

Current evidence of acupuncture for symptoms related to breast cancer survivors

A PRISMA-compliant systematic review of clinical studies in Korea

Tae-Hun Kim, KMD, PhD^a, Jung Won Kang, KMD, PhD^b, Myeong Soo Lee, PhD^{c,*}

Abstract

Background: Breast cancer survivors experience various symptoms associated with their cancer interventions, and the benefits of acupuncture for these symptoms have been evaluated in clinical trials worldwide. The purpose of this review was to discuss the current status of clinical research regarding the use of acupuncture as a part of traditional Korean medicine (KM) for various symptoms associated with breast cancer therapies.

Methods: We conducted a systematic review of the literature regarding the use of acupuncture as a part of traditional KM to treat symptoms associated with breast cancer therapies. The following databases were searched for content up to February 2017: MEDLINE, EMBASE, the Cochrane library, 4 Korean databases, and conference proceedings from major Korean medical societies.

Results: Among the 1228 identified articles, 8 observational studies (3 case series and 5 case reports), and 1 randomized controlled trial (RCT) were included in this review. Among these studies, 3 investigated lymphedema, 2 investigated chemotherapy-induced peripheral neuropathy, 1 investigated hot flushes, 1 investigated constipation, and 2 investigated miscellaneous symptoms in breast cancer survivors; all studies concluded that acupuncture can alleviate the symptom in question. However, we identified only 1 relevant RCT, and the included studies had limitations in terms of reporting quality.

Conclusion: There is a lack of conclusive evidence regarding the benefits of acupuncture for the treatment of breast cancer survivors in Korea. More rigorous RCTs are necessary in the future to establish stronger clinical evidence regarding the use of acupuncture to better reflect the clinical context of Korea.

Abbreviations: CIPN = chemotherapy-induced peripheral neuropathy, KM = Korean medicine, MD = mean difference, RCT = randomized controlled trial, RR = risk ratio, SR = systematic review, VAS = visual analog scale.

Keywords: acupuncture, breast cancer, clinical studies, Korean medicine, systematic review

1. Introduction

Breast cancer is a common disease in women, and its prevalence is currently increasing very rapidly in Korea; specifically, according to a recent statistical report on cancer in Korea, the incidence rate of breast cancer increased from 20.9 in 1999 to 44.7 in 2012, which corresponds to an increase in the annual incidence rate by 6.1% per year.^[1] In the same study, the 5-year relative survival

rate among breast cancer patients was 91.3%, indicating that women with breast cancer are expected to survive for a long time after their initial diagnosis.

Most breast cancer survivors experience various treatment-related symptoms from several months to years after their cancer treatment, and these symptoms significantly lower their quality of life.^[2] The most frequent symptoms are psychosocial distress, vasomotor complications (such as hot flushes), vaginal dryness (sexual dysfunction), arthralgia (after treatment using aromatase inhibitors), insomnia, fatigue, and cognitive impairments.^[3] Considering the relatively long life expectancy of breast cancer survivors, there is a need for appropriate strategies for managing these treatment-related symptoms. In this regard, acupuncture is currently used as an adjunctive treatment, and clinical trials have been conducted in many countries, including the United States and European countries, to evaluate the effectiveness and safety of acupuncture.^[4–6]

However, the results of clinical studies regarding the effectiveness of acupuncture in 1 country should be interpreted cautiously when applied to other countries. In particular, clinicians should avoid adopting new strategies solely on the basis of evidence from such studies, because the evidence may not accurately reflect real-world situations in different contexts.^[7] Acupuncture is a complex intervention whose effectiveness is considerably influenced by many factors, namely, medical tradition, environment, cultural specificity, and heterogeneity

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^a Korean Medicine Clinical Trial Center, Korean Medicine Hospital, ^b Department of Acupuncture and Moxibustion, College of Korean Medicine, Kyung Hee University, Dondaemun-gu, Seoul, ^c Clinical Medicine Division, Korea Institute of Oriental Medicine, Daejeon, South Korea.

* Correspondence: Myeong Soo Lee, (e-mail: drmslee@gmail.com).

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in acupuncture practice. In this regard, the critical appraisal of clinical studies concerning the use of acupuncture in traditional Korean medicine (KM) is meaningful for assessing the positive and negative effects of the treatment. Furthermore, the evidence must be assessed based on the real-world context for the use of acupuncture for breast cancer survivors in Korea.

A scoping study, representing preliminary investigation of the depth and breadth of existing evidence thorough extensive literature review, is one of the essential components in designing clinical studies.^[8] Scoping studies are helpful for developing hypotheses and research plans. Thus, the purpose of this review was to discuss the current status of clinical research on the use of acupuncture as a part of traditional KM for treating various symptoms associated with breast cancer therapy, as well as to use this information for planning future clinical studies.

2. Methods

We conducted a systematic review (SR) of clinical studies on the use of acupuncture as a part of traditional KM to treat symptoms associated with breast cancer interventions. This study was a SR which did not use individual patient's data directly so ethical approval by institutional review board was not necessary. The study population of this review consisted of breast cancer survivors who had undergone breast cancer therapy, including mastectomy, chemotherapy and radiation therapy, and had experienced therapy-related symptoms, namely, arthralgia after aromatase inhibitor treatment, vasomotor symptoms caused by antiestrogen therapy (i.e., hot flushes and sweating), vaginal symptoms (i.e., vaginal dryness and sexual dysfunction), lymphedema, pain after mastectomy, and other miscellaneous symptoms. In this review, acupuncture was defined as needle insertion into the skin, regardless of needle material and type, stimulation method, or concomitant interventions such as bee venom acupuncture, pharmacopuncture, or catgut-embedding therapy. The present review included both studies that used single interventions and studies that used complex treatments. As comparators for randomized controlled trials (RCTs), we included any type of conventional treatments such as drug therapies and physiotherapies as well as sham or placebo controls. The main clinical outcomes included individual symptoms such as pain, disability, and quality of life, as well as adverse events associated with breast cancer treatment. All types of clinical study were included—RCTs, epidemiological studies, and observational studies such as case studies and case series. However, experimental studies and review articles regarding acupuncture were excluded from the present study.

The following databases were searched for content up to February 2017: MEDLINE, EMBASE, the Cochrane library, Korean databases including the Oriental Medicine Advanced Searching Integrated System, which enables the most comprehensive literature search regarding KM, the National Digital Science Library, DBpia, and Korean Studies Information Service System. Conference proceedings from major academic societies, namely, proceedings from the Society of KM (1999–2011) and the Korean Acupuncture and Moxibustion Medicine Society, were manually searched as gray literature. The search strategy used the key words “acupuncture,” “Korean Medicine,” and “breast cancer” and was principally based on individual database-specific structure. The search strategy for MEDLINE was as follows:

(Breast Neoplasms [MeSH] OR Breast [tiab] OR Mammary [tiab]) AND (Neoplasms [MeSH] OR Neo-plasms* [tiab] OR Cancer* [tiab] OR Tumor* [tiab] OR Carcinoma [MeSH] OR

Carcinoma* [tiab] OR Adenocarcinoma* [tiab] OR Sarcoma [MeSH] OR Sarcoma* [tiab]) AND (acupuncture OR electro-acupuncture OR electro-acupuncture OR pharmacopuncture OR pharmacopuncture OR moxibustion OR acupressure)

Both authors (T-HK and JWK) participated in data extraction. Information regarding study design, population, symptom type, interventions, and outcomes was extracted from the studies. The quality of each study was assessed based on the study design; to this end, risk of bias assessment was used for RCTs. Domains including sequence generation, allocation concealment, blinding of participants, blinding of outcomes assessors, incomplete outcome data, selective reporting and other bias were assessed, and the risk of bias of each domain was decided as low, high, or unclear based on the Cochrane Collaboration guidelines.^[9] The quality appraisal tool produced by Moga et al^[10] was used for case series. Each item in this tool can be categorized based on the answer “yes,” “unclear” (or “partially reported”), or “no” to assess the reporting quality of the case series; the answers depend on the appropriateness of the reported information.

The reporting quality of case reports was assessed in accordance with the CARE guidelines; the quality of each item reported in a study can be considered “good” if the item is sufficiently reported, “insufficient” if the item is reported, although inadequately, or “not reported” if there is no mention of the item.^[11]

We aimed to conduct a meta-analysis if enough studies were identified for each symptom. We used the risk ratio (RR) for dichotomous outcomes and mean difference (MD) for continuous outcomes as summary estimates. Considering the expected clinical heterogeneity of acupuncture methods, we aimed to use a random effect model for this meta-analysis. If there were not enough RCTs for meta-analysis, we aimed to do a narrative review based on the research design. We summarized the study characteristics and effectiveness of acupuncture based on the individual results of the included studies.

A quick review of published SRs up to 2016 in MEDLINE using keywords including “breast cancer” and “acupuncture” provided the current global evidence on the effect of acupuncture for symptom management in breast cancer survivors. Here, we have identified and summarized the latest evidence regarding the use of acupuncture for the management of each symptom observed in breast cancer survivors with the aim of comparing studies from Korea with those from other countries.

3. Results

Electronic database searching and manual searching of gray literature yielded a total of 1228 articles. After a primary screening that involved reading the titles and abstracts, the full-texts of 25 studies were assessed for eligibility, and 9 studies were finally included in this review (Fig. 1).^[12–20] Among these, 3 were case series,^[13,14,19] 5 were single-case reports,^[12,15–18] and only 1 was a RCT.^[20] Three studies investigated lymphedema,^[12,14–15] 2 investigated chemotherapy-induced peripheral neuropathy (CIPN),^[18,19] 1 investigated hot flushes,^[13] 1 assessed constipation,^[20] and 2 investigated miscellaneous symptoms (nausea, CIPN, dryness of mouth, etc., Table 1).^[16,17] The excluded studies are listed in Supplementary 1, <http://links.lww.com/MD/C390>.

3.1. General characteristics and methodological quality of the included studies

Most studies involved manual acupuncture to treat the respective symptoms,^[12–17] and only 1 study used electro-acupuncture.^[15]

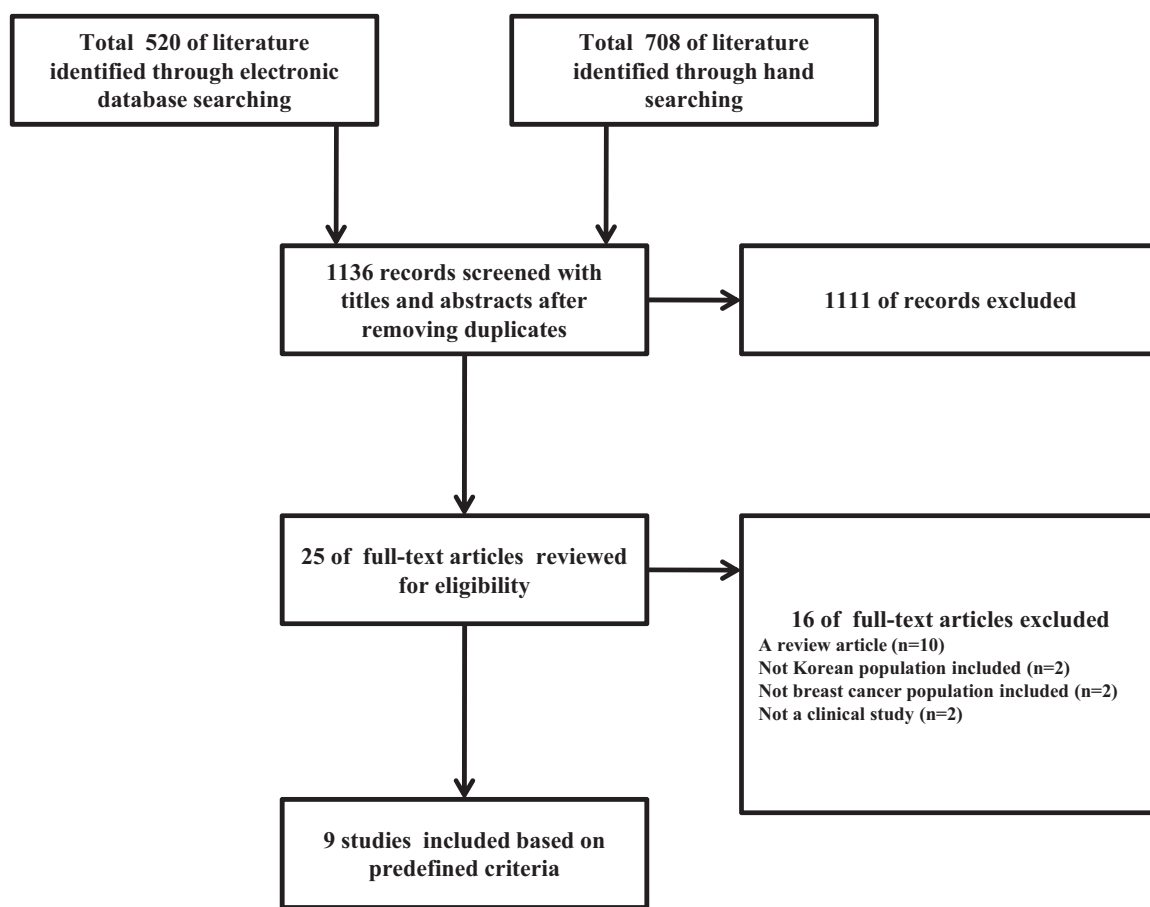


Figure 1. Study flowchart.

One study adopted electric acupoint stimulation,^[18] and another study used auricular acupressure by the patients' own hands.^[20] In 1 study, both acupotomy and pharmacopuncture were used.^[12] Treatment durations differed among the studies—from 12 days^[12] to approximately 5 months (intermittent).^[16] Most studies were observational studies, and only 1 study included a control group (Table 1).^[20] In most studies, fixed acupuncture points were selected; only 1 study involved semifixed points based on pattern identification in patients.^[14] The selected acupuncture points also varied across the studies. In many studies, concomitant interventions such as herbal medications,^[15–17] physiotherapy,^[12,16,17] moxibustion,^[16,17] or cupping therapies were offered to the patients during the treatment sessions (Table 2).^[15]

With regard to the quality assessment of the included case series, most items were appropriately reported in the included studies.^[13,14,19] However, the aims of the studies were not appropriately reported in all case series, and study results were not presented with effect estimates with confidence intervals. In addition, there was inadequate information regarding whether the cases were collected from more than 1 center (Table 3).^[13,14] Among the single-case reports, most did not report or insufficiently reported information regarding patient history, diagnostic methods, diagnostic challenges, diagnostic reasoning, changes in interventions during treatment, intervention adherence, adverse events, study strengths and limitations, relevant literature, rationale for the conclusions, patient's opinions on the received treatments, and informed consent (Table 4).^[12,15–18] Regarding the risk of bias assessment in the 1 RCT, most domains

exhibited a low risk of bias except incomplete outcome data, which had a high risk of bias because the data for 4 patients were excluded in the analysis after their withdrawal from the study.^[20]

3.2. Effectiveness of acupuncture for the management of individual symptoms in Korean breast cancer survivors

Each study recorded both subjective and objective outcomes to assess the patients' conditions; for example, forearm circumference in lymphedema,^[12,14,15] severity and frequency of hot flushes,^[13] pain and quality of life associated with CIPN^[18,19] and the presence of each symptom (nausea, CIPN, weakness, dryness of mouth, headache, and constipation) in patients with miscellaneous conditions.^[16,17,20] In patients with lymphedema, changes in the forearm circumference after treatment ranged from 0.5 to 4 cm.^[12,15] In 1 prospective case series, the mean score, based on a 0 to 100 visual analog scale (VAS), and the circumference of the upper arm significantly improved with acupuncture; however, lymphedema stage did not significantly change after treatment.^[14] In patients experiencing hot flushes, significant differences after treatment were reported using a 0 to 100 VAS for the severity of hot flushes (MD -52 ; $P < .001$) and a 0 to 4 hot flush severity score (MD -1.7 , $P < .001$). Furthermore, the daily frequency of hot flushes significantly decreased after treatment (MD -7.8 ; $P < .001$).^[13] In patients experiencing CIPN, 28 sessions of electro-acupoint stimulation improved upper limb pain (MD -3) and lower limb pain (MD -5) based on a 0 to 10 VAS as well as a 2 to 10 neurotoxicity questionnaire

Table 1
Summary of the included studies.

Study ID	Study design	Total number	Age (mean, SD)	Characteristics of study populations				Interventions			Effect estimates (mean difference before-after treatment in case study or series between RCTs)	Conclusion (quotes from the literature)
				Surgery type	Treatment after surgery	Concomitant conventional treatment	Main symptoms	Acupuncture type	Control intervention	Total duration of treatment		
Jang 2009 ^[2]	Case report	1	51 y	Lumpectomy	Chemotherapy (6 times) radiotherapy (33 times)	Letrozole 2.5mg 1T qd P.O.	Lymphedema	Acupuncture, manual acupuncture, pharmacopuncture	N/A	12 d	Circumference of forearm* -0.5 cm	"Oriental medical treatment with acupuncture . . . has a significant effect in improving symptoms of . . . upper limb lymphedema . . ."
Jeong 2013 ^[3]	Case series	10	46.6 y (4.93)	Unidentified	Chemotherapy (6 patients) radiotherapy (6 patients)	Tamoxifen P.O. (9 patients) anastrozole P.O. (1 patient)	Hot flushes	Manual acupuncture	N/A	4 wk	VAS for the severity of hot flushes (0 to 100) -41.21 Hot flush severity score (0-4) [-2.37, -1.03] Daily frequency of hot flushes [-13.92, -1.68] Rash (1 case) No difference ($p > 0.05$)	"Acupuncture appeared to provide effective relief from hot flushes among Korean women receiving antiestrogen therapy after surgery for breast cancer . . ."
Jeong 2015 ^[4]	Case series	9	58.4 y (7.21)	Either modified radical mastectomy (6) or lumpectomy (3)	Not reported	Not reported	Lymphedema	Manual acupuncture	N/A	6 wk	Significant reduction ($p < 0.001$) VAS (0 to 100)* [-2.37, -1.03] Significant reduction ($p < 0.05$) AEs Lymphangitis (2 cases)	"The Saam acupuncture method appeared to provide reduction of lymphedema . . ."
Kim 2008 ^[5]	Case report	1	52 y	Specific surgery type unidentified	Not reported	Not reported	Lymphedema	Manual acupuncture	N/A	24 d	Circumference of forearm* -4 cm	"We considered Dong-Qi acupuncture . . . had a useful effect on lymphedema . . ."
Kwon 2011 ^[6]	Case report	1	26 y	Partial mastectomy	Chemotherapy (6 times)	Adriamycin/5-fluorouracil	Miscellaneous	Manual acupuncture	N/A	approximately 5 mo (intermittent)	Not assessable	" . . . significant efficacy in aiding breast cancer patients suffering from Adriamycin plus 5-FU chemotherapy-induced adverse effects."
Park 2011 ^[7]	Case report	1	33 y	No surgery	Chemotherapy (5 times)	Adriamycin/cyclozan and Taxol	Miscellaneous	Manual acupuncture	N/A	approximately 4 mo (intermittent)	Not assessable	" . . . TKM's potential efficacy in treating breast cancer patients suffering from anticancer chemotherapy."
Park 2015 ^[8]	Case report	1	56 y	Partial mastectomy	Chemotherapy (16 times) radiotherapy (not reported)	Not reported	CIPN	Electro-acupoint stimulation	N/A	14 d	Nausea (1 to 5)* Dizziness of mouth (1 to 5)* CIPN (1 to 5)* Weakness (1 to 5)* Nausea (1 to 5)* Headache (1 to 5)* Constipation (1 to 5)* Weakness (1 to 5)*	"This case study suggests that electroacupuncture therapy may have significant effect of CIPN in breast cancer patients."
Park 2016 ^[9]	Case series	10	Not reported	Not reported	Not reported	Not reported	CIPN	Not reported	N/A	4 wk	Not assessable	"Acupuncture appeared to provide effective improvement of CIPN among Korean women with breast cancer."
Shin 2016 ^[10]	RCT	52	Not reported	Not reported	Chemotherapy (varying frequencies)	Not reported	Constipation	Acupressure	Usual care	6 wk	CAS (0 to 16) [-6.94, -3.20] BSF (1 to 7) 1.16, 95% CI [0.67, 1.65] PAC-OOL [-1.26, 95% CI [-1.60, -0.92]	"Auricular acupressure was effective at relieving constipation in patients with breast cancer receiving chemotherapy. auricular acupressure was also a safe and acceptable nursing intervention."

AEs = adverse events, BSF = Bristol stool form, CAS = constipation assessment scale, CI = confidence interval, CIPN = chemotherapy-induced peripheral neuropathy, N/A = not applicable, PAC-OOL = patient's assessment of constipation-quality of life, RCT = randomized controlled trial, VAS = visual analog scale.
* Higher scores indicate more severe symptoms.

Table 2
Acupuncture details based on standards for reporting interventions in clinical trials of acupuncture (STRICTA) statements.

Study ID	Acupuncture rationale	Acupoint selection principle	Acupuncture features					Concomitant treatment
			Acupuncture points used	Number of needles	Needle stimulation	Number of sessions	Frequency of acupuncture treatment	
Jang 2009 ^[12]	Textbook	Fixed acupuncture points	Acupotomy: 0.5 cun below PC7, 1.5 cun below HT8, 0.5 and 1.5 cun below LU9 manual acupuncture: SP3, LU9, LU10, and HT8	4 needles for both acupotomy and manual acupuncture	Manual stimulation	Not reported	Once a day	Physiotherapy (pneumatic compression, massage)
Jeong 2013 ^[13]	Experts' opinions and standard acupuncture textbooks	Fixed acupuncture points	GV20, M-HN-3, HT8, KI10, and LV2	8 points	Manual stimulation	12 sessions	3 times a week	None
Jeong 2015 ^[14]	Saam acupuncture	Semifixed acupuncture points according to pattern differentiation	48 different sets of acupuncture points	4–8 needles	Manual stimulation	18 sessions	3 times a week	Not reported
Kim 2008 ^[15]	Dong-Qi acupuncture	Fixed acupuncture points	Tong Shen, Tong Wei, Tong Guan, Tian Huang Fu, Di Huang, and Ren Huang	6 points	Electro-acupuncture	24 sessions	Not reported	Herbal medication and cupping therapy
Kwon 2011 ^[16]	Not reported	Fixed acupuncture points	PC6, SP4, SP6, GB41, S3, LR3, and ST36	7 points	Manual acupuncture	Not reported	Once a day	Herbal medication, moxibustion and physiotherapy
Park 2011 ^[17]	Not reported	Fixed acupuncture points	PC6, SP4, SP6, LI4, LR3, and ST36	6 points	Manual acupuncture	Not reported	Once a day	Herbal medication, moxibustion and physiotherapy
Park 2015 ^[18]	Not reported	Fixed acupuncture points	Both LI4 and SP6	4 points	Electro-acupoint stimulation	28 sessions	Twice a day	Not reported
Park 2016 ^[19]	Not reported	Not reported	Not reported	Not reported	Not reported	Not reported	Not reported	Not reported
Shin 2016 ^[20]	Auricular acupressure	Fixed acupuncture points	Auricular points including intestine, rectum, Sanjiao, spleen, lung, sympathetic, and subcortical regions	7 points	Not reported manual stimulation and Vaccaria seeds	6 wk	3 to 4 times a day	Not reported

Table 3
Quality assessment of the included case series¹⁰.

Items	Jeong 2013 ^[13]	Jeong 2015 ^[14]	Park 2016 ^[19]
Was the hypothesis/aim/objective of the study clearly stated?	Unclear	Unclear	Unclear
Were the characteristics of the study participants described?	Yes	Yes	Unclear
Were the cases collected from more than one center?	No	No	Unclear
Were the eligibility criteria (i.e., inclusion and exclusion criteria) for entry into the study clearly stated?	Yes	Yes	Unclear
Were the participants recruited consecutively?	Unclear	Yes	Unclear
Did participants enter the study at a similar point after disease diagnosis?	Yes	Yes	Unclear
Was the intervention of interest clearly described?	Yes	Yes	Unclear
Were additional interventions (co-interventions) reported in the study?	Yes	Yes	Unclear
Were the outcome measures established a priori?	Yes	Yes	Yes
Were the relevant outcomes measured with appropriate objective and/or subjective methods?	Yes	Yes	Unclear
Were the relevant outcomes measured before and after the intervention?	Yes	Yes	Yes
Were the statistical tests used to assess the relevant outcomes appropriate?	Yes	Yes	Unclear
Was the length of follow-up reported?	Yes	Yes	Unclear
Was the loss to follow-up reported?	Yes	Yes	Unclear
Did the study provide estimates of the random variability in the analysis of relevant outcomes?	No	No	Unclear
Were the adverse events related with the intervention reported?	Yes	Yes	No
Were the conclusions of the study supported by results?	Yes	Yes	Unclear
Were competing interests and sources of support for the study reported?	Yes	Yes	Unclear

Each item can be categorized based on the answer "yes," "unclear," (or "partially reported") or "no" depending on the appropriateness of the reported information.

Table 4
Quality assessment of the included case reports¹¹.

Items	Jang 2009 ^[12]	Kim 2008 ^[15]	Kwon 2011 ^[16]	Park 2011 ^[17]	Park 2015 ^[18]
The term "case report" in the title along with the area of focus.	Good	Good	Good	Good	Good
Two to 5 key words identifying areas covered by the case report.	Good	Good	Good	Good	Good
Introduction—highlighting what is unique about the case and what does the case report add to the medical literature based on the abstract.	Insufficient	Insufficient	Good	Insufficient	Insufficient
The mention of main symptoms of the patients and the important clinical findings in the abstract.	Good	Insufficient	Good	Insufficient	Insufficient
The mention of main diagnoses, therapeutic interventions, and outcomes in the abstract.	Good	Good	Good	Good	Good
Conclusion—the main "take-aways" from the case based on the abstract.	Good	Insufficient	Insufficient	Insufficient	Insufficient
One or 2 paragraphs summarizing why this case is unique with references in the introduction	Not reported	Not reported	Good	Good	Not reported
Deidentification of demographic information and other patient-specific information.	Good	Good	Good	Good	Good
Main concerns and symptoms of the patients.	Good	Good	Good	Good	Good
Medical, family, and psychosocial history including relevant genetic information (also see timeline).	Insufficient	Insufficient	Good	Good	Insufficient
Relevant past interventions and their outcomes.	Good	Insufficient	Good	Good	Good
Description of the relevant physical examination (PE) and other significant clinical findings.	Good	Insufficient	Insufficient	Good	Insufficient
Important information from the patient's history organized as a timeline.	Not reported	Not reported	Good	Good	Insufficient
Diagnostic methods (such as PE, laboratory testing, imaging, and surveys).	Not reported	Not reported	Not reported	Good	Not reported
Diagnostic challenges (such as access, financial, and cultural).	Not reported	not reported	Not reported	Not reported	Not reported
Diagnostic reasoning including other diagnoses considered.	Not reported	Not reported	Not reported	Not reported	Not reported
Prognostic characteristics (such as tumor stage), where applicable.	Not reported	Not reported	Good	Good	Good
Type of intervention (such as pharmacologic, surgical, preventive, and self-care).	Good	Good	Good	Good	Good
Details of intervention (such as dosage, strength, and duration).	Good	Good	Good	Good	Good
Changes in intervention (with rationale).	Not reported	Not reported	Not reported	Not reported	Not reported
Clinician- and patient-assessed outcomes, when appropriate.	Good	Good	Good	Good	Good
Important follow-up of diagnostic and other test results.	Not reported	Not reported	Not reported	Good	Not reported
Intervention adherence and tolerability (and the way in which this was assessed).	Not reported	Not reported	Not reported	Not reported	Not reported
Adverse and unanticipated events.	Not reported	Not reported	Not reported	Not reported	Not reported
Discussion of the strengths and limitations in the authors' approach.	Not reported	Not reported	Good	Good	Good
Discussion of the relevant medical literature.	Not reported	Not reported	Good	Not reported	Not reported
The rationale for conclusions (including assessment of possible causes).	Insufficient	Insufficient	Insufficient	Insufficient	Insufficient
The primary "take-aways" of the case report.	Good	Good	Good	Good	Good
When appropriate, patients sharing their perspective on the treatments received.	Not reported	Not reported	Not reported	Not reported	Not reported
Informed consent obtained from the patient or the mention of whether it was requested.	Not reported	Not reported	Not reported	Not reported	Not reported

Each item was classified as "good" if it was sufficiently reported, as "insufficient" if it was reported but not sufficiently or as "not reported" if there was no description of the item.

score (MD -2).^[18] In patients who had miscellaneous symptoms during chemotherapy, acupuncture conferred short-term improvements in most symptoms; however, the studies did not provide detailed effect estimates comparing the patients' states before and after treatment.^[16,17] In patients experiencing constipation after chemotherapy, compared with usual care, acupressure was effective in alleviating constipation severity based on the Constipation Assessment Scale (MD -5.07 , 95% CI $[-6.94, -3.20]$) and constipation-related quality of life (MD -1.26 , 95% CI $[-1.60, -0.92]$). In addition, patients in the acupressure group experienced increased normalization of feces when assessed by the Bristol Stool Form Scale (MD 1.16 , 95% CI $[0.67, 1.65]$).^[20] All included studies concluded that acupuncture may be effective in improving the respective symptoms in breast cancer survivors (Table 1).

4. Discussion

This review revealed a considerable research gap regarding the use of acupuncture for the management of symptoms in breast cancer survivors between Korea and other countries. Several RCTs have been conducted outside Korea, but mostly observational studies are currently available in Korea. Among the 1228 articles yielded by the electronic database and gray literature search, only 3 case series, 5 case reports, and 1 RCT were located in the context of Korea. These studies reported possible positive effects of acupuncture on symptoms such as lymphedema, hot flushes, CIPN, constipation, and miscellaneous symptoms; however, conclusive evidence is lacking due to limitations in study design and reporting quality.

The objectives of our study were to assess the current status of clinical evidence for the use of acupuncture for the management of symptoms in Korean breast cancer survivors. Although we found that there was a lack of sufficient clinical studies on this topic, we could not identify the reason behind this deficiency. However, considering that breast cancer is the second-most common cancer in Korean women and that its incidence rate is rapidly increasing in Korea,^[1] it can be speculated that new strategies for the management of various symptoms in breast cancer survivors have not yet been explored in the context of this population. Accordingly, Korean medical societies and breast cancer patients might not have considered acupuncture as an alternative strategy for the management of this emerging malignancy.

This study has several strengths. First, we conducted a comprehensive search using core databases including biomedicine and traditional KM as well as gray literature from KM-specific academic societies to ensure that we identified as many relevant studies as possible. Additionally, we included clinical studies regardless of their type. SRs of noncomparative clinical studies provide neither clinical evidence nor estimates of treatment effects, mainly because of the lack of an appropriate confirmed methodology. Nonetheless, SRs are useful in assessing the current status of clinical evidence, in directing future study design, and in helping plan methodologically rigorous and improved studies.^[21] Another strength of our study is that we assessed the reporting quality of the included studies based on their type. As with RCTs, the appropriate reporting of sufficient information is necessary to determine the rigor of observational studies. Using existing reporting guidelines, we assessed the adequacy in the reporting of each item,^[10,11] thereby revealing methodological flaws in existing observational studies and informing the planning and reporting in future investigations in this field.

This study also has some limitations. First, this study primarily included noncomparative observational studies; thus, clinical evidence regarding the use of acupuncture as a part of traditional KM for breast cancer survivors cannot be assessed solely on the basis of our findings. In this study, we merely identified a considerable research gap and determined that future investigations are necessary to establish the positive and negative effects of acupuncture as a part of traditional KM in these patients. Second, although we searched and analyzed Korean studies, we could not conclusively determine the difference in treatment methods and effect size between Korea and other countries; thus, these differences should be examined in future comparative clinical studies based on different countries.

Through this review, we have learnt that only a handful of clinical studies have investigated the use of acupuncture for breast cancer survivors in Korea. In contrast, a considerable number of RCTs have been conducted in Western countries and in China. Based on the analysis of the most recently published SRs (until 2016), the effect of acupuncture has been examined for conditions including aromatase inhibitor-related arthralgia,^[22] vasomotor symptoms,^[23] pain after mastectomy, and chemotherapy-induced nausea and vomiting.^[24] We learnt that between 3 and 11 RCTs have been conducted to study these symptoms in countries other than Korea and that chemotherapy-induced nausea and vomiting was the most frequently tested condition, followed by aromatase inhibitor-related arthralgia and vasomotor symptoms, but there have been no clinical studies in Korea investigating aromatase inhibitor-related arthralgia (Table 5). Although acupuncture in Korea is similar to that in other countries, the cultural, social, and clinical contexts surrounding acupuncture practice are quite different.^[25] Similar to the features of acupuncture in other countries, there are certain features of acupuncture practice that are specific to Korea.^[26] Thus, if acupuncture practices differ across countries in terms of features, such as the selection of acupuncture points, frequency of treatment, stimulation methods, and patient population, similar efficacy or effectiveness cannot be expected.^[27] Thus, clinical evidence regarding the use of acupuncture in Korea needs to be evaluated in Korean populations.

Additionally, we should note the absence of evidence concerning the use of acupuncture for the treatment of frequent and important symptoms in breast cancer survivors worldwide. Patients experience many local and systemic complications during and after breast cancer-related treatments, namely, pain in the chest wall, lymphedema, restricted range of motion in the affected shoulder joint, vasomotor symptoms (hot flushes), sexual dysfunction (vaginal dryness), amenorrhea, osteoporosis, arthralgia (after aromatase inhibitor treatment), and psychological distress. It has been reported that breast cancer survivors experience hot flushes more frequently than do women without a history of breast cancer; however, conventional hormone replacement therapy is avoided in many cases due to the fear of cancer recurrence, and thus patients seek alternative treatments to manage their discomfort.^[28] Many breast cancer survivors use acupuncture and expect it to be offered as a part of a regular cancer treatment program. Patients may have a positive perception of acupuncture either because they want not to use too many medications or because they have had a positive experience with acupuncture in the past.^[29] Considering this popular preference for acupuncture, evidence regarding the positive and negative effects of this therapeutic modality and its ability to treat each of the aforementioned symptoms needs to be established for better decision-making by physicians and patients. However,

Table 5

Summary of the current global evidence regarding the use of acupuncture for the treatment of symptoms associated with breast cancer interventions.

Symptoms	Latest relevant review	Number of included randomized controlled trials (studies included in the meta-analysis)	Comparison	Summary effect estimates	Recommendation (quotes from the literature)
Arthralgia after the use of aromatase inhibitors	Chien 2015 ^[22]	5 (2)	Acupuncture vs sham acupuncture	BPI-SF: MD -2.07, 95% CI [-4.72 to 0.57] WOMAC stiffness: MD -86.1, 95% CI [-249.11 to 76.92]	"In conclusion, acupuncture is a safe treatment for AIMSS, although it had no statistically significant effects relative to sham treatment."
Vasomotor symptoms including hot flushes and sweating	Lee 2009 ^[23]	6 (3)	Acupuncture vs sham acupuncture	Frequency of hot flushes: 3.09, 95% CI [-0.4, 6.23]	"Collectively these trials do not convincingly demonstrate the effectiveness of acupuncture for controlling vasomotor symptoms in breast cancer patients."
Sexual dysfunction Insomnia Pain after mastectomy	No reviews available No reviews available Chao 2009 ^[24]	3	Acupuncture vs usual care or no treatment	Not available	". . . the quality of many of the trials identified was poor; no conclusive remarks can be made. . . More well-designed trials using rigorous methodology are required."
Lymphedema Fatigue Chemotherapy-induced nausea and vomiting	No reviews available No reviews available Chao 2009 ^[24]	11	Acupuncture vs sham acupuncture or usual care	Not available	"Of these 11 studies, 10 (90.9%), including 3 high quality studies reported that APS could significantly improve emesis caused by breast cancer therapy."

AIMSS = aromatase inhibitor-related musculoskeletal symptoms, APS = acupressure, acupuncture, or acupoint stimulation, BPI-SF = brief pain inventory-short form, CI = confidence interval, MD = mean difference, WOMAC = Western Ontario & McMaster Universities Osteoarthritis Index.

only a few SRs are currently available that address aromatase inhibitor treatment-associated arthralgia^[22] and hot flushes^[23]; this is a big obstacle for evidence-based practice of acupuncture in Korea.

Based on the existence of limited evidence from current clinical studies, as identified in this review, we suggest that more clinical trials need to be conducted in the future in Korean breast cancer survivors regarding the use of acupuncture as a part of traditional KM to better reflect the clinical context of Korea.

5. Conclusion

Only 1 RCT and a handful of observational studies have addressed the use of acupuncture as a part of traditional KM for treating breast cancer survivors. Additionally, a considerable research gap exists between Korea and other countries. The available evidence on the positive effects of acupuncture on symptoms including lymphedema, hot flushes, CIPN, constipation, and miscellaneous symptoms is limited; thus, future rigorous clinical studies are necessary for establishing evidence regarding the effects of acupuncture for Korean breast cancer survivors to better reflect the clinical context of Korea.

Author contributions

Conceptualization: Tae-Hun Kim.

Data curation: Jung Won Kang.

Formal analysis: Tae-Hun Kim, Jung Won Kang.

Funding acquisition: Tae-Hun Kim.

Investigation: Jung Won Kang.

Methodology: Tae-Hun Kim, Myeong Soo Lee.

Project administration: Tae-Hun Kim.

Resources: Tae-Hun Kim.

Software: Tae-Hun Kim.

Validation: Myeong Soo Lee.

Writing – original draft: Tae-Hun Kim.

Writing – review & editing: Tae-Hun Kim, Myeong Soo Lee.

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