

Acupuncture and Herbal Medicine for Nausea and Vomiting in Pregnancy: An Overview and Quality Assessment of Systematic Reviews

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Background: Up to 85% of pregnant women experience nausea and vomiting in pregnancy (NVP), which can impact both the pregnant woman and developing fetus. Traditional East Asian Medicine (TEAM) including acupuncture and herbal medicine has been used to treat NVP; however, its effectiveness remains under debate. This study aimed to systematically review the existing evidence from systematic reviews on the effectiveness of TEAM for NVP and to critically evaluate the quality of these reviews.

Methods: Nine databases were searched from their inception until January 2024. Search terms included, “Hyperemesis gravidarum”, “Nausea”, “Vomiting”, “acupuncture” and “herbal medicine”. Systematic reviews (SRs) that evaluated the effect of TEAM treatment for NVP were included. We evaluated methodological quality, reporting quality, and risk of bias using the AMSTAR-2, ROBIS tool, and PRISMA guidelines.

Results: In total, 20,121 publications were retrieved from the databases. Twenty-five SRs met the inclusion criteria, indicating that acupuncture and related techniques, and herbal medicines are effective in alleviating NVP. Various methods including traditional acupuncture, acupressure, acupoint injection, electroacupuncture, herbal acupoint patching, and herbal decoctions were used. Herbs like ginger and additional aromatherapies such as lemon and cardamom have also shown beneficial effects. However, there are controversies regarding the consistency of results and the quality of methodologies. Despite low risk of bias across reviews, all were deemed low or critically low in methodological quality, with none fully adhering to PRISMA guidelines.

Conclusion: This comprehensive review underscores the potential of TEAM in managing NVP but highlights significant gaps in research quality and reporting. Future studies of higher methodological quality are essential to validate these findings and guide clinical practice.

Keywords: systematic review, complementary therapies, morning sickness, acupuncture, herbal medicine

Introduction

Nausea and vomiting in pregnancy (NVP) is a common medical condition experienced by pregnant women, with approximately 70–85% suffering from nausea and up to 50% from vomiting.^{1,2} Severe symptoms such as hyperemesis gravidarum (HG; the severe form of NVP) occur in 0.3–2% of all pregnancies and can have significant negative impacts on both the pregnant woman and developing fetus.

The immediate effects of this condition include significant ketones in urine, rapid weight reduction, nutritional deficiencies, fluid loss, and imbalanced electrolytes.³ When ketone levels in urine become excessive, they can overwhelm kidney function, negatively impacting pregnancy. This makes ketone measurement in urine a crucial parameter for evaluating the severity of hyperemesis gravidarum.⁴ Without prompt intervention, severe cases may progress to symptoms like jaundice, oliguria, and neurological complications.⁵ Long-term, women who experience this condition face higher risks of psychological issues including depression and pregnancy avoidance.^{6,7} Moreover, approximately 10% of pregnant women suffering from hyperemesis gravidarum terminate their pregnancies due to unbearable

symptoms and complications.⁸ Therefore, it's vital to manage nausea and vomiting during pregnancy and prevent hyperemesis gravidarum from worsening during crucial pregnancy stages to avoid hospitalization, intensive treatment requirements, and negative outcomes for mothers, developing fetuses, and birth results.³

Currently, the etiology of nausea and vomiting during pregnancy (NVP) are not fully understood, but several theories suggest factors such as hormonal changes, gastrointestinal dysmotility, and psychological factors could play a role.⁹ Despite the availability of pharmacological interventions for NVP, the therapeutic management of this condition remains challenging. Antiemetics may not completely alleviate symptoms, and potential teratogenic effects of medication on the fetus may also decrease medication compliance.¹⁰ Concerns about potential adverse effects of pharmacological interventions often lead pregnant women to explore alternative approaches. Among these, Traditional East Asian Medicine (TEAM), including acupuncture, moxibustion, cupping, herbal medicines, and manual therapies, has gained attention for its holistic and noninvasive options.^{11,12} TEAM is believed to alleviate symptoms primarily through improving digestive function, regulating gastrointestinal motility, providing antiemetic effects, and modulating the autonomic nervous system.^{13–15}

TEAM is one of the most popular CAM practices in the world as well as in East Asian countries. TEAM includes traditional medical systems from China, Korea, Japan, and surrounding regions. According to the cross-national survey conducted in East Asian countries, 34% of the respondents in China, 27% in Japan, 44% in Korea and 34% in Taiwan have used TEAM in the past year.¹⁶ In the “equalization” system in Korea and Taiwan and in the “unification” system in China, TEAM is recognized as legitimate medical practices that are equivalent to biomedicine. As a result, medical education, licensing, and health insurance systems in these three countries have established a separate category of TEAM doctors who have rights over all treatment modalities within TEAM, such as acupuncture/moxibustion, herbal medicine and manual therapies.¹⁷ Therefore, in these East Asian countries, TEAM is widely utilized within mainstream healthcare systems and is actively employed to manage conditions such as NVP.

Considering such clinical realities, several international guidelines on the treatment of NVP have recommended acupuncture related techniques and ginger as possible options to manage this condition.^{9,18,19} Numerous clinical researches and reviews have investigated TEAM interventions for NVP. However, comprehensive reviews of overall TEAM interventions for NVP are insufficient,¹⁰ leaving the safety and efficacy of TEAM interventions for NVP unclear.⁹ Additionally, conflicting findings from existing studies make it difficult for healthcare professionals to draw definitive conclusions. The abundance of Systematic reviews (SRs) further complicates the synthesis and effective use of the evidence.²⁰

This study seeks to address these challenges by summarizing the evidence from SRs on the effects of TEAM for NVP and critically evaluating the scientific quality of these reviews. Specifically, we aim to identify consistent findings, clarify uncertainties, and highlight research gaps to guide future studies and improve decision-making in this field. The findings of this study are expected to provide clinicians, researchers, and policymakers with essential information for understanding the evidence base for TEAM in treating NVP and HG and developing effective and safe treatment strategies.

Materials and Methods

Protocol and Registration

The protocol of this review was prospectively registered at the Research Registry (review registry 1678). This overview adheres to the guidelines for overview of SRs in the field of traditional and complementary medicine.²⁰

Eligibility Criteria

Type of Studies

This study included SRs of randomized controlled trials (RCTs) on patients with NVP, including HG. Repeat publications and graduate theses were excluded.

Interventions

This study included SRs of TEAM therapies, including acupuncture-related techniques (eg, acupuncture, acupressure, moxibustion, and cupping), herbal medicines, and manual therapies. Furthermore, studies on TEAM or TEAM plus

conventional therapy as an intervention for NVP were included. The following treatments were used in the control group: placebo, sham, no treatment, and conventional treatments.

Outcome

SRs had to include at least one clear outcome in assessing the symptoms of NVP. Examples of such outcomes include the proportion of nausea and vomiting, effective rate, urine ketone levels, blood potassium and sodium level, recurrence rate, termination of pregnancy rate, and prevalence and severity of nausea and vomiting symptoms.

Data Sources and Search Strategy

Nine electronic databases (PubMed, Cochrane Library, EMBASE, CNKI, CiNii, OASIS, ScienceON, KISS, and KMBASE) were searched for potential SRs from their inception until October 08, 2022, and an updated search was conducted on January 8, 2024, to provide an up-to-date comprehensive evidence. No language restrictions were applied. [Supplement 1](#) presents the search strategies applied in each database.

Data Management and Extraction

The following information was extracted from the final study using a data extraction form in Microsoft Excel 2016: the first author's name, publication year, country, language, number of the included clinical studies, total sample size, details of the participants, interventions of the treatment and control groups, quality assessments tool, whether a meta-analysis was conducted, and main results. All articles were evaluated by two independent investigators, and disagreements between the two investigators were resolved through discussions with a third person.

Quality Assessment

Two independent investigators assessed the methodological quality, reporting quality, risk of bias, and evidence quality using Assessing the Methodological Quality of Systematic Reviews 2 (AMSTAR-2),²¹ Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA)²², Risk of Bias in Systematic Reviews (ROBIS),²³ and Grading of Recommendations, Assessments, Development, and Evaluation (GRADE).²⁴ Disagreements between the two investigators were resolved through discussion with a third person.

Umbrella Review Synthesis Methods

The overlap in component RCTs that were included across all eligible reviews was assessed using the Corrected Covered Area (CCA) method.²⁵ A CCA of 100% indicates that every review included in our umbrella review comprised the same component RCTs, while a CCA of 0% indicates that every review in our umbrella review included entirely unique RCTs. The following cut-offs were used to quantify the CCA: 0%–5%="slight overlap"; 6%–10%="moderate"; 11%–15%="high" and >15%="very high" overlap.²⁵

Results

Results on Literature Search and Selection

In total, 20,121 publications were retrieved from the nine databases. After removing duplicates and screening the titles/abstracts, 82 publications were retrieved for full-text assessment. Examination of these full-text publications resulted in the exclusion of 57 articles. Ultimately, 24 publications were included. The screening and selection procedures are presented in [Figure 1](#). They included 221 unique (component) RCTs and the CCA was 2.96%, indicating slight overlap ([Supplement 2](#)). This low overlap is likely due to the diversity of TEAM interventions evaluated.

Description of Characteristics

The summarized data extracted from the 24 SRs/MAs are listed in [Table 1](#). These included SRs/MAs published between 2005 and 2024. Six of these articles were written in Chinese,^{26–31} one³² in Korean, and the remaining ones in English. The number of trials ranged from 4 to 33, and sample size ranged from 504 to 8,986. The intervention in the included studies were largely acupuncture related techniques and herbal medicines. Fifteen studies^{2,26,27,29–31,33–41} reported the

Identification of studies via databases and registers

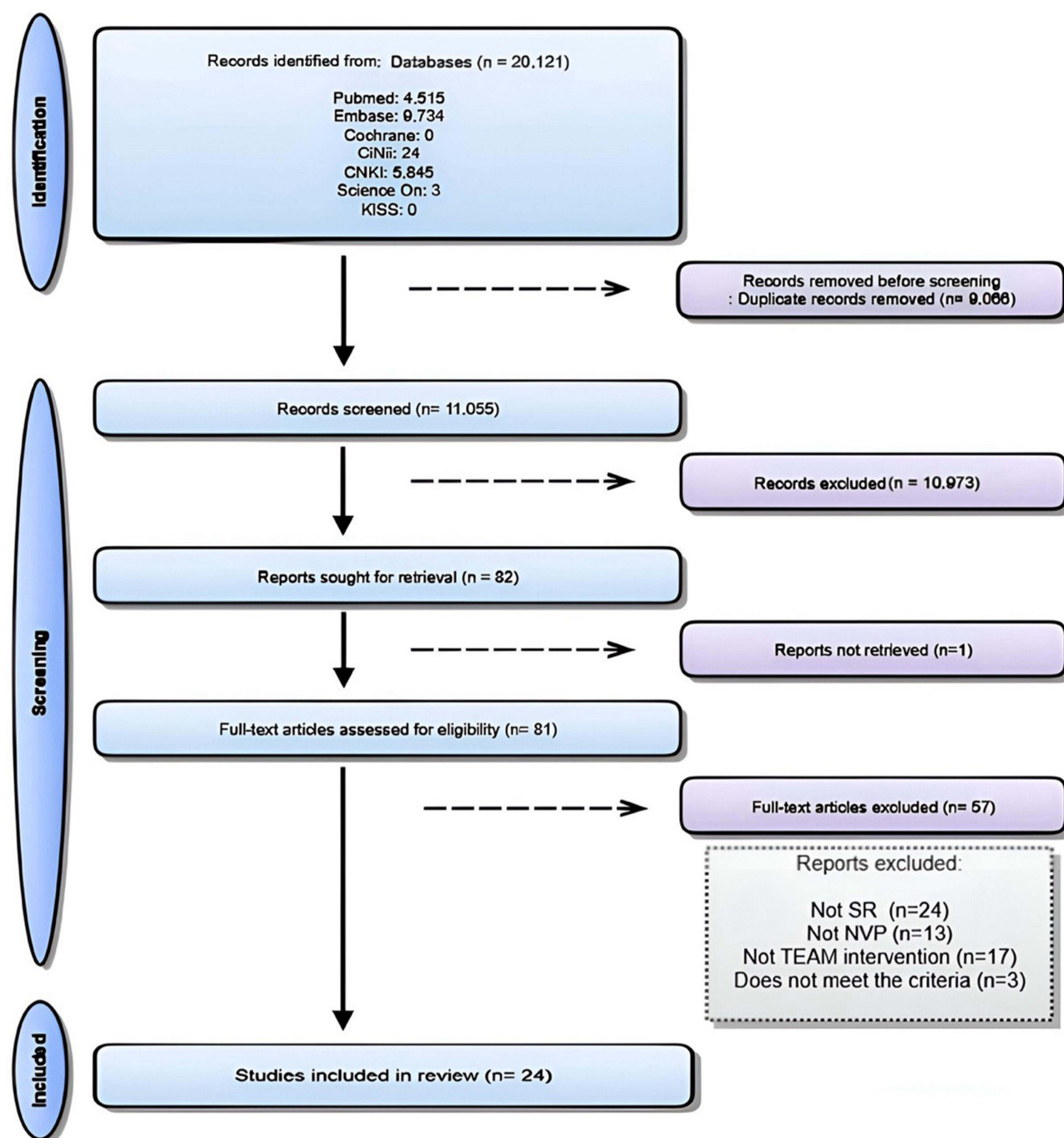


Figure 1 The flowchart of the literature selection.

Abbreviations: SR, Systematic review; NVP, Nausea and vomiting in pregnancy; TEAM, Traditional East Asian Medicine.

effects of acupuncture-related techniques on NVP and 12^{2,28,32,34,36,37,42–47} reported the effects of herbal medicines. There were no studies on manual therapies. Any interventions that excluded TEAM were included in the control group. In terms of the quality assessment scales, seven studies^{26,29,30,36,37,42,48} used Jadad, one³⁹ used the Quality of Reports of Meta-analysis of Randomized Controlled Trials (QUOROM) guidelines, another one⁴³ used CASP tool and the remaining ones used the Cochrane Risk of Bias criteria.

Table 1 Main Characteristics of the Included Reviews

Author, Year (country)	Language	Trials (Participants)	Participants	Treatment, Traditional Medicine Intervention	Control Intervention	Quality Assessment	Meta-Analyses	Results
AlHajri, L. et al, 2017 (UK) ³⁷	English	5 (505)	NVP	Ginger	Vit B6, doxylamine combined with vit B6, placebo	Jadad scale	No	These studies showed that ginger can improve NVP in a statistically significant manner. Ginger may be an effective treatment in managing nausea and vomiting symptoms during pregnancy. Shenque acupuncture point application in the treatment of hyperemesis gravidarum has some advantages. The best available evidence suggests that ginger is a safe and effective treatment for NVP. However, there remains uncertainty regarding the maximum safe dosage of ginger; appropriate duration of treatment, consequences of over-dosage, and potential drug-herb interactions. Injection of vitamin B1 into P6 has more obvious effect on the treatment of hyperemesis gravidarum and is easy to operate. Women who are experiencing nausea and vomiting during pregnancy can utilize ginger to alleviate their symptoms to the same amount as vitamin B6.
Borrelli et al, 2005 (Italy) ⁴²	English	6 (675)	NVP	Ginger	Placebo (eg, soybean oil), vitamin b6	Jadad scale	No	
Chen T. et al, 2022 (China) ²⁶	Chinese	16 (1,150)	NVP	Acupoint herbal patching, acupoint herbal patching +conventional medicine	Conventional Western medicine (fluid)	Jadad scale	Yes	
Ding et al, 2013 (Australia) ⁴³	English	4 (504)	NVP	Ginger	Vitamin B6, placebo	CASP tool	No	
Feng X. et al, 2020 (China) ²⁷	Chinese	12 (1,247)	NVP	Acupoint injection (Vit B1 injection at P6)	Conventional Western medicine	Cochrane RoB	Yes	
Gaur, R. et al, 2022 (India) ⁴⁴	English	7 (763)	NVP	Ginger	Vit B6	Cochrane RoB	Yes	

(Continued)

Table 1 (Continued).

Author, Year (country)	Language	Trials (Participants)	Participants	Treatment, Traditional Medicine Intervention	Control Intervention	Quality Assessment	Meta-Analyses	Results
Gong, J. et al, 2023 (China) ³⁸	English	33 (3,390)	NVP	Acupressure alone, acupressure combined with other treatments (attaching cowherb seeds, placing magnetic seed, wearing band on acupuncture point)	Conventional treatment, medication, placebo acupressure, sham acupressure, no treatment	Cochrane RoB	Yes	Acupressure effectively reduces nausea and vomiting during pregnancy.
Helmreich et al, 2006 (USA) ³⁹	English	14 (1,655)	NVP	Acustimulation	Placebo, no treatment, superficial needles, wrist band, sham, upper side of wrist, placebo band no stud, finger palm and 5th metatarsal bone, finger near right elbow, cocktail sticks on bony regions near acupoints	QUOROM guidelines	Yes	Noninvasive acustimulation treatments including acupressure and ETS modalities are safe and effective for NVP without teratogenic effects.
Hu et al, 2022 (China) ⁴⁵	English	13 (1,174)	NVP	Ginger	Vitamin B6, placebo	Cochrane RoB	Yes	Ginger supplementation significantly relieves general NVP symptoms and nausea compared with placebo, but no significant effect on vomiting.
Khorasani et al, 2020 (Iran) ⁴⁸	English	24 (2,310)	NVP	Herbal medicine (Ginger, lemon, ment, chamomilla, pomegranate syrup, cardamomum, quince, spearmint) alone, herbal medicine + pharmacological drug	Vitamin B6, placebo, combination of doxylamine plus Vitamin B6, lactose, dimenhydrinate, water, honey and lemon, normal saline	Jadad scale	No	<i>Matricaria chamomilla</i> , <i>Elettaria cardamomum</i> , pomegranate, spearmint syrup, lemon and ginger can be recommended to pregnant women for alleviation of NVP.
Lee et al, 2021 (Korea) ³²	Korean	7 (665)	HG	Herbal medicine or herbal medicine + Western medicine	Western medicine	Cochrane RoB	No	All indexes in the treatment group were significantly improved compared to the control group.
Lin et al, 2019 (China) ²⁹	Chinese	10 (834)	HG	Acupoint injection	Intravenous infusion	Cochrane RoB, Jadad scale	Yes	Compared to single intravenous infusion, acupoint injection and acupoint injection plus intravenous infusion can produce a better clinical efficacy with less adverse reactions.

Lu 2021 (China) ³³	English	16 (1,046)	HG	Acupuncture solely or combined with other treatments, regardless of acupoint selection, treatment frequency, or course	Conventional medication, placebo, sham or no treatment	Cochrane RoB	Yes	Acupuncture was effective in treating HG.
Nassif, M. S. et al, 2022 (Brazil) ²	English	31 (8,986)	NVP	Aromatherapy (lemon oil, peppermint oil), phytotherapy (ginger), acupuncture (manual acupuncture, acupressure bracelet, systemic acupressure, acupressure, ear acupressure)	Placebo, vit B6, doxylamine	Cochrane RoB	No	The three most effective interventions to control gestational nausea and vomiting were aromatherapy, herbal medicine and acupuncture, with significant results in the assessment of individual studies.
Ozgoli et al, 2018 (28) (Iran) ³⁶	English	21 (2,224)	NVP	Ginger, cardamom, lemon, peppermint aromatherapy, acupressure (PC6, KD21)	Placebo and no treatment	Jadad scale	No	The majority of methods employed were effective in reducing the incidence of NVP, among which ginger and P6 acupressure can be recommended with more reliability.
Tan, M. Y. et al, 2023 (China) ³⁴	English	33 (3,457)	NVP	Ginger, acupressure, acupuncture, manual acupuncture, electroacupuncture, ear acupressure	Conventional medicine (western medicine, vit B6), placebo,	Cochrane RoB	Yes	The results showed that CAM therapies were able to alleviate NVP.
Thomson et al, 2014 (Canada) ⁴⁶	English	6 (508)	NVP	Ginger	Placebo (placebo, vitamin B6, lactose, plain syrup)	Cochrane RoB	Yes	Ginger is an effective nonpharmacological treatment for NVP.
Van den Heuvel et al, 2016 (Belgium, Netherlands) ³⁵	English	29 (3,519) but Insufficient information for pooling: 920 studies included in quantitative synthesis	NVP	Acupressure, acupuncture, moxibustion, auricular acupuncture	Sham or placebo acupuncture, IV fluid therapy, oral western medication, Chinese herbal medicine or no treatment	Cochrane RoB, STRICTA	Yes	Although there is some evidence that different acustimulation techniques significantly reduce the combined outcome for nausea, vomiting, and ketones in case of HG, it is too early to definitively conclude on the beneficial effects of acustimulation for the treatment of NVP and HG.

(Continued)

Table 1 (Continued).

Author, Year (country)	Language	Trials (Participants)	Participants	Treatment, Traditional Medicine Intervention	Control Intervention	Quality Assessment	Meta-Analyses	Results
Viljoen, E. et al, 2014 (South Africa) ⁴⁷	English	12 (1,278)	NVP	Ginger	Placebo, vit B6, metoclopramide, dimenhydrinate	Cochrane RoB	Yes	Ginger did not significantly affect vomiting episodes, nor pose a risk for side-effects or adverse events during pregnancy.
Wan et al, (2020) (China) ³⁰	Chinese	12 (1,053)	HG	Acupoint herbal patching + symptomatic treatment	Symptomatic treatment (fluid + herbal medicine/ auricular acupoint stimulation)	Cochrane RoB, Jadad scale	Yes	Acupoint herbal patching with TCM medicine is effective and safe in treating HG.
Wang, X. et al, 2024 (China) ⁴⁰	English	11 (1,378)	NVP	Acupressure	Sham acupressure	Cochrane RoB	Yes	Acupuncture may have potential favorable or encouraging effect on treating on nausea and vomiting during pregnancy.
Wen et al, 2013 (China) ²⁸	Chinese	20 (1,738)	HG	Herbal medicine	Western medicine	Cochrane RoB	Yes	The Chinese medicinal herbal therapy for HG is effective and efficient.
Yi et al, 2017 (China) ³¹	Chinese	11 (794)	HG	Acupuncture or acupuncture combined with acupoint injection, catgut embedding, moxibustion, auricular point and other auxiliary therapies or acupuncture plus control interventions	Conventional medicine (Western medicine)	Cochrane RoB	Yes	Acupuncture is effective for HG.
Yue et al 2022 (China) ⁴¹	English	13 (1,026)	NVP	Auricular acupressure	Conventional Western medicine, routine nursing, or sham control	Cochrane RoB	No	The efficacy of auricular acupressure in managing NVP is insufficient and the efficacy of auricular acupressure for treating NVP remains limited.

Abbreviations: HG, hyperemesis gravidarum; IV, intravenous; NVP, Nausea and vomiting in pregnancy; QUOROM, Quality of Reports of Meta-analysis of Randomized Controlled Trials; Cochrane RoB, Cochrane Risk of Bias criteria; CASP, Critical Appraisal Skills Program; STRICTA, Standards for Reporting Interventions in Controlled Trials of Acupuncture; ETS, electrical stimulation; TCM, Traditional Chinese medicine.

Results of the Methodological Quality

In terms of methodological quality, three trials were regarded as low-quality, and others as critically low-quality. Quality was critically low when more than one critical item was unmet in the included SRs and SRs with just one critical flaw were of low quality. The critical items considered as methodological limitations were as follows: Q 2 (five SRs registered the protocol), Q 4 (only two SRs provided a complete search strategy), Q 7 (two of the SRs provided an excluded studies' list), Q 9 (five SRs did not conduct an adequate quality assessment), Q 13 (four SRs did not account for the risk of bias when interpreting the results of the review), and Q 11 and 15 (six SRs did not conduct a meta-analysis). These details are presented in Table 2.

Table 2 Results of the AMSTAR-2 Assessment

Reference	AMSTAR-2																Quality
	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14	Q15	Q16	
AlHajri, L. et al, 2017 ³⁷	Y	N	Y	PY	Y	Y	Y	Y	N	N	N	N	N	N	N	Y	CL
Borrelli et al, 2005 ⁴²	Y	N	Y	PY	Y	Y	N	Y	N	N	n/a	n/a	Y	Y	n/a	N	CL
Chen T. et al, 2022 ²⁶	Y	N	Y	PY	Y	Y	N	Y	N	N	Y	N	N	Y	Y	N	CL
Ding et al, 2013 ⁴³	Y	N	Y	PY	N	N	N	Y	N	N	n/a	n/a	N	N	n/a	N	CL
Feng X. et al, 2020 ²⁷	Y	N	Y	PY	Y	Y	N	Y	Y	N	Y	Y	Y	Y	Y	N	CL
Gaur, R. et al, 2022 ⁴⁴	Y	Y	Y	PY	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	L
Gong, J. et al, 2023 ³⁸	Y	N	Y	PY	Y	Y	N	Y	Y	N	Y	Y	Y	Y	Y	Y	CL
Helmreich et al, 2006 ³⁹	Y	N	Y	PY	Y	Y	N	Y	N	N	Y	Y	Y	Y	Y	N	CL
Hu et al, 2022 ⁴⁵	Y	N	Y	PY	Y	Y	N	Y	Y	N	Y	Y	Y	Y	Y	Y	CL
Khorasani et al, 2020 ⁴⁸	Y	N	Y	PY	Y	Y	N	Y	N	N	n/a	n/a	N	N	n/a	Y	CL
Lee et al, 2021 ³²	Y	N	Y	PY	N	N	N	Y	Y	N	n/a	n/a	N	N	n/a	N	CL
Lin et al, 2019 ²⁹	Y	N	Y	PY	N	Y	N	Y	Y	N	Y	Y	Y	Y	Y	N	CL
Lu et al, 2021 ³³	Y	Y	Y	Y	Y	Y	N	Y	Y	N	Y	Y	Y	Y	Y	Y	CL
Nassif, M. S. et al, 2022 ²	Y	N	Y	PY	Y	Y	N	Y	Y	N	N	N	Y	N	N	N	CL
Ozgoli et al, 2018 ³⁶	Y	N	Y	PY	Y	Y	N	PY	N	N	n/a	n/a	Y	N	n/a	Y	CL
Tan, M. Y. et al, 2023 ³⁴	Y	Y	Y	N	Y	Y	N	Y	Y	N	Y	Y	Y	Y	N	Y	CL
Thomson et al, 2014 ⁴⁶	Y	N	Y	PY	Y	Y	N	PY	Y	N	Y	N	N	Y	Y	Y	CL

(Continued)

Table 2 (Continued).

Reference	AMSTAR-2																Quality
	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14	Q15	Q16	
Van den Heuvel et al, 2016 ³⁵	Y	N	Y	PY	Y	Y	N	Y	Y	N	Y	Y	Y	Y	Y	Y	CL
Viljoen, E. et al, 2014 ⁴⁷	Y	Y	Y	PY	Y	Y	N	Y	Y	N	Y	Y	Y	Y	N	Y	CL
Wan et al, 2020 ³⁰	Y	N	Y	PY	Y	Y	N	Y	Y	N	Y	Y	Y	Y	Y	Y	CL
Wang, X. et al, 2024 ⁴⁰	Y	Y	Y	PY	Y	Y	N	Y	Y	N	Y	Y	Y	Y	Y	Y	CL
Wen et al, 2013 ²⁸	Y	N	Y	PY	Y	Y	N	PY	Y	N	Y	Y	Y	Y	Y	N	CL
Yi et al, 2017 ³¹	Y	N	Y	PY	Y	Y	N	Y	Y	N	Y	Y	Y	N	Y	N	CL
Yue et al, 2022 ⁴¹	Y	Y	Y	Y	Y	Y	N	Y	Y	N	n/a	n/a	Y	Y	n/a	Y	L

Abbreviations: Y, Yes; PY, Partial yes; CL, Critically low; L, Low; H, High; n/a, Not Applicable because no meta-analysis was conducted.

Results of the Reporting Quality

We used the 27-item checklist from the PRISMA Statement.²² The aim of the PRISMA Statement is to help authors improve the reporting of systematic reviews and meta-analyses. It may also be useful for the critical appraisal of published systematic reviews.²² An overview of PRISMA assessment for the included SRs is presented in [Table 3](#). Generally, none of the SRs reported all items required for PRISMA. The results showed that seven items were reported in 100% of the SRs (yes or partially yes). When assessing the items of PRISMA, if at least one criterion was not met, it was regarded as “partially yes”, even though most criteria were met. Less than 50% of the included studies reported the items of Protocol and registration, Search, Risk of bias across studies, and Additional analysis in the Methods section; Risk of bias across studies and Additional analysis in the Results section; and the Funding section. Further details are provided in [Table 3](#).

Results of ROBIS Evaluation

In Phase I of the ROBIS, which assesses the relevance of the research topic, all SRs/MAs were rated as low-risk. Domain 1 assessed the study eligibility criteria, and all SRs/MAs except for one were rated as having a low risk of bias. Domain 2 assessed the identification and selection of studies, and 16 SRs/MAs had a low risk of bias. Domain 3 assessed collection and study appraisal, and 17 SRs/MAs had a low risk of bias. Domain 4 assessed the synthesis and findings. Regarding Domain 4, 8 SRs/MAs could not be evaluated because of the lack of data synthesis, and 9 out of 16 SRs/MAs were rated as having a low risk of bias. Phase 3 considered the overall risk of bias in the reviews, and 14 SRs/MAs had a low risk of bias. Additional details are provided in [Table 4](#).

Evidence Quality

Seventeen out of the 24 SRs/MAs conducted a meta-analysis; 112 outcomes in the 16 SRs/MAs included were evaluated using the GRADE system. The evidence was downgraded owing to limitations within the RCTs, inconsistency, indirectness, imprecision, and publication bias. Details are provided in the [Supplement 3](#).

Table 3 Results of the PRISMA

Items	Borr elli et al, 2005 ⁴²	Hel mreich et al, 2006 ³⁹	Yi et al, 2017 ²¹	Van den Heuvel et al, 2016 ²⁵	Wen et al, 2013 ³⁸	Ding et al, 2013 ⁴³	Thom son et al, 2014 ⁴⁶	Kho rasani et al, 2020 ⁴⁸	Lee et al, 2021 ³²	Yue et al, 2022 ⁴¹	Lin et al, 2019 ²⁹	Wan et al, 2020 ³⁰	Hu et al, 2022 ⁴⁵	Lu et al, 2021 ³³	Oz goli et al, 2018 ³⁴	Chen T. et al, 2022 ²⁸	Feng X. et al, 2020 ²⁷	Gong, J. et al, 2023 ³⁸	Wang, X. et al, 2024 ⁴⁰	Tan, M. Y. et al, 2023 ³⁴	AIH ajri, L. et al, 2017 ³⁷	Gaur, R. et al, 2022 ⁴⁴	Nassif, M. S. et al, 2022 ²	Vilij oen, E. et al, 2014 ⁴⁷	Comp liance
Q1. Title	N	Y	Y	Y	Y	Y	Y	Y	PY	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	95.83
Q2. Structured summary	PY	PY	PY	PY	PY	PY	PY	PY	PY	Y	Y	PY	PY	Y	Y	Y	Y	PY	PY	PY	PY	PY	PY	Y	100
Q3. Rationale	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	100
Q4. Objectives	PY	Y	PY	Y	PY	PY	PY	N	N	PY	PY	PY	Y	Y	PY	PY	PY	Y	PY	Y	Y	PY	Y	Y	91.67
Q5. Protocol and registration	N	N	N	N	N	N	N	N	N	Y	N	N	N	Y	N	N	N	N	N	Y	N	Y	N	N	20.83
Q6. Eligibility criteria	PY	Y	Y	Y	Y	PY	PY	PY	PY	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	100
Q7. Information source	Y	Y	Y	Y	PY	PY	PY	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	100
Q8. Search	N	N	N	N	Y	N	N	N	Y	Y	N	N	N	Y	N	N	N	N	Y	N	N	N	Y	N	29.17
Q9. Study selection	Y	Y	Y	Y	N	PY	Y	PY	PY	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	100
Q10. Data collection process	PY	Y	Y	Y	N	N	PY	PY	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	87.5
Q11. Data items	Y	Y	Y	Y	N	PY	PY	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	91.67
Q12. Risk of bias in individual studies	Y	Y	Y	Y	Y	N	N	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	87.5
Q13. Summary measures	N	Y	N	Y	Y	N	Y	N	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	N	Y	70.83
Q14. Synthesis of results	N	Y	Y	Y	Y	N	PY	N	N	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	N	Y	N	Y	75
Q15. Risk of bias across studies	N	Y	N	N	N	N	N	N	N	N	N	N	Y	Y	N	Y	Y	Y	Y	N	N	Y	N	N	33.33
Q16. Addition analyses	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	Y	Y	N	Y	N	N	N	N	16.67
Q17. Study selection	Y	Y	N	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	87.5
Q18. Study characteristics	Y	Y	Y	Y	Y	PY	PY	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	100

(Continued)

Table 3 (Continued).

Items	Borr elli et al, 2005 ⁴²	Hel mreich et al, 2006 ³⁹	Yi et al, 2017 ²¹	Van den Heuvel et al, 2016 ¹⁵	Wen et al, 2013 ³⁸	Ding et al, 2013 ⁴³	Thom son et al, 2014 ⁴⁶	Kho rasani et al, 2020 ⁴⁸	Lee et al, 2021 ³²	Yue et al, 2022 ⁴¹	Lin et al, 2019 ²⁹	Wan et al, 2020 ³⁰	Hu et al, 2022 ⁴⁵	Lu et al, 2021 ³³	Oz goli et al, 2018 ³⁴	Chen T. et al, 2022 ³⁶	Feng X. et al, 2020 ²⁷	Gong, J. et al, 2023 ³⁸	Wang, X. et al, 2024 ⁴⁰	Tan, M. Y. et al, 2023 ³⁴	AIH ajri, L. et al, 2017 ²⁷	Gaur, R. et al, 2022 ⁴⁴	Nassif, M. S. et al, 2022 ²	Vilj oen, E. et al, 2014 ⁴⁷	Comp liance
Q19. Risk of bias within studies	Y	Y	PY	Y	Y	N	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	91.67
Q20. Results of individual studies	Y	Y	Y	Y	Y	PY	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	N	Y	91.67
Q21. Synthesis of results	N	Y	Y	Y	Y	N	Y	N	N	N	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	N	Y	N	Y	66.67
Q22. Risk of bias across studies	N	Y	N	N	N	N	N	N	N	N	Y	Y	Y	Y	N	Y	Y	Y	Y	N	N	Y	N	N	41.67
Q23. Additional analysis	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	Y	Y	N	N	N	N	8.33
Q24. Summary of evidence	Y	Y	Y	Y	N	PY	N	PY	PY	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	91.67
Q25. Limitations	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	100
Q26. Conclusions	Y	PY	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	95.83
Q27. Funding	N	N	N	Y	N	N	Y	N	N	Y	N	Y	Y	N	Y	N	N	Y	Y	Y	Y	Y	N	Y	50

Abbreviations: Y, yes; PY, Partial yes; N, No.

Table 4 Results of ROBIS Evaluation

Reviews	Phase 1	Phase 2				Phase 3
	Assessing Relevance	Domain1	Domain2	Domain3	Domain4	Risk of Bias
AlHajri, L. et al, 2017 ³⁷	L	L	L	H	n/a	H
Borrelli et al, 2005 ⁴²	L	L	L	L	n/a	H
Chen T. et al, 2022 ²⁶	L	L	L	L	L	L
Ding et al, 2013 ⁴³	L	H	H	H	n/a	H
Feng X. et al, 2020 ²⁷	L	L	L	L	L	L
Gaur, R. et al, 2022 ⁴⁴	L	L	L	L	L	L
Gong, J. et al, 2023 ³⁸	L	L	L	L	H	L
Helmreich et al, 2006 ³⁹	L	L	L	L	L	H
Hu et al, 2022 ⁴⁵	L	L	H	L	L	L
Khorasani et al, 2020 ⁴⁸	L	L	H	H	n/a	H
Lee et al, 2021 ³²	L	L	H	H	n/a	H
Lin 2019 et al, ²⁹	L	L	H	L	L	L
Lu et al, 2021 ³³	L	L	L	L	L	L
Nassif, M. S. et al, 2022 ²	L	L	L	L	n/a	L
Ozgoli et al, 2018 ³⁶	L	L	H	L	n/a	H
Tan, M. Y. et al, 2023 ³⁴	L	L	L	L	H	L
Thomson et al, 2014 ⁴⁶	L	L	L	L	H	L
Van den Heuvel et al, 2016 ³⁵	L	L	L	H	L	L
Viljoen, E. et al, 2014 ⁴⁷	L	L	L	H	H	L
Wan et al, 2020 ³⁰	L	L	H	L	L	H
Wang, X. et al, 2024 ⁴⁰	L	L	L	L	H	H
Wen et al, 2013 ²⁸	L	L	H	H	H	H
Yi et al, 2017 ³¹	L	L	L	L	H	L
Yue 2022 et al, ⁴¹	L	L	L	L	n/a	L

Abbreviations: L, low; H, high; n/a, not applicable.

Effect Evaluation

Acupuncture-Related Techniques

Fifteen studies^{2,26,27,29–31,33–41} reported the effects of acupuncture-related techniques on NVP. Acupressure, acupuncture, acupoint injection, electroacupuncture, moxibustion, auricular acupuncture or acupressure, acupoint herbal patching, and catgut embedding acupuncture were used as interventions. Proportion of nausea and vomiting, effective rate, urine ketone levels, blood potassium and sodium level, recurrence rate, termination of pregnancy rate, and prevalence and severity of nausea and vomiting symptoms were used as outcome indicators.

Most studies reported that acupuncture-related techniques were effective in NVP, but the effect of these techniques were controversial. According to one review,³⁵ the overall effect of different acustimulation techniques showed

a significant reduction in the combined outcome for NVP or HG in pregnancy as a dichotomous variable; however, studies that used continuous outcome measures for nausea, vomiting, and the combined outcome did not show any evidence for acupuncture-related techniques in relieving symptoms of NVP and HG.³⁵

Some studies reported adverse events; however, only one study³³ conducted meta-analysis on the safety of the acupuncture-related approaches. One study³³ reported that compared with the control set, the random-effects model suggested that the incidence of adverse events in the acupuncture group was lower. Since there were significant differences between the groups ($p=0.04$).³³

One study³⁴ reported that some articles mentioned adverse events of acupressure, including fatigue, sleep disturbance, arm heaviness, vomiting, flatulence, dreaming, and a feeling of coldness, but there were no significant differences between the acupuncture group and control group. Adverse effects of wristbands were reported in some reviews, including pain, numbness, hand swelling, itching, or other allergic reactions.^{38,39}

Most studies reported that they were not able to include the safety results in the analysis because of insufficient data. All these studies suggest that larger sample sizes or high-quality studies are required. Because of the small number of included studies and low quality of the evidence, further studies on the safety of acupuncture treatment are needed in the future.

Traditional Acupuncture

In many studies,^{2,31,33–35,39} traditional acupuncture points were used, primarily the points that were believed to alleviate nausea and vomiting during pregnancy. Most studies^{2,31,33–35} generally found traditional acupuncture to be effective in reducing the severity of nausea and frequency of vomiting when compared to placebo or conventional treatment. However, one study³⁹ reported that acupuncture was not effective in reducing NVP and there was a placebo effect on reducing nausea and vomiting compared with controls.

Acupressure

Eight studies^{2,34–36,38–41} reported that acupressure was beneficial in reducing nausea symptoms among pregnant women. Acupressure with hand and other devices such as wearable band were analyzed together, and acupressure was effective in women with nausea and vomiting during pregnancy.^{2,34–36,38–41} One study⁴¹ analyzed auricular acupoint acupressure alone, and there was a significant difference in effect rate between the treatment and control groups.

Acupoint Injection

Two studies^{27,29} reported the acupoint injection showed a higher effectiveness rate in controlling severe nausea and vomiting compared to control groups receiving conventional treatment. In one study,²⁷ the use of Vitamin B1 at acupuncture points was specifically highlighted for its effect in providing relief of hyperemesis gravidarum symptoms. One study²⁹ compared the acupoint injection with intravenous infusion, suggesting that acupoint injection and acupoint injection with intravenous infusion can produce a better clinical effect with less adverse reactions compared to single intravenous infusion.

Electroacupuncture

It was difficult to find studies evaluating the effect of electroacupuncture alone. One study³⁴ assessed the effectiveness of electroacupuncture by combining it with other studies with acupuncture interventions, and confirmed that its effect was significantly higher compared to conventional medicine ($P = 0.042$).

Acupoint Herbal Patching

Two studies^{26,30} reported that acupoint herbal patching showed a higher effectiveness rate compared to the treatment used in the control group. One study²⁶ analyzed the herbal patching on CV8, and another one³⁰ did not specify the acupuncture points used. Acupuncture patch therapy is relatively safe compared to other methods because it can be applied without oral medication. However, further analysis of acupuncture points and herbs used is needed.

Herbal Medicine

Herbal Medicine Decoction

Two studies^{28,32} investigated the effects of Traditional herbal medicine decoctions on NVP. In both studies, the herbal medicine group showed a higher effect rate and lower recurrence rate than the western medicine group.

Ginger

Twelve studies^{2,34,36,37,42–49} reported the effect of ginger on NVP. Various main outcome methods such as the Rhodes Index, Visual Analogue Scale, and Pregnancy Unique Quantification of Emesis Score were used. Across several studies, ginger has been consistently shown to reduce the severity of nausea and frequency of vomiting in pregnancy. Most studies compared ginger to placebo and some to vitamin B6, with ginger often performing comparably or better in reducing symptoms. Some studies compared the effects of Western medications (doxylamine, metoclopramide, and dimenhydrinate) with those of ginger, with no significant differences in reducing NVP. Most clinical trials used ginger in daily doses ranging from 750 mg to 1.5 g, typically administered in capsule form. The duration of the studies varied, generally spanning from a few days to several weeks. Ginger was generally well-tolerated with mild side effects. Common side effects were minor, such as stomachaches and heartburns. Some studies noted no significant adverse effects from ginger use. However, ginger should be used with caution in patients taking medications that affect blood clotting or in those on anti-arrhythmic or central nervous system depressants. High doses of ginger may interact with these medications, potentially leading to increased risks of bleeding or other pharmacological interactions⁴³.

Ginger was found to be as effective as vitamin B6 in many cases. However, some meta-analyses suggest that while both treatments are effective, vitamin B6 might be slightly more effective in reducing overall NVP scores⁴⁴. Nevertheless, ginger provided relief from nausea and vomiting in early pregnancy more effectively than some conventional medicines without the risk of severe side effects, making it a viable non-pharmacological alternative.

Additional Herbs

One study³⁶ included cardamom, lemon, and peppermint aromatherapies. Lemon aromatherapy led to a significant reduction in NVP compared to the placebo, and cardamom powder significantly reduced the severity of NVP; however, aromatherapy with peppermint oil caused no significant reduction in NVP compared to the placebo.

One study⁴⁸ reviewed various herbal remedies for treating nausea and vomiting in pregnancy (NVP), highlighting their effectiveness and usage. The study showed that herbal medicines such as *matricaria chamomilla*, *Elettaria cardamomum*, pomegranate and spearmint syrup, lemon provide safe and effective medical alternatives for treating pregnant women with mild to moderate NVP. Cardamom was effective for treating NVP compared to placebo ($p < 0.001$). There was significant difference in NVP between lemon and placebo ($p < 0.049$). Inhalation of peppermint oil did not show a significant difference in vomiting and nausea scores compared to placebo, and the use of mint oil also demonstrated identical effects to placebo in improving symptoms before and after treatment. *Matricaria chamomilla* showed significantly better effects than placebo ($p < 0.05$); however, there was no significant difference between pomegranate and spearmint syrup plus vitamin B, and alone vitamin B.

One study² included aromatherapy with lemon or peppermint oil. Aromatherapy using lemon essential oil has been shown to effectively reduce gestational nausea and vomiting. In comparison with placebo treatments, aromatherapy demonstrated superior results in about 67% of the studies where it was used, particularly in combination with lemon essential oil. Aromatherapy was generally well tolerated. Less than half of the studies reported adverse effects, which were predominantly mild and transient.

Discussion

Our review of the SRs on TEAM treatment strategies for NVP showed that they could be divided into acupuncture-related techniques and herbal medicine. The overall quality of the SRs was low, with many failing to meet key criteria such as protocol registration and the performance of meta-analyses. These methodological limitations likely contributed to inconsistencies in the reported effects of TEAM interventions. Ginger demonstrated consistent short-term

effectiveness, while acupuncture-related techniques showed mixed results due to variations in methodologies and study quality. The low quality of evidence and lack of long-term safety data further underscore the need for rigorous future research.

Among the herbal medicine treatments for NVP, ginger has been studied extensively and shown to be effective in treating NVP symptoms. Ginger is considered both an herbal medicine and a food, making it a viable treatment option for patients hesitant to take conventional medication. Although ginger appears safe and effective for short-term use, there are limited data on its long-term safety and effectiveness. Future research should focus on long-term outcomes and more detailed safety profiles of ginger, especially concerning its dosages above 2 g per day and interactions with other medications. There is a need for standardization in the dosages used in trials to better compare effectiveness and safety outcomes across studies. Furthermore, further research is required to determine the safety of complex herbal medicines involving several components.

Acupuncture-related techniques included auricular acupressure, acupuncture, electroacupuncture, ear acupuncture, acupoint herbal patching, acustimulation band, acupoint injection, and thread embedding acupuncture. However, due to low or critically low quality, more high-quality studies are required to establish the effect of acupuncture-related techniques in the management of NVP. In the case of acupuncture treatment, various methods are often combined; therefore, analysis of each specific method of use seems necessary. In the case of acupuncture, it can be easily employed in clinical settings because this treatment method can be used even in cases where oral medication is difficult due to severe nausea and vomiting. Indeed, it can be applied in patients who have difficulty taking oral medication due to severe vomiting.

According to previous studies,⁵⁰ herbal medicine and acupuncture are the most widely used TEAM interventions for NVP or HG, but cupping, moxibustion, and pharmacopuncture are also widely used. Cupping and moxibustion are non-drug-based interventions and acupuncture-related techniques that stimulate acupuncture points, which can be safely performed, but owing to the lack of related studies the need for clinical research has been confirmed. Moxibustion is also a widely used intervention, but because it provides thermal stimulation, its safety needs to be evaluated. Pharmacopuncture is a novel intervention that is still evolving and is widely used in clinical practice.⁵¹ Pharmacopuncture therapy combines acupuncture and herbal medicine, with the injection of herbal extracts into acupoints.⁵² The two included reviews^{27,29} evaluated acupoint injection; however, this approach differs from pharmacopuncture which involves the injection of traditional herbal medicines, because it involves the injection of western medications. Although there are some RCTs^{53–59} on the treatment of NVP by injecting vitamin B6 into acupuncture points, there are no RCTs on pharmacopuncture. Therefore, it is necessary to actively conduct clinical research on pharmacopuncture treatment and update the SR.

This study provides a comprehensive reference to clinical practice, providing an overview of TEAM treatments for NVP. Different studies used varying intervention techniques and outcome measures, making it difficult to draw uniform conclusions about the effect of TEAM interventions. Additionally, there was a lack of clear criteria for the severity of NVP in the included SRs, and in Korean and Chinese language studies, NVP was often encompassed within HG. Future analyses should consider the severity of the condition for more precise evaluations. There were also limited long-term outcome data. Long-term data are important because NVP can be associated with fetal growth and development over time. Many studies lacked long-term follow-up, making it difficult to assess the sustained effect and safety of TEAM interventions for NVP.

Our study also has some limitations. Many of the included SRs were of low or critically low quality according to AMSTAR-2 assessments, which limits the reliability of the conclusions drawn. None of the SRs fully complied with the PRISMA guidelines, indicating potential issues with reporting completeness and transparency. Although the ROBIS tool suggested low risk of bias overall, some domains within individual SRs indicated potential biases that were not fully accounted for. This review included studies published in Chinese, Korean, and English, potentially excluding relevant SRs published in other languages.

We strived to utilize transparent and reproducible methods throughout our study. However, the substantial variation in interventions, designs, execution, and data presentation across the included reviews necessitated the use of judgment in appraising the quality of these systematic reviews and in articulating the standards and criteria employed.

Additionally, the process of quality evaluation can be subjective, as different researchers might assess the same factors differently, leading to potential variations in findings across studies. This subjectivity could influence the assessment of study quality. Moreover, inconsistencies in reporting results and a lack of long-term outcome data challenge the robustness of the review's conclusions, highlighting the need for more comprehensive future research to solidify the evidence base.

Conclusions

This study provides a comprehensive overview of TEAM treatments for NVP, highlighting both acupuncture-related techniques and herbal medicine. Several herbal medicines, particularly ginger, and acupuncture have emerged as promising complementary therapies for alleviating NVP symptoms. However, the reliability of these findings is limited due to methodological weaknesses and inadequate reporting quality observed in existing systematic reviews. Critical gaps include inadequate long-term follow-up assessments and insufficient safety monitoring protocols, which preclude definitive judgments regarding the safety profile of TEAM interventions. Thus, our overview confirms the necessity for future research that rigorously adheres to established methodological guidelines, clearly reports study procedures, and includes comprehensive evaluations of long-term clinical outcomes and safety profiles of TEAM therapies.

Data Sharing Statement

The original contributions presented in the study are included in the article, further inquiries can be directed to the corresponding author.

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Author Contributions

All authors made a significant contribution to the work reported, whether that is in the conception, study design, execution, acquisition of data, analysis and interpretation, or in all these areas; took part in drafting, revising or critically reviewing the article; gave final approval of the version to be published; have agreed on the journal to which the article has been submitted; and agree to be accountable for all aspects of the work.

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Disclosure

The authors declare no competing interests in this work.

References

1. Piwko C, Ungar WJ, Einarson TR, Wolpin J, Koren G. The weekly cost of nausea and vomiting of pregnancy for women calling the Toronto Motherisk Program. *Curr Med Res Opin.* 2007;23:833–840. doi:10.1185/030079907x178739
2. Nassif MS, Costa ICP, Ribeiro PM, CdC M, PED O. Integrative and complementary practices to control nausea and vomiting in pregnant women: a systematic review. *Revista da Escola de Enfermagem da USP.* 2022;56:e20210515. doi:10.1590/1980-220X-REEUSP-2021-0515en
3. Fejzo MS, Trovik J, Grooten IJ, et al. Nausea and vomiting of pregnancy and hyperemesis gravidarum. *Nat Rev Dis Primers.* 2019;5(1):62. doi:10.1038/s41572-019-0110-3
4. Boelig RC, Barton SJ, Saccone G, Kelly AJ, Edwards SJ, Berghella V. Interventions for treating hyperemesis gravidarum: a Cochrane systematic review and meta-analysis. *J Matern Fetal Neonatal Med.* 2018;31(18):2492–2505. doi:10.1080/14767058.2017.1342805
5. McCullough DC, McKinney JA, Patel J, Best K, Wiggins JM, Sanchez-Ramos L. Nausea and vomiting during pregnancy leading to nystagmus, ataxia, and maternal brain injury. *Am J Clin Exp Obstet Gynecol.* 2022;227(2):327–328. doi:10.1016/j.ajog.2022.03.061
6. McCarthy FP, Khashan AS, North RA, et al. A prospective cohort study investigating associations between hyperemesis gravidarum and cognitive, behavioural and emotional well-being in pregnancy. *PLoS One.* 2011;6(11):e27678. doi:10.1371/journal.pone.0027678

7. Christodoulou-Smith J, Gold JJ, Romero R, et al. Posttraumatic stress symptoms following pregnancy complicated by hyperemesis gravidarum. *J Matern Fetal Neonatal Med.* **2011**;24(11):1307–1311. doi:10.3109/14767058.2011.582904
8. Poursharif B, Korst LM, MacGibbon KW, Fejzo MS, Romero R, Goodwin TM. Elective pregnancy termination in a large cohort of women with hyperemesis gravidarum. *Contraception.* **2007**;76(6):451–455. doi:10.1016/j.contraception.2007.08.009
9. Erick M, Cox JT, Mogensen KM. ACOG practice bulletin 189: nausea and vomiting of pregnancy. *Obstet Gynecol.* **2018**;131:935. doi:10.1097/AOG.0000000000002604
10. Nieblyl JR, Goodwin TM. Overview of nausea and vomiting of pregnancy with an emphasis on vitamins and ginger. *Am J Clin Exp Obstet Gynecol.* **2002**;186(5):S253–S255. doi:10.1067/mob.2002.122595
11. Cheung F. TCM: made in China. *Nature.* **2011**;480:S82–3. doi:10.1038/480S82a
12. Kim Y, Lee D, Lim E. Reviewing gravid patients in dept. Gynecology clinic of hospital, college of oriental medicine, Kyung-won Univ. *The J Korean Obstet Gynecol.* **2001**;14:380–392.
13. Li S, Lei Y, Chen JD. Chemotherapy-induced pica in rats reduced by electroacupuncture. *Neuromodulation.* **2018**;21(3):254–260. doi:10.1111/ner.12712
14. Li H, He T, Xu Q, et al. Acupuncture and regulation of gastrointestinal function. *World J Gastroenterol.* **2015**;21(27):8304–8313. doi:10.3748/wjg.v21.i27.8304
15. Lu M-J, Yu Z, He Y, Yin Y, Xu B. Electroacupuncture at ST36 modulates gastric motility via vagovagal and sympathetic reflexes in rats. *World J Gastroenterol.* **2019**;25(19):2315–2326. doi:10.3748/wjg.v25.i19.2315
16. Shim J-M. The relationship between the use of complementary and alternative medicine and the use of biomedical services: evidence from East Asian medical systems. *Asia Pac J Public Health.* **2016**;28(1):51–60. doi:10.1177/1010539515613411
17. Shim J-M, Kim J. Cross-national differences in the holistic use of traditional East Asian medicine in East Asia. *Health Promotion Int.* **2018**;33(3):536–544. doi:10.1093/heapro/daw089
18. National Guideline Alliance (UK). *Management of Nausea and Vomiting in Pregnancy.* London: National Institute for Health and Care Excellence (NICE); **2021**.
19. Tsakiridis I, Mamopoulos A, Athanasiadis A, Dagklis T. The management of nausea and vomiting of pregnancy: synthesis of national guidelines. *Obstet Gynecol Surv.* **2019**;74:161–169. doi:10.1097/OGX.0000000000000654
20. Kim T-H, Tian Z-Y, Liao X, Robinson N. Essential elements required for conducting and structuring an overview of systematic reviews in the field of traditional and complementary medicine. *Eur J Int Med.* **2022**;49:101605. doi:10.1016/j.eujim.2021.101605
21. Shea BJ, Reeves BC, Wells G, et al. AMSTAR 2: a critical appraisal tool for systematic reviews that include randomised or non-randomised studies of healthcare interventions, or both. *BMJ.* **2017**;358:j4008. doi:10.1136/bmj.j4008
22. Moher D, Liberati A, Tetzlaff J, Altman DG. PRISMA Group. Preferred reporting items for systematic reviews and meta-analyses: the PRISMA statement. *Int J Surg.* **2010**;8:336–341. doi:10.1016/j.ijsu.2010.02.007
23. Whiting P, Savović J, Higgins JP, et al. ROBIS: a new tool to assess risk of bias in systematic reviews was developed. *J Clin Epidemiol.* **2016**;69:225–234. doi:10.1016/j.jclinepi.2015.06.005
24. Guyatt G, Oxman AD, Akl EA, et al. GRADE guidelines: 1. Introduction—GRADE evidence profiles and summary of findings tables. *J Clin Epidemiol.* **2011**;64(4):383–394. doi:10.1016/j.jclinepi.2010.04.026
25. Pieper D, Antoine S-L, Mathes T, Neugebauer EA, Eikermann M. Systematic review finds overlapping reviews were not mentioned in every other overview. *J Clin Epidemiol.* **2014**;67(4):368–375. doi:10.1016/j.jclinepi.2013.11.007
26. Chen Tingting SJ. Meta analysis of clinical effect of shenque acupoint application on hyperemesis gravidarum. *Chin J Ethnomed Ethnopharm.* **2022**;31(9):83–89.
27. Xin F, Zhongbo X, Lin Y, Shuping Z. meta-analysis and sequential analysis of the efficacy of vitamin B1 injection in treating hyperemesis gravidarum neiguan point (P6). *Chin Med Herald.* **2020**;17(9):87–102.
28. Wen X, Yao Z. Meta-analysis of internal TCM on hyperemesis gravidarum. *J Liaoning Univ TCM.* **2013**;15:163–165.
29. Lin X, Shen Q, Zhuang L. Clinical efficacy of acupoint injection in treating hyperemesis gravidarum: a meta analysis. *J Clin Acupunct Moxibustion.* **2019**;35:62–67.
30. Wan Q, Ou Y, Wang B. A meta-analysis of treating hyperemesis gravidarum by acupoint application. *Clin J Chin Med.* **2020**;12:135–139.
31. Yi L, Yirong W, Chunli L, Zhixing Z. A systematic review and meta-analysis of domestic acupuncture for treatment of hyperemesis gravidarum. *J Liaoning Univ TCM.* **2017**;19:150–152.
32. Lee J-W, Ahn S-Y, Kim D-C. A review of randomized controlled trials on the treatment effects of herbal medicine for hyperemesis gravidarum. *The J Korean Obstet Gynecol.* **2021**;34:62–77. doi:10.15204/jkobgy.2021.34.4.062
33. Lu H, Zheng C, Zhong Y, Cheng L, Zhou Y. Effectiveness of acupuncture in the treatment of hyperemesis gravidarum: a systematic review and meta-analysis. *Evid Based Complement Alternat Med.* **2021**;2731446. doi:10.1155/2021/2731446
34. Tan M-Y, Shu S-H, Liu R-L, Zhao Q. The efficacy and safety of complementary and alternative medicine in the treatment of nausea and vomiting during pregnancy: a systematic review and meta-analysis. *Front Public Health.* **2023**;11:1108756. doi:10.3389/fpubh.2023.1108756
35. Van den Heuvel E, Goossens M, Vanderhaegen H, Sun HX, Buntinx F. Effect of acustimulation on nausea and vomiting and on hyperemesis in pregnancy: a systematic review of Western and Chinese literature. *BMC Complement Altern Med.* **2016**;16:13. doi:10.1186/s12906-016-0985-4
36. Ozgoli G, Saei Ghare Naz M. Effects of complementary medicine on nausea and vomiting in pregnancy: a systematic review. *Int J Prev Med.* **2018**;9:75. doi:10.4103/ijpvm.IJPVM_430_16
37. AlHajri L, AlFalasi M, Abdelrahim M, AlKaabi R. The efficacy of ginger for pregnancy-induced nausea and vomiting: a systematic review. *J Nat Remedies.* **2017**:48–56. doi:10.18311/jnr/2017/18012
38. Gong J, Gu D, Wang H, et al. Effect of acupressure in nausea and vomiting treatment during pregnancy: a meta-analysis. *EXPLORE.* **2023**;20:17–26. doi:10.1016/j.explore.2023.06.015
39. Helmreich RJ, Sytk S, Dune LS. Meta-analysis of acustimulation effects on nausea and vomiting in pregnant women. *Explore.* **2006**;2:412–421. doi:10.1016/j.explore.2006.06.002
40. Wang X, Yang G, Li K, Yang F, Liang X, Wu S. Efficacy and safety of acupressure in nausea and vomiting during pregnancy: a systematic review and meta-analysis of randomized controlled trials. *Arch Gynecol Obstetrics.* **2024**;309(4):1237–1248. doi:10.1007/s00404-023-07313-0

41. Yue SW, Huang YY, Huang CR, Huang WP, Ouyang YQ. Effect of auriculotherapy on nausea and vomiting during pregnancy: a systematic review. *Eur J Integr Med.* 2022;53:102130. doi:10.1016/j.eujim.2022.102130
42. Borrelli F, Capasso R, Aviello G, Pittler MH, Izzo AA. Effectiveness and safety of ginger in the treatment of pregnancy-induced nausea and vomiting. *Obstet Gynecol.* 2005;105:849–856. doi:10.1097/01.AOG.0000154890.47642.23
43. Ding M, Leach M, Bradley H. The effectiveness and safety of ginger for pregnancy-induced nausea and vomiting: a systematic review. *Women Birth.* 2013;26:e26–30. doi:10.1016/j.wombi.2012.08.001
44. Gaur R, Mudgal SK, Kalyani V, et al. Ginger vs vitamin B6 for treating nausea and vomiting during pregnancy: a systematic review and meta-analysis. *J South Asian Fed Obstet Gynecol.* 2022;14(2):210–217. doi:10.5005/jp-journals-10006-2040
45. Hu Y, Amoah AN, Zhang H, et al. Effect of ginger in the treatment of nausea and vomiting compared with vitamin B6 and placebo during pregnancy: a meta-analysis. *J Matern Fetal Neonatal Med.* 2022;35:187–196. doi:10.1080/14767058.2020.1712714
46. Thomson M, Corbin R, Leung L. Effects of ginger for nausea and vomiting in early pregnancy: a meta-analysis. *J Am Board Fam Med.* 2014;27:115–122. doi:10.3122/jabfm.2014.01.130167
47. Viljoen E, Visser J, Koen N, Musekiwa A. A systematic review and meta-analysis of the effect and safety of ginger in the treatment of pregnancy-associated nausea and vomiting. *Nutr J.* 2014;13:1–14. doi:10.1186/1475-2891-13-20
48. Khorasani F, Aryan H, Sobhi A, et al. A systematic review of the efficacy of alternative medicine in the treatment of nausea and vomiting of pregnancy. *J Obstet Gynaecol.* 2020;40:10–19. doi:10.1080/01443615.2019.1587392
49. Matthews A, Haas DM, O'Mathúna DP, Dowswell T. Interventions for nausea and vomiting in early pregnancy. *Cochrane Database Syst Rev.* 2015;2015:CD007575. doi:10.1002/14651858.CD007575.pub4
50. Jung H-J, Choi S-J, Kim D-I. A survey on general public's experience and perception of Korean medicine treatment for developing clinical practice guideline of nausea and vomiting of pregnancy. *J Korean Obstet Gynecol.* 2023;36(2):69–84. doi:10.15204/jkobgy.2023.36.2.069
51. Choi S-J, Kim D-I. The review on trend of clinical studies of hominis placenta pharmacopuncture on obstetrics & gynecology diseases. *The J Korean Obstet Gynecol.* 2019;32:15–25. doi:10.15204/jkobgy.2018.32.1.015
52. Park J, Lee H, Shin B-C, Lee MS, Kim B, Kim J-I. Pharmacopuncture in Korea: a systematic review and meta-analysis of randomized controlled trials. *Evid Based Complement Alternat Med.* 2016.
53. Mei QX. Clinical observation of acupoint injection therapy in the treatment of severe vomiting in pregnancy in 30 cases. *Chin J Ind Med.* 2009;26:171. doi:10.13586/j.cnki.yjyx1984.2009.02.00
54. Huijuan Z, Xiaoping W, Guanghong L. Treatment of 73 cases of nausea and vomiting in pregnancy with acupoint injection therapy. *J Shandong Univ Trad Chin Med.* 1996;8.
55. Jie C, Baixue Z, Xiuxia Y. Clinical experience of acupoint injection with vitamin B1 for the treatment of severe nausea and vomiting in pregnancy. *Strait Pharm J.* 1997.
56. Jufen X. Acupoint injection for the treatment of 58 cases of pregnancy vomiting: a therapeutic observation. *Traffic Med.* 1997;11:229.
57. Guanghua Z, Lan D, Chengwen J. Acupoint injection of vitamin B1 at Neiguan for the treatment of 35 cases of severe vomiting in pregnancy. *Shaanxi J Trad Chin Med.* 2005;26:1089–1090.
58. Yuzhen S, Hongying S. Therapeutic observation of vitamin B1 acupoint blockage treatment for severe vomiting during pregnancy. *J Guangdong Med Coll.* 2002;20:363.
59. Caixia Y. Analysis of 68 cases of severe vomiting in pregnancy treated by acupoint injection at Neiguan and Zusanli acupoints. *J Prim Health Care.* 2008;12:732–733.

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