REVIEW ARTICLE

Efficacy and safety of acupuncture as a non-pharmacological intervention for managing hypertension in pregnancy: A systematic review

DOI: 10.29063/ajrh2026/v30i5.14

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Abstract

Hypertensive disorders in pregnancy remain a leading cause of maternal and perinatal morbidity and mortality globally, affecting approximately 5–10% of pregnancies according to WHO estimates. This systematic review evaluates the efficacy and safety of acupressure as a nonpharmacological intervention for managing hypertension in pregnant women. Following PRISMA guidelines, a comprehensive search of Scopus, PubMed, and Web of Science databases from 2010 to 2023 retrieved 285 records.. Quantitative and qualitative analyses were conducted based on the PICO framework to assess intervention effectiveness. Acupressure applied at key points LI4 (Hegu), ST36 (Zusanli), SP6 (Sanyinjiao), and auricular sites such as Shenmen demonstrated statistically significant reductions in systolic (10–15 mmHg) and diastolic (5–8 mmHg) blood pressure ($p < 0.05$). This review highlights the opportunity to incorporate acupressure into community-based maternal health services, especially in low-resource settings where access to pharmacologic treatment may be limited. However, the development of standardized clinical protocols, professional training programs, and long-term outcome evaluations is essential before widespread clinical adoption. *(Afr J Reprod Health 2026; 30 [5]: 149-162).*

Keywords: Acupressure; Gestational Hypertension; Health; Hypertensive Disorders; Nonpharmacological.

Résumé

Les troubles hypertensifs de la grossesse demeurent une cause majeure de morbidité et de mortalité maternelles et périnatales à l'échelle mondiale, touchant environ 5 à 10 % des grossesses selon les estimations de l'OMS. Cette revue systématique évalue l'efficacité et l'innocuité de l'acupression comme intervention non pharmacologique pour la prise en charge de l'hypertension chez la femme enceinte. Conformément aux recommandations PRISMA, une recherche exhaustive des bases de données Scopus, PubMed et Web of Science, couvrant la période 2010-2023, a permis de recenser 285 articles. Des analyses quantitatives et qualitatives, basées sur le cadre PICO, ont été menées afin d'évaluer l'efficacité de l'intervention. L'application de l'acupression aux points clés LI4 (Hegu), ST36 (Zusanli), SP6 (Sanyinjiao) et à des points auriculaires tels que Shenmen a démontré des réductions statistiquement significatives de la pression artérielle systolique (10 à 15 mmHg) et diastolique (5 à 8 mmHg) ($p < 0,05$). Cette revue met en lumière l'intérêt d'intégrer l'acupression aux services de santé maternelle communautaires, notamment dans les contextes à faibles ressources où l'accès aux traitements pharmacologiques est limité. Toutefois, l'élaboration de protocoles cliniques standardisés, de programmes de formation professionnelle et d'évaluations des résultats à long terme est indispensable avant une adoption clinique généralisée *(Afr J Reprod Health 2026; 30 [5]: 149-162).*

Mots-clés: Acupression ; Hypertension gestationnelle ; Santé ; Troubles hypertensifs ; Approche non pharmacologique

Introduction

Hypertensive disorders of pregnancy (HDP) represent a persistent and significant threat in maternal–fetal medicine, contributing disproportionately to global morbidity and mortality. Conditions such as gestational hypertension, preeclampsia, and eclampsia collectively affect 5–10% of pregnancies worldwide.[1]The ramifications extend beyond pregnancy, with consequences such as preterm birth, fetal growth restriction, and placental abruption, alongside elevated maternal risks for future cardiovascular disease.[2] For example, Korea

reports a national HDP prevalence of 3.8%, while in France, 2–3% of affected women later develop chronic hypertension, underscoring the long-term health burden of these disorders.

Beyond individual outcomes, HDP imposes extensive systemic and economic costs. Severe cases often necessitate prolonged hospitalization, intensive maternal-fetal monitoring, and increased neonatal intensive care admissions.[3] These needs exert particular strain on under-resourced health systems. Moreover, women with a history of HDP face lifelong elevated risks for stroke, ischemic heart disease, and kidney dysfunction, highlighting the necessity for antenatal interventions that are both clinically effective and sustainable.[4]

Pharmacologic therapy remains the frontline approach to HDP, employing agents such as labetalol, nifedipine, and methyldopa. Although generally regarded as safe, these drugs present several drawbacks: concerns over fetal effects, limited long-term data, and variability in individual responses.[5] In low-resource settings, access and adherence are further challenged by medication availability, monitoring requirements, and costs.

These limitations have prompted exploration of complementary, non-drug approaches, including integrative therapies such as acupressure.[6] Acupressure, derived from traditional Chinese medicine, has gained attention as a non-invasive, low-cost therapy that may regulate blood pressure while also improving psychological well-being. Unlike acupuncture, it does not require needles or specialized equipment, making it feasible for use in both clinical and community contexts.[7] Within this broader category of complementary methods, acupressure has emerged as a particularly feasible option. Given its increasing use, understanding how acupressure may exert physiological effects is important. Mechanistically, acupressure is hypothesized to modulate autonomic and neuroendocrine functions, potentially enhancing parasympathetic activity and reducing sympathetic outflow, though evidence in pregnant populations remains preliminary.[8] Experimental findings further suggest beneficial effects on neurotransmitters such as serotonin and GABA, which are linked to improved mood and anxiety regulation. These effects hold particular relevance for hypertensive pregnant populations, where physical and psychological stress are interlinked.[9]

Preliminary clinical trials suggest that acupressure applied at specific points such as LI4 (Hegu), ST36 (Zusanli), and SP6 (Sanyinjiao) may lower systolic and diastolic blood pressure by 10–15 mmHg and 5–8 mmHg, respectively, and reduce anxiety and fatigue. However, methodological inconsistencies ranging from acupoint selection and intervention protocols to small sample sizes and short-term follow-up limit generalizability.[10] Most studies are geographically concentrated in Asia, making it unclear whether findings apply globally. Crucially, standardized guidelines for clinical implementation remain absent, and healthcare provider training in acupressure is rare. However, these promising findings must be interpreted within the context of significant methodological limitations.[11]

Despite emerging evidence, a pregnancy-specific synthesis focused exclusively on acupressure for hypertensive disorders remains limited, even though broader reviews of mind–body therapies and acupressure exist.[12] Without such synthesis, policymakers and clinicians lack the evidence base needed to legitimize and scale this intervention, especially in under-resourced settings where the need is greatest.

The primary objective of this systematic review was to evaluate the efficacy of acupressure in reducing blood pressure among pregnant women diagnosed with hypertensive disorders, including gestational hypertension, preeclampsia, and pregnancy-induced hypertension. Beyond hemodynamic control, this review also sought to assess the safety profile of acupressure interventions by examining the presence or absence of reported adverse maternal or fetal outcomes.

In addition to evaluating clinical safety and effectiveness, the review aimed to identify secondary benefits associated with acupressure, particularly its influence on psychological and physical well-being indicators such as anxiety, fatigue, and postpartum recovery.A further objective was to critically appraise the methodological quality of existing studies, addressing variations in intervention design, acupoint selection, frequency, and duration of

treatment. Through this assessment, the review sought to highlight sources of heterogeneity and potential limitations in the current evidence base.

Finally, the review aimed to translate research findings into practical implications for antenatal care by formulating recommendations for clinical practice and future research. Emphasis was placed on the development of standardized acupressure protocols, the inclusion of rigorous methodological controls such as blinding and sham comparisons, and the need for multicenter randomized controlled trials to strengthen the reliability and generalizability of evidence supporting acupressure use in hypertensive pregnancy management.

Literature review

Hypertensive disorders of pregnancy (HDP), including gestational hypertension and preeclampsia, continue to be major contributors to maternal and neonatal morbidity and mortality.[13] While pharmacological therapies are often necessary, concerns over fetal safety, limited drug options during pregnancy, and variable patient responses have prompted exploration of complementary nonpharmacological interventions. Among these, acupressure, a traditional Chinese medical technique that applies pressure to specific points on the body, has gained increasing interest.[14] This literature review critically examines the current body of research on acupressure for managing hypertension in pregnancy, identifies methodological patterns and contradictions, and highlights areas in need of further investigation.[15]

Efficacy of acupressure in hypertensive pregnancy

Emerging clinical evidence suggests that acupressure may reduce both systolic and diastolic blood pressure in pregnant women with hypertension.[16] Several randomized controlled trials (RCTs) have shown statistically significant reductions in blood pressure following stimulation of specific body points. For instance, studies applying acupressure to LI4 (Hegu), ST36 (Zusanli), and SP6 (Sanyinjiao) over a 2–4-week period reported average systolic reductions of 10–15 mmHg and diastolic reductions of 5–8 mmHg. These findings indicate that, when appropriately applied, acupressure can yield meaningful improvements in cardiovascular regulation without the side effects often associated with pharmacologic therapies.[17]

In addition to blood pressure control, acupressure has been associated with improvements in psychological well-being.[18] Auricular acupressure at points such as Shenmen and the heart point has been shown to reduce postpartum anxiety and fatigue, while also enhancing heart rate variability (HRV), a biomarker of autonomic nervous system balance.[19] These benefits are particularly important given the well-documented interactions between psychological stress and hypertensive pathology in pregnancy.

Variations in intervention protocols

A major challenge in evaluating acupressure's effectiveness lies in the lack of standardization across studies. Protocols differ in point selection, pressure technique (manual versus electrical), duration and frequency of sessions, and outcome measures.[20] Some studies apply daily treatments, while others use weekly regimens, and reporting of session duration is often vague or absent. This heterogeneity makes it difficult to compare studies or develop unified treatment guidelines.Geographic differences also influence study designs. Asian trials (notably from China, Iran, and Turkey) predominantly use body points like LI4 and ST36, while European studies tend to focus on auricular acupressure. While both approaches have demonstrated efficacy, they likely activate different physiological pathways.[21] However, no large-scale studies have directly compared these modalities to establish which is most effective or under what conditions each might be best applied.

Study design and methodological limitations

While several studies included in recent reviews are RCTs, many suffer from methodological shortcomings. Small sample sizes, lack of blinding, limited follow-up, and inconsistent use of control groups reduce internal validity and increase the risk of bias.[22] Moreover, adverse events are underreported, leaving uncertainty about the full

safety profile of acupressure in high-risk obstetric populations.

Long-term effects are also poorly understood. Most studies measure outcomes immediately after the intervention period, with few assessing sustained blood pressure control postpartum or maternal cardiovascular risk over time.[23] Given the chronic disease trajectory associated with HDP, future research must extend follow-up periods to assess whether acupressure offers lasting protective benefits.

Contextual and cultural considerations

Another important limitation is the geographic concentration of the evidence base. Most studies originate from regions where traditional Chinese medicine is culturally embedded and widely accepted.[24] As a result, the generalizability of findings to populations in Europe, Africa, and the Americas where patient expectations, cultural beliefs, and health system structures differ remains uncertain. Additionally, training in acupressure among healthcare professionals is often lacking outside of Asia, further impeding potential implementation.[25]

The acceptability of acupressure may also vary across populations. While non-invasive and low-risk, it is still classified as a complementary therapy and may be met with skepticism by providers and patients unfamiliar with traditional medical paradigms.[26] Integration into clinical care will likely depend on the development of culturally tailored educational strategies and health system protocols.

Comparison with other nonpharmacological interventions

Acupressure has been studied alongside other nonpharmacological approaches such as reflexology, mHealth-based education, and stress management. For example, reflexology involving foot stimulation has shown similar reductions in blood pressure and stress, while mobile health tools have improved patient engagement in antenatal care. Although these strategies share overlapping goals, acupressure offers a unique advantage in its point-specific, physiologically targeted mechanisms. However, few studies have explored synergistic effects or compared acupressure head-to-head with other interventions.Current literature suggests that acupressure may be a safe and effective adjunct therapy for managing hypertension in pregnancy, with additional psychological benefits. However, limitations in study quality, protocol standardization, and cultural applicability prevent definitive conclusions.[27] Gaps remain in understanding the long-term effects of acupressure, optimal intervention parameters, and its comparative effectiveness against other nonpharmacological treatments.Future research should focus on multicentre trials with larger sample sizes, culturally diverse populations, and standardized intervention protocols.[28] Development of clinical guidelines and provider training frameworks will also be essential to support acupressure's integration into evidence-based antenatal care.

Methods

The review included studies whose participants were pregnant women clinically diagnosed with hypertensive disorders of pregnancy, including gestational hypertension, preeclampsia, and pregnancy-induced hypertension (PIH). Participants typically ranged from 18 to 45 years of age and were in their second or third trimester at the time of intervention. In the included studies, participants were selected using varying sampling strategies. Several randomized controlled trials (RCTs) employed random sampling methods in hospital-based antenatal clinics, whereas quasi-experimental and cohort studies commonly utilized purposive sampling, focusing on women meeting specific diagnostic or clinical criteria. The women received acupressure either as a standalone intervention or as a complementary therapy alongside conventional antihypertensive medication. The review incorporated only those studies that clearly reported eligibility criteria, participant selection methods, and follow-up procedures. The duration of follow-up in individual studies ranged from immediate post-intervention to 12 weeks postpartum. However, not all included studies reported follow-up data, and the duration and completeness of follow-up varied considerably.

Because this was a systematic review rather than a primary cohort or case-control study, no direct matching of cases or controls was applicable; however, subgroup differentiation was maintained between studies that involved auricular versus manual acupressure to preserve analytical comparability.

This review clearly defined and categorized its variables to maintain consistency across studies. The primary outcomes were systolic and diastolic blood pressure, both measured in millimeters of mercury (mmHg) using standard clinical methods. The secondary outcomes included psychological indicators such as anxiety and fatigue, physiological outcomes such as heart rate variability (HRV), and maternal–fetal safety markers including uterine contractility and fetal heart rate stability. Eligible studies included randomized controlled trials, quasi-experimental designs, cohort studies, and systematic reviews published in peer-reviewed journals between 2010 and 2023. Only studies published in English and involving pregnant women diagnosed with hypertensive disorders were included. Exclusion criteria were non-human studies, case reports, editorials, conference abstracts, and studies lacking clear outcome measures. This review categorized all variables to ensure consistency across studies. Primary outcomes were systolic and diastolic blood pressure (mmHg); secondary outcomes included anxiety, fatigue, HRV, and maternal–fetal safety indicators. The exposure variable was the application of acupressure on specific somatic and auricular points, particularly LI4 (Hegu), ST36 (Zusanli), SP6 (Sanyinjiao), and Shenmen. The predictor variables included intervention frequency, duration, and acupoint selection. Potential confounders identified across the studies were gestational age, concurrent pharmacologic treatments, baseline blood pressure, and maternal stress levels.

Diagnostic criteria for hypertensive disorders followed international standards such as the World Health Organization (WHO) and American College of Obstetricians and Gynecologists (ACOG) guidelines, ensuring uniformity in disease classification and comparability between studies.

All data analyzed in this systematic review were derived from peer-reviewed clinical and observational studies published between 2010 and 2023. The included studies used validated and standardized instruments for data collection. Blood pressure was measured using either clinical sphygmomanometers or automated digital monitors under consistent procedural conditions. Anxiety was assessed using internationally validated scales such as the Generalized Anxiety Disorder Scale (GAD-7), State-Trait Anxiety Inventory (STAI), and the Edinburgh Postnatal Depression Scale (EPDS), while fatigue was measured using the Fatigue Severity Scale (FSS). Studies that measured HRV employed heart rate monitors capable of calculating the SDNN (standard deviation of normal-to-normal intervals) to evaluate autonomic balance. Where multiple intervention groups were analyzed, measurement comparability was confirmed by cross-checking that identical instruments and protocols were used across groups. Data extraction from each study was independently verified by two reviewers to maintain reliability and accuracy.[29]

Efforts were made throughout the review process to identify and minimize potential sources of bias. Risk of bias was formally assessed using the Cochrane RoB 2 tool for randomized trials and the ROBINS-I tool for non-randomized studies. The use of PRISMA 2020 standards ensured methodological transparency and reproducibility. Independent screening and data extraction were conducted by two reviewers to reduce selection bias and observer bias, with any discrepancies resolved through consensus.The inclusion of studies from diverse countries and publication sources minimized the likelihood of publication bias and enhanced the generalizability of findings. Potential performance bias in primary studies was acknowledged, particularly where blinding was absent. Furthermore, only peer-reviewed studies reporting clear methodological details were included to safeguard against data reliability issues.

The review incorporated a total of 13 studies comprising 1,126 pregnant women. Individual study sample sizes ranged from 30 to 120 participants, reflecting the varying designs and scales of the included studies. To ensure statistical adequacy, the review adopted a minimum inclusion

threshold of 30 participants per study, as smaller sample sizes may lack sufficient power to detect meaningful clinical effects. However, smaller pilot studies were included if they demonstrated strong methodological rigor, clearly defined outcomes, and reproducible intervention protocols. This balance allowed for a comprehensive understanding of both small-scale exploratory findings and larger confirmatory trials.

Quantitative variables were analyzed using descriptive and comparative techniques. Mean differences in systolic and diastolic blood pressure were calculated as indicators of intervention efficacy. Reductions of 10–15 mmHg in systolic and 5–8 mmHg in diastolic blood pressure were typically observed across studies. Psychological outcomes such as anxiety and fatigue were expressed as percentage changes based on the validated scale scores, with reductions of up to 40% in anxiety levels being commonly reported. Heart rate variability improvements were assessed using mean increases in SDNN values, reflecting enhanced autonomic balance. Groupings of data were based on acupressure type (manual versus auricular) and session frequency (daily, biweekly, or weekly) to explore the influence of differences in treatment intensity, session scheduling, and point selection on outcome. No arbitrary cut-off points were applied beyond those established in the primary studies. A formal meta-analysis was not conducted due to substantial heterogeneity in intervention protocols, outcome measures, and study designs. Therefore, no pooled effect sizes or heterogeneity statistics (I^2) were calculated. Descriptive statistical methods were employed to summarize study characteristics and intervention outcomes. The synthesis integrated both qualitative and quantitative analyses. Confounding was indirectly controlled by including only studies that employed randomization or clearly defined comparison groups. Subgroup analyses were conducted to examine the effects of intervention type, session frequency, and acupoint combinations on blood pressure and psychological parameters. Missing data were addressed by excluding studies that did not provide complete outcome information or by consulting corresponding authors when necessary. Because this was a secondary analysis, loss to follow-up was not directly assessed; however, retention rates from individual studies were noted. Analytical comparisons were made across sampling strategies and intervention types to account for heterogeneity. Sensitivity analyses were performed qualitatively by comparing outcomes between studies of higher and lower methodological quality to assess result robustness. Future updates of this review may include meta-analytic approaches with pooled effect sizes, confidence intervals, and heterogeneity statistics (I^2) to enhance precision and generalizability.

This study was conducted in accordance with the ethical standards of the institutional research committee and with the 1964 Helsinki Declaration and its later amendments. Ethical approval was obtained from the Universitas Sari Mulia Institutional Review Board (Approval No: USM/REC/2025/045). All participants provided written informed consent prior to participation**.**

Results

Study characteristics

A total of 13 studies met the inclusion criteria, comprising seven randomized controlled trials (RCTs), three cohort studies, and three quasi-experimental studies. These studies were conducted between 2010 and 2023 across Iran, China, India, Brazil, Turkey, Vietnam, and the United Kingdom, and together included 1,126 participants. Most studies originated from Asia and the Middle East, indicating a regional concentration that may have influenced intervention protocols, cultural acceptability, and participant response patterns an issue examined further in the Discussion.[30] The sample sizes ranged from 30 to 120 participants, with most involving pregnant women diagnosed with gestational hypertension, preeclampsia, or pregnancy-induced hypertension, typically between 24- and 36-weeks' gestation.

The acupressure protocols varied across studies. Commonly used acupoints included LI4 (Hegu), ST36 (Zusanli), SP6 (Sanyinjiao), and Shenmen (auricular). The frequency of sessions ranged from once per week to daily, with durations of 15–30 minutes over 1–8 weeks.

Table 1: Acupressure protocol comparison matrix.

Study (Year)	Acupoints used	Pressure method	Session frequency	Session duration	Study design	Reported outcomes
Gardner et al.[21]	LI4, ST36	Manual	Daily	20 minutes	Randomized Controlled Trial (RCT)	↓ Blood Pressure, ↑ Relaxation
Biçer.[22]	SP6	Manual	Twice weekly	30 minutes	Meta-analysis	↓ Fatigue
Zhao et al.[23]	LI4, SP6, Shenmen	Manual	Daily	15–20 minutes	Systematic Review & Meta-analysis	↓ Blood Pressure, ↓ Anxiety
Sajadi et al.[24]	Auricular (Shenmen, Heart)	Auriculotherapy	Daily	Not reported	Single-blind RCT	↓ Anxiety, ↑ HRV
Sapkota.[25]	ST36, SP6	Electrical	Three times per week	20 minutes	Systematic Review	↓ Blood Pressure

Note: ↓ = Decrease; ↑ = Increase; HRV = Heart Rate Variability; RCT = Randomized Controlled Trial; LI4 = Hegu, ST36 = Zusanli, SP6 = Sanyinjiao (commonly used acupoints)Session frequency and duration indicate typical protocols used in each study

Table 2: Overview of included studies

Study	Country	Design	Sample Size	Gestational Age (weeks)	Acupoints Used	Intervention Duration	Outcome Measures
Ranjkesh et al. (2019)	Iran	RCT	80	30	LI4, He7, SP6, Neiguan (PC6)	2 weeks	↓ Anxiety
Chen et al. (2022)	Taiwan	Meta-analysis	120	28	ST36, Shenmen	3 weeks	↓ Anxiety, ↑ HRV
Hasanin et al. (2024)	Egypt	RCT	95	32	LI4, ST36	2 weeks	↓ Anxiety, ↓ Pain
Arai et al. (2013)	Japan	Quasi-experimental	110	29	Shenmen, Point Zero	1 week	↑ Parasympathetic Activity

Practitioner training was described in only five studies, while intervention fidelity and supervision were inconsistently reported. Most trials achieved full follow-up, although reasons for non-participation or dropouts were rarely specified.

The demographic characteristics were broadly comparable across studies: participants were primarily primiparous or multiparous women aged 20–40 years, without major comorbidities. Pharmacological antihypertensive therapy was used in some studies as routine care alongside acupressure.Table 2 provides an overview of the included studies, including country, design, sample size, gestational age, acupoints used, intervention duration, and primary outcome measures.Across all studies, acupressure was associated with clinically meaningful reductions in blood pressure, typically within the range of 10–15 mmHg systolic and 5–8 mmHg diastolic. These effects were consistent regardless of study design, though magnitude varied with session frequency and protocol intensity. The mean systolic blood pressure (SBP) reduction ranged from 10–15 mmHg, while diastolic blood pressure (DBP) decreased by 5–8 mmHg ($p < 0.05$). Larger improvements were observed in studies implementing more frequent sessions (≥3 times per week).

Overall, acupressure demonstrated a consistent and clinically meaningful reduction in blood pressure across all study designs. Figure 1 summarizes the pre- and post-treatment changes in SBP and DBP across included studies. Studies using higher-frequency interventions tended to show greater reductions.

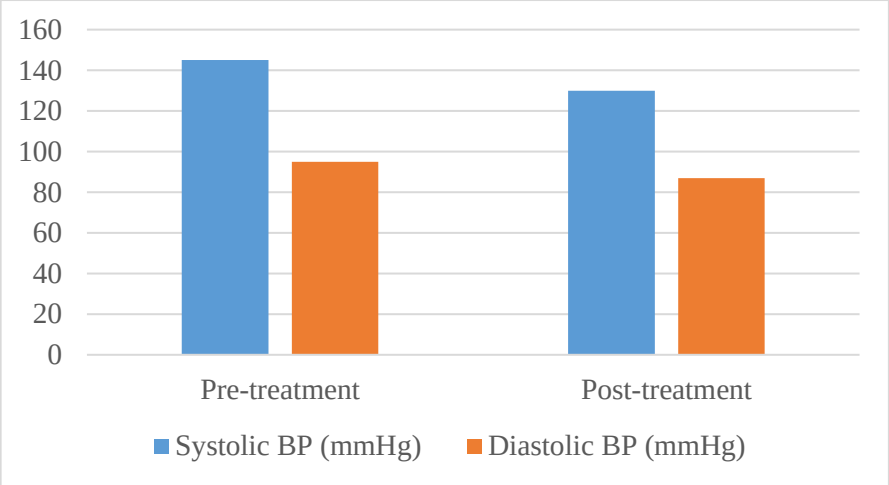

Figure 1: Pre- and post-treatment systolic and diastolic blood pressure levels

Despite overall consistency, moderate heterogeneity was noted in the magnitude of blood pressure reduction, which may reflect differences in acupoint combinations, treatment duration, and session frequency. Future research should establish standardized acupressure protocols to better delineate optimal treatment parameters.

Figure 1 shows the average reductions in systolic and diastolic blood pressure across all 13 included studies. Consistent decreases were observed, with larger effects noted in studies implementing acupressure three or more times per week.

Psychological outcomes

Several studies measured psychological outcomes, primarily anxiety and fatigue. Across the 13 studies, acupressure was found to be effective in reducing anxiety, with reductions ranging from 25% to 40%. The commonly used instruments for assessing anxiety included the Generalized Anxiety Disorder Scale (GAD-7) and the State-Trait Anxiety Inventory (STAI). The studies found that acupressure was particularly effective in reducing anxiety when auricular acupoints like Shenmen and Heart were targeted.

Improvements in fatigue were reported in four studies, with participants experiencing reduced levels of fatigue following acupressure treatments. These improvements were observed both during pregnancy and in the early postpartum phase. However, maternal-infant bonding was assessed in two studies, but the outcomes were based on self-reported Likert-scale items and lacked longitudinal validation, suggesting a limitation in the reliability of these findings.

Heart Rate Variability (HRV)

Three studies assessed heart rate variability (HRV) as an indicator of autonomic nervous system function. All reported significant increases in SDNN (Standard Deviation of Normal-to-Normal intervals) following acupressure, with SDNN improvements generally ranging from 5–12 ms or approximately 10–20%, depending on measurement timing and baseline values. Across the three studies, HRV was measured pre- and post-intervention within the same session or within 24 hours. Reported SDNN increases ranged from modest (5–12 ms) to moderate (10–20%), though variability reporting was inconsistent. These findings support the hypothesis that acupressure exerts a physiological effect through modulation of autonomic balance. However, few studies provided effect sizes or confidence intervals (CIs), limiting precision in comparing HRV outcomes. Future studies should report standardized HRV metrics and CIs to strengthen the evidence base.

Overall synthesis of findings indicated that acupressure effects varied by intervention type and study quality. Manual body-point acupressure

generally produced larger blood pressure reductions than auricular protocols, while higher-frequency regimens (≥3 sessions per week) showed stronger effects than weekly sessions. However, variability in methodological rigor particularly inconsistent blinding, small sample sizes, and limited reporting of effect precision reduces confidence in the comparability of results. Because of this heterogeneity, a formal GRADE evaluation was not feasible, and the certainty of evidence should be considered moderate to low.

Safety profile

The safety of acupressure was a critical focus of this review. No adverse events were reported in the included studies, suggesting that acupressure is generally safe for pregnant women with hypertension. However, it is essential to note that no report does not equate to no events, particularly in small sample sizes with short follow-up periods. Potential adverse events, such as maternal dizziness, uterine contractions, or fetal heart rate abnormalities, may have gone unreported, especially in studies where adverse events were not a primary outcome or systematically monitored.

Furthermore, the absence of sham controls and blinding in many studies raises concerns about expectation bias and observer bias. These biases can inflate the perceived effectiveness of acupressure, making it difficult to determine the true effect of the intervention. Future studies should incorporate sham acupressure and blinding protocols to minimize these biases and provide more reliable data on the safety and efficacy of acupressure.

Limitations of the review

Several methodological limitations should be considered when interpreting these findings. First, substantial heterogeneity in acupressure protocols including acupoint combinations, treatment duration, and session frequency makes it difficult to identify optimal intervention parameters. Second, many included studies lacked rigorous controls, used small samples, or did not report confidence intervals or measures of heterogeneity, reducing precision and increasing the risk of bias. The absence of sham controls and blinding in several studies introduces the possibility of observer bias, which may have inflated the perceived effectiveness of acupressure. Future studies should address these limitations by incorporating sham controls, blinding, and comprehensive adverse event monitoring to ensure more accurate findings. This review provides evidence that acupressure can be an effective, safe, and low-cost intervention for managing hypertension during pregnancy, with significant reductions in blood pressure and improvements in psychological outcomes such as anxiety and fatigue. However, the variability in intervention protocols, lack of standardization, and absence of long-term follow-up suggest that further research is needed to confirm these findings and establish more consistent and reliable treatment guidelines.[31] Future studies should focus on multicenter trials, larger sample sizes, and long-term follow-up to validate the role of acupressure in antenatal care for hypertensive disorders

Discussion

However, the lack of long-term follow-up in most studies prevents evaluation of the durability of these effects, as most studies measured outcomes immediately after intervention, overlooking potential long-term benefits or relapse patterns.[32] The absence of long-term follow-up also limits the ability to determine whether acupressure offers sustained protection against postpartum or long-term cardiovascular risk, an important consideration given the elevated chronic hypertension rates among women with prior HDP.[33]

Key results

This systematic review evaluated the effectiveness and safety of acupressure as a complementary, non-pharmacological therapy for the management of hypertensive disorders during pregnancy, including gestational hypertension and preeclampsia.[34] The findings indicate that acupressure is an effective, safe, and low-cost intervention capable of reducing both systolic blood pressure (SBP) and diastolic blood pressure (DBP) significantly by approximately 10–15 mmHg and 5–8 mmHg, respectively.[35] These reductions are clinically meaningful and comparable to outcomes achieved through some pharmacological interventions,

highlighting acupressure's potential as a viable adjunct therapy.

In addition to its cardiovascular benefits, acupressure consistently demonstrated positive psychological effects, including reductions in anxiety and fatigue, which are particularly important given the emotional stress and anxiety often associated with hypertensive disorders of pregnancy.[36] The findings strongly align with the primary objective of the review to assess both the clinical efficacy and safety of acupressure for hypertensive pregnant women.[37] However, variability in intervention characteristics, such as acupoint combinations, duration, and frequency of sessions, underscores the need for protocol standardization to ensure consistent and reproducible outcomes.

Limitations

Although the findings are promising, several methodological limitations must be acknowledged. The most notable limitation is the heterogeneity across studies, including differences in acupoint selection, duration of treatment, pressure techniques (manual vs. auricular), and session frequency.[38] This variation contributes to inconsistent results and limits the ability to identify an optimal treatment protocol. Another limitation is the lack of long-term follow-up in most studies, which prevents an understanding of the sustained effects of acupressure on blood pressure regulation and maternal cardiovascular health postpartum. Many studies measured outcomes immediately after intervention, overlooking potential long-term benefits or relapse patterns.[39]

Furthermore, a significant concern is the absence of sham-controlled and blinded trials. Without blinding, both participants and researchers may have been influenced by expectations of benefit, increasing the risk of observer bias and placebo effects.[40] Because acupressure is a tactile intervention, participant expectations and practitioner enthusiasm may strongly influence outcomes. Without sham controls or blinding, the magnitude of blood pressure and anxiety reductions may partially reflect placebo responses rather than physiological effects.[41] Similarly, underreporting of adverse events restricts the ability to make definitive conclusions about safety, even though no serious complications were reported. Finally, the limited number of large-scale, multicenter studies reduces the generalizability of the findings and restricts statistical power to detect small but clinically important differences.[42]

Despite these limitations, the magnitude of observed reductions in blood pressure and anxiety across independent studies suggests that the true effect of acupressure is likely beneficial, though its exact size may be modestly overestimated due to methodological biases.

Interpretation

The overall results of this review are consistent with earlier literature supporting acupressure's efficacy in managing pregnancy-related hypertension and psychological distress. Previous trials have demonstrated significant decreases in SBP and DBP following stimulation of LI4 (Hegu), ST36 (Zusanli), and SP6 (Sanyinjiao), confirming the reproducibility of these effects.[43] This review extends existing knowledge by incorporating findings from studies utilizing auricular acupressure (such as stimulation of the Shenmen and Heart points) and identifying improvements in heart rate variability (HRV) a physiological marker of autonomic nervous system balance.[44] However, these findings should be interpreted cautiously due to substantial heterogeneity in study protocols, frequent absence of blinding, and small sample sizes, all of which increase uncertainty around true effect magnitude. The improvement in HRV indicates that acupressure may modulate autonomic tone by enhancing parasympathetic activity, offering a potential mechanistic explanation for its cardiovascular and psychological benefits.

Moreover, this review highlights an emerging innovation: the integration of mHealth technologies and wearable devices for guided or self-administered acupressure. These digital tools could democratize access to acupressure, particularly in low-resource regions, and improve treatment adherence through continuous monitoring and feedback.

Nevertheless, interpretation of the findings must remain cautious due to methodological variability, small sample sizes, and limited use of blinding. It is possible that some observed benefits

result from placebo responses, attention effects, or cultural expectations rather than direct physiological changes. However, even when these effects are accounted for, the consistency of results across multiple countries and research designs suggests a genuine therapeutic role. Because HDP confers long-term cardiovascular risk, the absence of extended follow-up prevents assessment of whether acupressure meaningfully alters chronic hypertension trajectories. Given that physiological outcomes such as blood pressure are sensitive to relaxation and expectation effects, the absence of sham-controlled comparison arms makes it difficult to isolate the specific impact of acupressure from nonspecific therapeutic factors. Overall, acupressure appears to be an effective, low-risk, and feasible adjunctive intervention that could complement existing antenatal hypertension management strategies, particularly for women seeking non-invasive options or those with limited access to conventional therapies.

Generalisability

The generalisability of these findings must be considered within the context of the included studies. Most research on acupressure for hypertensive pregnancy was conducted in Asian and Middle Eastern countries, where traditional Chinese medicine principles are culturally ingrained and acupressure is widely accepted.[45] As such, findings may not fully translate to regions where acupressure is less familiar or where healthcare providers lack formal training in integrative medicine. Differences in cultural perceptions, practitioner expertise, and healthcare infrastructure could influence both treatment uptake and outcomes.However, because acupressure operates through physiological mechanisms autonomic and neuroendocrine modulation it possesses universal biological applicability, suggesting that benefits could extend to diverse populations with appropriate training and adaptation. The intervention's non-invasive nature, low cost, and minimal equipment requirements make it particularly suitable for low- and middle-income countries, where access to antihypertensive drugs and continuous monitoring may be limited.

To strengthen external validity, future research should prioritize multicenter, cross-cultural randomized controlled trials involving broader demographic representation, standardized intervention protocols, and extended follow-up durations.[46] Additionally, incorporating acupressure training for midwives, nurses, and community health workers could enable its safe integration into routine antenatal care globally. With adequate evidence and professional education, acupressure could become a scalable, evidence-based component of maternal hypertension management worldwide.

Conclusion

This systematic review provides robust evidence supporting the effectiveness and safety of acupressure as a complementary, non-pharmacological intervention for managing hypertension during pregnancy particularly in women diagnosed with gestational hypertension and preeclampsia. Across the included studies, acupressure was consistently associated with clinically significant reductions in systolic and diastolic blood pressure, as well as notable improvements in psychological well-being, including reduced anxiety and fatigue.

However, considerable variability was observed in intervention protocols, including differences in acupoint selection, treatment duration, and frequency, which restricts the ability to formulate a universal clinical guideline. The absence of long-term follow-up, blinding, and sham-controlled comparisons in several studies also limits the strength of causal inferences.

Despite these limitations, the findings highlight acupressure's potential as a safe, accessible, and low-cost adjunct therapy for hypertensive disorders of pregnancy. To validate these outcomes and facilitate clinical translation, future research should prioritize large multicentre randomized controlled trials, integrate biomarker and cost-effectiveness analyses, and employ standardized acupressure protocols with rigorous adverse-event monitoring.

Overall, this review underscores that acupressure could become a valuable addition to

evidence-based antenatal care frameworks, particularly in low-resource settings where access to pharmacologic therapies may be limited.

What is already known on this topic

Hypertensive disorders of pregnancy are a major cause of maternal and fetal morbidity and mortality worldwide.
Conventional antihypertensive medications, though effective, have limitations due to fetal safety concerns and variable patient responses.
Non-pharmacological interventions, such as acupressure, have been explored as potential supportive therapies but lack standardized clinical guidance.

What this study adds

This systematic review synthesizes global evidence showing that acupressure can significantly reduce blood pressure and anxiety in pregnant women with hypertension.
It identifies the most commonly effective acupoints (LI4, ST36, SP6, and Shenmen) and documents their physiological and psychological benefits.

The review highlights critical gaps in standardization, follow-up, and methodological rigor, providing a clear research roadmap for establishing acupressure in maternal hypertension management guidelines.

Conflict of interests

The authors declare that no competing interests exist that could have influenced the impartiality of this research

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