage lymphedema, including traditional, palpating, electro-acupressure, and magnetic acupressure. Henneghan et al. reviewed the complementary and alternative medicine therapies for managing symptoms of late effects following breast cancer treatments.[21] However, no studies on acupressure for lymphedema were involved in this review. Additionally, Fu MR conducted a qualitative study exploring the experiences of Chinese American breast cancer survivors in managing lymphedema, revealing that participants experimented with Chinese medicine such as acupuncture, acupressure, wax massage, elevation, or herbs during the management of lymphedema.[20] Details of the included studies are presented in Table 1.

Characteristics of study participants

For the 12 original research studies,[19,20,22–25,28–30,32–34] the sample size ranged from 13 to 200, with a total of 1024 participants. Eleven out of the 12 studies focused on breast cancer survivors, with four studies specifically recruiting breast cancer survivors diagnosed with upper limb lymphedema. The three review articles focused on breast cancer survivors, cancer patients, and patients with or at risk of lymphedema, respectively.[21,26,27] The report article did not specify the targeted population. The mean age of participants ranged from 45.50 to 59.30 years. Details are shown in Tables 1 and 2.

Study interventions and control

Among the 11 interventional studies, nine utilized acupressure (acupoint massage),[19,22–24,28,30,32–34] one employed tuina,[29] and one utilized Transcutaneous Electrical Acupoint Stimulation (TEAS).[25] 8 studies[23–25,28,30,32–34] mainly focused on the effects of lymphedema prevention, while three studies[19,22,29] focused on the effects of lymphedema treatment. In each study, several acupressure points were selected, ranging from 3 to 11. In total, 33 points were chosen across the 11 included interventional studies that reported detailed acupressure regimens. Among these points, the most frequently utilized ones were Neiguan (PC 6), Hegu (LI 4), Jianjing (GB 21), Quchi (LI 11), Chize (LU 5), Shousanli (LI 10), Quze (PC 3), and Jianzhen (SI 9). The frequently used points are shown in Table 3, along with their location and function. Each session lasted from 15 to 30 min. The average duration of the interventions was two to four weeks. The frequency of acupressure ranged from twice a week to twice per day (Table 3).

Only three studies provided details on the interventionists involved in administering acupressure.[23,29,32] In Wang's study, tuina and moxibustion were performed by well-trained doctors.[29] In the study by Li et al., patients were trained to perform acupressure themselves.[23] In Xu LL's study, interventionists were well-trained and qualified nurses.[32] The intervention of the control group mainly consisted of routine care, including education on rehabilitation, functional exercise, and psychological care. Additionally, Li et al. applied acupressure based on the self-manual lymph drainage, which was also used for the control group.[23]

Study outcomes and safety

Lymphedema was identified as the primary outcome in 11 studies. Among those studies, seven studies assessed lymphedema by measuring limb circumferences,[19,23–25,28,29,32] two studies utilized water replacement.[29,34] One study utilized symptom assessment;[22] details were not provided for the remaining studies. The diagnostic criteria for lymphedema varied among the included studies. Three studies used an inter-limb circumference difference $\geq$ 3 cm as the diagnostic criteria;[24,28,32] two used an inter-limb circumference difference $\geq$ 2 cm as the diagnostic criteria.[23,29] Limb motion and function, quality of life measured by Functional Assessment of Cancer Therapy – Breast (FACT-B) or other questionnaires, degree of swelling (measured by visual analog scale, VAS), shoulder joint function, clinical efficacy, adverse events were reported as secondary outcomes. Only one RCT reported on the adverse events associated with acupressure, and it revealed that no adverse events were detected during the treatment.[29] Two review articles reported that acupressure can be non-invasive, safe, and effective for management of lymphedema.[21,25] Li's study assessed inflammatory indicators including TNF-α, IL-10, and NF-kB at pre-surgery, 3 days and 7 days post-surgery, and found that these inflammatory indicators in the intervention group were lower than in the control group at 7 days post-surgery.[24]

Effectiveness of acupressure on lymphedema

The effectiveness of acupressure on lymphedema was consistently demonstrated across the 11 interventional studies, showing improvements not only in lymphedema prevention, lymphedema treatment, but also in limb function and quality of life. Five studies reported significant lymphedema prevention effect of acupressure with a lower incidence of lymphedema in the intervention group compared to the control group.[19,23,30,32,33] One study reported 1/30 lymphedema incidence in the acupressure group compared to 6/30 in the control group.[30] Two studies reported a better efficacy rate of lymphedema treatment for the acupressure intervention,[19,25] such as 72.00% of the acupressure group vs. 55.56% of the control group.[27] Five studies revealed better limb function in the acupressure group compared to the control group.[24,30,32–34] Additionally, quality of life was reported as significantly better in the acupressure group in three studies.[28,30,32]

Discussion

To ensure the vigor of our findings, this scoping review followed the methodological frameworks of Arksey and O'Malley, the Joanna Briggs Institute Methodological Guidelines, and the PRISMA extension for Scoping Reviews. Thirteen out of 16 articles included were published after 2014, reflecting a growing interest in acupressure for CRL. Eleven experimental studies, including randomized and non-randomized trials, demonstrated significant improvements in lymphedema prevention or treatment-related outcomes.[19,22–24,28–30,32–34] Several reviews from the US and UK highlighted acupressure's promise,[21,26,27] and a US qualitative study explored breast cancer survivors' experiences with acupressure for lymphedema.[20]

Acupressure has consistently demonstrated significant effects on limb volume,[19,25,28,31,34] the incidence of lymphedema,[22–24,30,32,33] lymphedema-related symptoms,[25,31] limb function,[24,30,32–34] quality of life,[28,30,32] and certain inflammatory markers, compared to rountine care, manual lymphatic drainage, functional exercise, etc.[24] The occurrence of lymphedema can reduce the range of motion and function of the affected limb, and negatively impact patients's overall quality of life. With the improvement of lymphedema, the limb function and quality of life were also improved. In Lu's study, acupressure showed a 16.44% higher efficacy rate (72.00%) compared to CDT treatment (55.56%),[25] which is the gold standard treatment for lymphedema, consisting of manual lymphatic drainage, compression therapy, exercise, skin care and patient self-care.[6] This study was the only one comparing the effectiveness of acupressure with CDT for lymphedema management, demonstrating that acupressure has advantages in reducing lymphedema, particularly in moderate and severe cases. Acupressure also offers a cost-effective and easily accessible alternative, alleviating swelling as well as associated symptoms such as pain and discomfort. However, given the retrospective design and small sample size of this study, the conclusions should be interpreted with caution and validated through

Table 1
Characteristics of included studies.

No	Author, Year	Country	Study design	Sample size	Participants	Primary outcomes	Other outcomes	Main findings
1	Walters, 2010[27]	UK	Traditional review	87 articles	Cancer patients	NR	NR	Lymphatic massage could be used for CRL as a valid complementary therapy.
2	Fu, 2012[20]	US	Qualitative research	13	BCSs with chronic LE	NR	NR	Participants reported experimenting with Chinese medicine acupressure during the management of LE.
3	Wolfgang Luckmann, 2013[31]	US	Report	NA	NA	NR	NR	This article provided manual instructions on the holistic treatment of LE using acupressure, aromatherapy, and manual lymphatic drainage.
4	Xiaoling Jiang, 2014[22]	China	RCT	60 (TG: 30; CG: 30)	BCSs with LE. Mean age: TG: 45.5 (10.0) years; CG: 46.0 (9.5) years.	Clinical efficacy Criteria: Excellent: Symptoms disappear and LE 100% reduced; Good: Symptoms improve and LE reduced $>$ 50%; Poor: Symptoms improve but LE reduced $\leq$ 50%.	NR	Acupressure showed greater clinical efficacy in the management of LE compared to routine care.
5	Yaqin Zuo, 2014[34]	China	RCT	60 (TG: 30; CG: 30)	BCSs with mastectomy. Mean age: TG: 50.97 (8.40) years; CG: 51.78 (9.25) years.	Arm volume (water replacement) Diagnostic criteria: NR	Shoulder-joint function assessed by shoulder joint function assessment scale	Acupressure significantly reduced arm volume and improved shoulder-joint function compared to the routine care group.
6	Hezhen Yang, 2014[33]	China	Quasi-experimental study (non-RCT)	200 (TG:100; CG:100)	BCSs with mastectomy. Mean age: TG: 50.84 (13.01) years; CG: 55.38 (11.48) years.	LE incidence Diagnostic criteria: NR	Limb function (measured by range of arm motion), post-surgery complications	Acupressure combined with rehabilitation exercise significantly reduced the incidence of LE (8.00% in the intervention group and 36.00% in the control group) and improved limb function compared to rehabilitation exercise alone.
7	Rodrick, 2014[26]	US	Systematic review	38 studies	Patients at risk of or with LE	In Alem and Gurgel (2008),[38] the primary outcome was AC (tape measure) , and a $>$ 2 cm inter-AC difference defined diagnostic criteria.	NR	This review aimed to synthesize the effect of acupressure for LE, but no studies were included to support the conclusion.
8	Henneghan, 2015[21]	US	Traditional review	NA	BCSs	NR	NR	Acupressure was included as a CAM therapy for LE management strategies with no detail.
9	Jing Bi, 2017[19]	China	Quasi-experimental study (pre-post intervention study)	30	Post-surgery ipsilateral BCSs with mean age of 56.3 (9.8) years	AC (tape measure) and clinical efficacy Diagnostic criteria: AC increases of 0.2–1cm was mild increase, 1.1–2.0 cm was moderate increase, and $>$ 2.1 cm was severe increase. Significantly effective: Swelling is completely relieved or reduced by more than one degree. Effective: Swelling is reduced, but not by one degree. Ineffective: Swelling is not improved or worsens.	NR	Acupressure massage combined with Chinese medicine poultices and medium-frequency pulse therapy was effective (67.50%) for LE treatment, and significantly reduced AC.
10	Hui Wan, 2019[28]	China	RCT	60 (TG: 30; CG: 30)	Post-surgery BCSs underwent ALND	LE severity Diagnostic criteria: Inter-AC difference $\geq$ 3 cm, mild LE; 3 cm to 6 cm, moderate LE; $>$ 6 cm, severe LE.	Quality of life, measured by FACT-B	Acupressure significantly reduced LE severity and improved patients' quality of life.
11	Hailin Wang, 2019[30]	China	Quasi-experimental study (non-RCT)	60 (TG: 30; CG: 30)	BCSs with mastectomy. Mean age: TG: 48.0 (5.1)	Incidence and severity of LE Diagnostic criteria: NR	Limb function and quality of life assessed by questionnaire	Acupressure could significantly reduce the incidence of LE (1/30 in the

(*continued on next page*)

Table 1 (*continued*)

No	Author, Year	Country	Study design	Sample size	Participants	Primary outcomes	Other outcomes	Main findings
					years; CG: 48.5 (5.2) years.			acupressure group, 6/30 in the control group), improve limb function and quality of life compared to routine care.
12	Cheng Li, 2020[23]	China	Quasi-experimental study (non-RCT)	64 (TG: 32; CG: 32)	BCSs with more than three lymph nodes dissected	LE incidence and severity Diagnostic criteria: Inter-AC difference ≥ 2 cm was defined as LE, 2–5 cm as mild LE, > 5 cm as moderate/severe LE.	NR	Acupressure combined with self-drainage massage significantly reduced the incidence of LE (3.10%) compared to self-drainage alone (16.70%).
13	Ran Li, 2022[24]	China	RCT	74 (TG: 37; CG: 37)	BCSs aged 18–45 years.	AC (tape measure) Diagnostic criteria: AC increase > 3 cm, mild LE; 3–5 cm, moderate LE; > 5 cm, severe LE.	Limb function (measured by range of motion and handgrip dynamometer), inflammatory indicators including TNF-α, IL-10, NF-kB	Acupressure could significantly reduce the incidence of LE (2/37 in the aacupressure group, 9/37 in the control group) and improve limb function, as well as lower inflammatory indicators.
14	Lu, 2023[25]	China	Retrospective cohort study	52 (TG: 25, CG: 27)	BCSs with LE. Mean age: CG: 52.56 (9.88) years, TG: 50.52 (10.12) years	AC (tape measure) Diagnostic criteria: NR	Swelling assessed by VAS scores; clinical efficacy by self-developed criteria	TEAS combined with warm acupuncture effectively (72.00%) reduced AC and swelling of the affected arm in patients with LE compared to the control group (CDT) (55.56%).
15	Lingling Xu, 2022[32]	China	RCT	165 (TG: 84; IG: 81)	BCSs with radical mastectomy. Mean age: TG: 48.35 (7.12) years; CG: 47.14 (6.46) years	Incidence of LE Diagnostic criteria: Inter-AC difference < 3 cm, mild LE; 3–5 cm, moderate LE; > 5 cm, severe LE.	Limb function (measured by range of arm motion), and quality of life (assessed by FACT-B)	Acupressure could significantly reduce the incidence of LE (6/84 in the intervention group and 13/81 in the control group), improve limb function and quality of life compared to routine care.
16	Wang, 2023[29]	China	Cross-over RCT	35 (TG: 17, CG:18)	Female BCSs with LE. Mean age: TG: 58.45 (5.92) years; CG: 59.30 (7.06) years.	Arm volume (cylinder) and AC (tape measure) Diagnostic criteria: ≥2 cm inter-AC difference, or≥120 ml inter-arm VD	Swelling assessed by VAS scores	Compared with CDT, tuina combined with moxibustion significantly reduced arm volume, AC and severity of swelling.

NA, not available; NR, not reported; RCT, randomize controlled trial; LE, lymphedema; ALND, axillary lymph nodes dissection; CG, control group; TG, treatment group; CRL, cancer-related lymphedema; BCSs, Breast cancer survivors; AC, Arm circumference; VD, volume difference; CAM, Complementary and Alternative Medicine; TEAS, Transcutaneous electrical acupoint stimulation; VAS, Visual Analog Scale; FACT-B, Functional Assessment of Cancer Therapy – Breast; CDT, Comprehensive Decongestive Therapy.

future research. Biological pathophysiological factors and genetic factors have been identified as contributing to the developments of lymphedema,[35,36] including cytokines such as IL-15 and IL-3. Inflammation is well established as a risk factor for limb lymphedema.[37] However, only one study in this review explored the effects of acupressure on inflammation, demonstrating a reduction in inflammatory factors, including TNF-α, NF-kB, and IL-10, which were significantly lower in the acupressure group compared to the control group.[24] This exploration into acupressure's impact on inflammation provides a foundation for understanding its mechanisms in lymphedema management. Based on the included studies, acupressure offers considerable flexibility in terms of practitioner, setting, and timing. It can be administered by trained nurses, patients, or their caregivers in outpatient clinics or at home. Li's study demonstrated that patients' self-administered acupressure combined with self-manual lymph drainage had positive outcomes compared to the control group.[23] As reported by a systematic review, self-acupressure has emerged as a promising intervention for cancer symptom management, such as fatigue, pain, and nausea.[9] Given the lifelong risk and incurable nature of CRL, exploring self-acupressure for prevention and treatment could be beneficial.

The findings of this scoping review could provide some practical guidance on the selection of acupoints, dosage, interventionists, and other relevant factors for the development of intervention protocols for future trials. The selection of acupoints is particularly important for the effectiveness of acupressure. Neiguan (PC 6), Hegu (LI 4), Jianjing (GB 21), Quchi (LI 11) and Chize (LU 5), emerged as the most commonly utilized acupoints among the studies included. From the perspective of Traditional Chinese Medicine, breast cancer surgery can lead to physiological dysfunction or weakness, resulting in the accumulation of pathogenic factors that disturb the balance of Yin and Yang, obstruct meridians, and impede the flow of Qi and blood, consequently causing various issues.[24,28] The location of breast cancer surgery in the chest area aligns with the pathway of the Hand Taiyin meridian. Specific acupoints, such as Jianjing (GB 21), Quchi (LI 11), Hegu (LI 4), Neiguan (PC 6), Chize (LU 5) and Shousanli (LI 10), are utilized to address symptoms like shoulder and scapular pain, upper limb paralysis, shoulder and back numbness, inability to lift the arm, shoulder and elbow joint pain, limb paralysis, and muscle spasms. These acupoints, when combined, promote meridian circulation, alleviate pain, dissipate blood stasis, relax tendons, relieve muscle spasms, and enhance joint mobility.[24,30] Additionally, acupressure on these points can adjust Qi and blood and harmonize Yin and Yang.[23,32,33] The dosage and duration of acupressure varied among included studies, generally ranging from 15 to 30 minutes per session, administered twice daily to twice weekly, over a period of two to four weeks. However, due to the limited number of studies and the absence of direct comparisons between different dosages and durations, this study cannot provide specific recommendations. Further research is needed to establish optimal intervention parameters. Currently, we suggest that the acupressure protocol should be developed in collaboration with professional acupressure therapists.[23,24,28,32,33]

Table 2
Information on the intervention.

No	Author, Year	Intervention						Control
		Type	Acupoints	Duration of the session	Duration of the program	Procedure	Safety	
1	Walters, 2010[27]	NA	NA	NA	NA	NA	NR	NA
2	Fu, 2012[20]	NA	NA	NA	NA	NA	NR	NA
3	Wolfgang Luckmann, 2013[31]	NA	NA	NA	NA	NA	NR	NA
4	Xiaoling Jiang, 2014[22]	Acupressure and routine care	LI 4, P 6, GB 21, LU 1, LU 4	30 times/min for each acupoint	Twice a day, for 15-20 d.	From the 1st day after surgery to the 2nd day after extubation, use the thumb to press and massage LI 4 and P 6, and massage the outer and inner sides of the affected upper arm 30 times/min for 5 minutes. Starting from the 8th week after surgery, massage the shoulders, chest, and back, and tap acupoints GB 21, LU 1, and LU 4.	NR	Routine care
5	Yaqin Zuo, 2014[34]	Acupressure and limb function exercise	LI 1, C 6, LU 5, PC 3, GB 21	25 min/session	Twice a day, once at 9:00 and once at 15:00, for 10 days.	**Finger-pressing**: Press LI 1 for 1 minute. **Rubbing**: Pressing inward and downward with thumb until the patient feels soreness and warmth, then rotate and rub at 120 times per minute for 3 minutes. Massage PC 6, LU 5, PC 3, GB 21 in sequence for 12 minutes, adjusting pressure based on patient tolerance.	NR	Limb function exercise
6	Hezhen Yang, 2014[33]	Acupressure combined with routine education on rehabilitation and exercise.	GB 21, LI 11, and LI 4	30 times/min for 5 mins	Twice a day, for 15–20 days	Press the thumb vertically on the acupoint, applying and releasing pressure 30 times per minute until a "De-qi" sensation is felt. Massage GB 21, LI 11, and LI 4 for five minutes each, then knead and tap each acupoint for five minutes from top to bottom.	NR	Routine education on rehabilitation and exercise
7	Rodrick, 2014[26]	NA	NA	NA	NA	NA	NR	NA
8	Henneghan, 2015[21]	NA	NA	NA	NA	NA	Acupressure is non-invasive, safe and effective.	NA
9	Jing Bi, 2017[19]	Acupressure combined with Chinese medicine compresses and medium-frequency pulse intervention	LR 13, HT 1, Ex-UE 8, LI 15	Medium-frequency pulse intervention for 20 min/session.	NR	Acupressure: Before the massage, clear the lymph nodes in the torso by pushing from LR 13 to HT 1 for 5 minutes. Knead the affected armpit for 2 minutes. Massage from the back of the hand to the shoulder (Ex-UE 8 to LI 15) for 5 minutes. End with three slow, deep breaths. Then, apply herbal poultice and use medium-frequency pulse heat therapy.	NR	NA
10	Hui Wan, 2019[28]	Routine care and acupoint massage	PC 6, TE 5, LI 11, HT 3, LI 4, LI 10, TE 14, LI 15, LI 18	NR	Once per day, duration not reported.	Three weeks after surgery, press and massage the acupoints moving from distal to proximal.	NR	Routine care
11	Hailin Wang, 2019[30]	Acupressure	LU 11, PC 6, LU 5, PC 2	Each session lasting 1–2 minutes.	2-3 times/ day, total duration was not reported.	The operator applied pressure to LU 11, PC 6, LU 5, PC 2 by rotating the thumb until the patient felt soreness and warmth. Then, patients performed three slow, deep breaths.	NR	Routine care (education, guidance on function exercise, psychological care)
12	Cheng Li, 2020[23]	Acupressure and self-manual lymph drainage administered	PC 7, PC 6, TE 5, LU 5, PC 3	Each acupoint for 30 s.	Once a day, total duration was not reported.	Acupressure massage: use the thumb to apply inward and downward pressure on acupoints, adjusting for patient comfort. Massage each	NR	Self-manual lymph drainage

(*continued on next page*)

Table 2 (*continued*)

No	Author, Year	Intervention						Control
		Type	Acupoints	Duration of the session	Duration of the program	Procedure	Safety	
						acupoint for 30 seconds, once daily. Perform acupressure to clear the meridians before self-lymphatic drainage.		
13	Ran Li, 2022[24]	Acupressure combined with the early rehabilitation training.	GB 21, LI 11, LI 10, LI 4, SI 9, GB 20, ST 36, SP 6	2–3 min for each point	Twice a day, for 3 months	First, use the palm to tap the acupoints continuously for 2–3 minutes. Then, accurately knead the points with the thumb, alternating between clockwise and counterclockwise motions until the patient feels a tingling sensation. Massage each point for 2–3 minutes. Finally, tap and knead each acupoint for 3–5 minutes.	NR	Early rehabilitation training
14	Lingling Xu, 2022[32]	Acupressure	SI 9, GB 21, LI 11, LI 10, LI 4	15–25 minutes/ session	Twice daily (morning and evening), until discharge.	Acupressure began 24 hours postoperatively. Pressure was applied using the thumb, followed by alternating clockwise or counterclockwise rubbing, until the patient felt local soreness, numbness, or distension. Each acupoint was massaged for 3–5 minutes at a frequency of 30–45 times per minute.	NR	Routine care
15	Wang, 2023[29]	Tuina combined with moxibustion	SI 9, TE 5, LI 11, LU 5, PC 6, and HT11	Tuina for 20 mins and moxibustion for 20 mins.	Twice every week, for 4 weeks.	Week 1–4: Tuina and moxibustion were performed by well-trained doctors; tuina of the affected arm: Acupoints were gently pressed for 3–5 seconds every time. Entire operation repeated 3 times. Week 7–10: Pneumatic circulation and compression garment applied. Repeat 3 times.	No adverse events	Pneumatic circulation and compression garment
16	Lu, 2023[25]	TEAS combined with warm acupuncture	SJ 2, HT 1, HT 3, LI 10, PC 6, PC 2, PC 3, LU 5, SJ 5, Ashi acupoints.	30 min/session	Twice a week, for 4 weeks.	Acupuncture was inserted at Yemen (SJ 2) 10–15 mm parallel to the finger. Other acupoints were punctured 15–20 mm, followed by neutral reinforcement and reduction after De-qi. TEAS was applied at HT 1, HT 3, LI 10 and PC 6, with a frequency of 2/100 Hz and intensity was adjusted based on patient tolerance. Warm acupuncture was used at PC 2, PC3, LU 5, SJ 5, and Ashi acupoints.	Minor adverse events: Subcutaneous hematomas at acupoints	CDT

NA, not available; NR, not reported; TEAS, transcutaneous electrical acupoint stimulation; CDT, comprehensive decongestive therapy.

Implications for nursing practice and research

As acupressure has showed promising effects in the management of lymphedema, and considering its convenince and cost-effectiveness, acupressure coule be incorporated into the rountine care for CRL management. Oncology nurses could be trained to apply acupressure in clincal practice. Additionally, since there is no evident complications associated with acupressure, breast cancer patients and their caregivers can be trained to perform acupressure by themselves following instructional videos or brosure, either at home or during the longterm survivorship.

To enhance the body of knowledge on acupressure for lymphedema management, standardized protocols are needed regarding acupoints, dosage, frequency, and duration. While we didn't formally assess the quality of the included studies, certain methodological issues were noted, such as a lack of randomization, and absence of sample size calculations, etc. Future research should focused on rigorously designed RCTs with well-defined control groups, clear randomization, and robust blinding methods to improve the transparency and reproducibility of acupressure in lymphedema management. Moreover, future studies should include diverse populations beyond China to ensure the generalizability of findings. In addition, we suggest a mixed-methods approach, integrating both quantitative and qualitative perspectives, to better understand the effects of acupressure and patients' experiences with this intervention.

Limitations

The findings of this scoping review should be interpreted within the context of its limitations. Despite encouraging findings, all of the intervention studies originated in China and were published in Chinese. Publications in English were predominantly review papers that included acupressure in this context[21,26,27] and one abstract of a qualitative study conducted in the US, which explored the experiences of breast cancer

Table 3
Frequently used acupoints among the included studies.

Acupoints	Number of papers used	Function[39]	Location[39]
Neiguan (PC 6)	6[23,25,28-30,34]	Regulates the heart and calms the spirit, alleviates nausea and vomiting, opens the chest and treats cardiac pain, regulates the qi and alleviates pain.	Anterior forearm, 2 cun above the transverse crease of the wrist, between the tendons of palmaris longus and flexor carpi radialis.
Hegu (LI 4)	5[24,25,28,32,33]	Balances defensive qi and regulates sweating, expels wind and releases the exterior, alleviates pain, restores yang energy.	Dorsum of the hand, between first and second metacarpal bones, at the midpoint of the second metacarpal bone, close to its radial border.
Jianjing (GB 21)	5[22,24,32-34]	Balances and activates qi, alleviates pain, decreases phlegm, cleanses nodules, promotes breast health.	Posterior shoulder, midway between the acromion and the spine of the scapula, at the highest point of the shoulder.
Quchi (LI 11)	5[24,28,29,32,33]	Clears heat, cools the blood, eliminates wind, alleviates itching, regulates and activates qi, and alleviates pain.	Lateral end of the transverse cubital crease, midway between Chize (LU 5) and the lateral epicondyle of the humerus.
Chize (LU 5)	5[23,25,29,30,34]	Clears heat from the lungs and calms aggravated qi, regulates the water passages, relaxes the tissues and alleviates pain.	Cubital crease of the elbow, in the depression at the radial side of the tendon of biceps brachii.
Shousanli (LI 10)	4[24,25,28,32]	Regulates and activates qi and blood, alleviates pain, harmonizes the intestines and stomach.	Radial side of the forearm, 2 cun below the cubital crease, on the line connecting Quchi (LI 11) and Hegu (LI 4).
Quze (PC 3)	3[23,25,34]	Clears excess heat, provides nutritive action, regulates blood levels, harmonizes the stomach and intestines, stops vomiting, and alleviates pain.	Transverse cubital crease, in the depression medial to the ulnar side of the aponeurosis of the biceps brachii muscle.
Jianzhen (SI 9)	3[24,29,32]	Expels wind, promotes shoulder health, alleviates pain.	Posterior aspect of the shoulder, 1 cun above the posterior axillary crease when the arm hangs in the adducted position.
Shaohai (HT 3)	2[22,25]	Calms the spirit, regulates phlegm, clears excess heat, benefits the arm.	Medial end of the transverse cubital crease when the elbow is fully flexed, in the depression anterior to the medial epicondyle of the humerus.
Waiguan (TE 5)	2[28,29]	Expels wind, benefits the head and ears, opens the "Yang Linking vessel", clears excess heat, and alleviates pain.	Dorsal aspect of the forearm, 2 cun proximal to the dorsal crease of the wrist, between the radius and the ulna.

survivors managing lymphedema.[20] Moreover, our scoping review results were hindered by the variations in study designs and measurements and incomplete intervention procedure descriptions (e.g., specific acupoints, dosage, and intervention providers), which complicated drawing precise conclusions about the acupressure's efficacy. Additionally, the lack of quality appraisal and quantitative indices for the included studies, which, while not required by scoping review guidelines, may affect the robustness of the conclusions.

Methodological shortcomings, such as unclear randomization and inconsistent lymphedema diagnoses and measurements, highlighted the need for rigorous research and RCTs. Additionally, the scarcity of English-language studies underscored the need for more publications in English to validate acupressure's efficacy in managing lymphedema. This will ensure broader dissemination of research findings, facilitate international collaboration, and promote evidence-based practice in other countries.

Furthermore, our review could not elucidate the mechanism of acupressure in treating lymphedema due to the limitations of the included studies, which did not investigate the underlying mechanisms. While acutherapy has gained popularity globally, its mechanism remains under investigation. The traditional theory relies on meridians, which are scientifically undetectable energy pathways.[10] Only one study in this review reported lower inflammatory biomarkers in the acupressure group compared to the control group.[24]

Lastly, although we aimed to include studies with diverse populations, the majority of the included studies focused on breast cancer-related lymphoedema, predominantly affecting the upper limb. This focus limits the generalizability of the findings to other cancer populations or types of lymphoedema, such as lower limb lymphoedema. Future research should expand the scope to include more diverse populations and conduct high-quality primary studies to explore lymphoedema management in patients with other types of cancer.

Conclusions

The present review, systematically summarized the current evidence from 16 articles on acupressure for CRL, demonstrating its promising effectiveness in managing the condition. The findings provide valuable insights into the potential clinical application of acupressure, including key elements such as acupoint selection, dosage, and the qualifications of practitioners. By offering an initial framework for integrating acupressure into CRL care, this review contributes to the growing body of knowledge in this area. However, as the majority of the evidence comes from studies conducted in China, future research is crucial to validate these findings across more diverse populations. High-quality, well-powered RCTs with rigorous design are necessary to confirm the effectiveness of acupressure and ensure its broader applicability in CRL management.

CRediT authorship contribution statement

Aomei Shen: Conceptualization, Methodology, Software, Data Curation, Writing – Original Draft, Visualization; Mingfang Li: Data Curation, Writing – Review & Editing; Hongting Ning: Investigation, Writing – Review & Editing; Gyumin Han: Writing – Review & Editing; Giulia Castelli: Writing – Review & Editing; Wanmin Qiang: Supervision, Writing – Review & Editing; Qian Lu: Supervision, Writing – Review & Editing; Nada Lukkahatai: Conceptualization, Supervision, Data Curation, Writing – Review & Editing, Visualization. All authors had full access to all the data in the study, and the corresponding author had final responsibility for the decision to submit for publication. The corresponding author attests that all listed authors meet authorship criteria and that no others meeting the criteria have been omitted.

Ethics statement

Not required.

Funding

This study was supported by grants from the National Natural Science Foundation of China (Grant No. 72174011), and Nursing Innovation Talent Fund of Tianjin Medical University Cancer Institute and Hospital (Grant No. HL2021-27). Tianjin Key Medical Discipline (Specialty) Construction Project (TJYXZDXK 011A). The funders had no role in considering the study design or in the collection, analysis, interpretation of data, writing of the report, or decision to submit the article for publication.

Data availability statement

The data that support the findings of this study are available from the corresponding author, QL, upon reasonable request.

Declaration of generative AI and AI-assisted technologies in the writing process

No AI tools/services were used during the preparation of this work.

Declaration of competing interest

The authors declare no conflict of interest. The corresponding author, Prof. Qian Lu, is an editorial board member of *Asia–Pacific Journal of Oncology Nursing*. The article was subject to the journal's standard procedures, with peer review handled independently of Prof. Lu and their research groups.

Acknowledgments

We are grateful for the support that was provided by the China Scholarship Council and the Center for Global Initiatives at Johns Hopkins University School of Nursing. Thanks, also, to Nezar Ahmed Salim for his help in revising the manuscript.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.apjon.2025.100669.

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