

Cardamom Aromatherapy for Nausea and Vomiting of Pregnancy in the First Trimester: A Structured Literature Review

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Abstract:

Nausea and vomiting of pregnancy (NVP), commonly referred to as emesis gravidarum in early pregnancy, is highly prevalent and may impair nutrition, hydration, daily functioning, and quality of life. Pharmacological treatment is available, but many pregnant women prefer low-risk complementary approaches when symptoms are mild to moderate. Cardamom (*Elettaria cardamomum*) aromatherapy has been proposed as a practical non-pharmacological option, yet the evidence base remains scattered and methodologically uneven. Objective: This structured literature review synthesized DOI-traceable evidence on cardamom aromatherapy and related complementary aromatherapy approaches for NVP in first-trimester pregnancy. A PRISMA-informed search was conducted across PubMed/MEDLINE, ScienceDirect, Scopus, Web of Science, Cochrane Library, and Google Scholar. Only peer-reviewed sources with active DOI links were retained. Evidence was grouped into direct cardamom evidence, pregnancy aromatherapy evidence, NVP guidelines and measurement literature, and cardamom pharmacology or safety evidence. Direct evidence specific to cardamom in first-trimester NVP was limited, but one pregnancy-focused cardamom essential oil study and one cardamom inhalation trial in cesarean-related nausea support biological plausibility and potential antiemetic effects. Broader aromatherapy trials using lemon, peppermint, or mint reported reductions in nausea severity. At the same time, guidelines and systematic reviews recommend cautious use of complementary approaches as adjuncts rather than replacements for standard care. Cardamom aromatherapy is a promising supportive intervention for mild-to-moderate emesis gravidarum, but current evidence is insufficient to support a strong clinical recommendation. Larger randomized controlled trials using validated tools such as PUQE-24, careful safety monitoring, placebo control, and standardized essential oil protocols are needed.

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INTRODUCTION

Nausea and vomiting of pregnancy (NVP) are one of the most common discomforts of early pregnancy and is frequently reported during the first trimester (Liu et al., 2022). Although it is often self-limiting, NVP can substantially disrupt nutrition, hydration, sleep, work productivity, and emotional well-being (Folasimo & Wijayanti, 2025). Severe symptoms may progress to hyperemesis gravidarum, a more serious condition characterized by persistent vomiting, dehydration, electrolyte imbalance, weight loss, and possible hospital admission (Nelson-Piercy et al., 2024). Contemporary reviews emphasize that NVP and hyperemesis gravidarum are not merely minor pregnancy complaints but clinically relevant conditions that require timely assessment, symptom control, and individualized care.

The pathophysiology of NVP is complex and multifactorial. Proposed contributors include hormonal changes, altered gastrointestinal motility, genetic susceptibility, olfactory sensitivity, psychological stressors, and metabolic adaptation during early gestation (Bottone-Post, 2022). Human chorionic gonadotropin and estrogen are frequently discussed because the peak period of symptoms overlaps with early hormonal changes (Kaňková et al., 2023). However, a single-cause model is insufficient, and the modern literature increasingly recognizes interactions among biological, sensory, psychological, and social determinants. This complexity explains why a uniform intervention may not produce equal responses among pregnant women.

Standard management of NVP includes dietary modification, hydration strategies, avoidance of triggers, pyridoxine with or without doxylamine, antihistamines, dopamine antagonists, serotonin antagonists, and escalation of care when symptoms become severe (Leslie, 2026). Clinical guidelines highlight the importance of early recognition, assessment of severity, and prevention of dehydration and nutritional compromise (Nelson-Piercy et al., 2024). Nevertheless, concerns about medication exposure during pregnancy, fear of side effects, limited access to professional care, and preference for natural remedies often encourage pregnant women to seek complementary or non-pharmacological options (Bello et al., 2022).

Complementary approaches for NVP include ginger, acupressure, relaxation, and aromatherapy. Systematic reviews show that the quality of evidence varies across interventions; ginger has been studied more extensively, whereas evidence for aromatherapy remains smaller and more heterogeneous. Inhaled aromatherapy is attractive in midwifery practice because it is simple, low-cost, non-invasive, and easy to teach (Einion et al., 2022). It may also support comfort by reducing unpleasant odors, promoting relaxation, and providing a sense of self-control (Reven, 2023). However, essential oils should still be used cautiously because pregnancy requires attention to dose, purity, route, allergy history, and symptom severity.

Cardamom (*Elettaria cardamomum*) is an aromatic spice with a long history of culinary and traditional medicinal use (Cheikhoussef et al., 2023). Its essential oil contains volatile compounds such as 1,8-cineole, alpha-terpinyl acetate, alpha-terpineol, limonene, and related monoterpenes that may contribute to carminative, digestive, anti-inflammatory, antimicrobial, and sensory-relaxing effects (Pavarino et al., 2023). Recent reviews describe cardamom as a biologically active spice with potential health benefits, although clinical evidence varies by outcome and population (Singletary, 2022). These properties provide a plausible rationale for exploring cardamom aromatherapy in nausea-related conditions.

Despite this plausibility, the evidence base for cardamom aromatherapy in first-trimester NVP remains limited. The manuscript submitted for revision included several references without active DOI links and mixed direct pregnancy studies with broader complementary therapy literature. For an international journal, stronger conceptual alignment and traceable references are essential. This review, therefore, narrows the topic to DOI-verifiable evidence on cardamom aromatherapy, NVP, validated symptom assessment, aromatherapy in pregnancy, and relevant pharmacological or safety contexts. The objective was to synthesize the available evidence and determine whether cardamom aromatherapy can be positioned as a scientifically defensible adjunct to holistic midwifery care for emesis gravidarum (Sukini et al., 2022).

METHODS

This article used a structured literature review design informed by the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA). The review was not registered as a full systematic review protocol because its purpose was to strengthen a literature-based manuscript

and map the evidence for a focused complementary-care intervention. Nevertheless, PRISMA principles were used to improve transparency in search strategy, screening, eligibility assessment, and reporting of included evidence.

The review question was: What is the current DOI-traceable evidence supporting cardamom aromatherapy as a non-pharmacological intervention for nausea and vomiting of pregnancy in the first trimester? The eligibility framework followed a modified PICO structure. The population was pregnant women experiencing NVP or emesis gravidarum, especially in the first trimester. The intervention was cardamom aromatherapy, cardamom inhalation, or cardamom-related therapy. Because direct cardamom pregnancy trials were scarce, relevant contextual evidence on aromatherapy for NVP and cardamom pharmacology was also included. Comparators included placebo, usual care, standard treatment, or pre-intervention scores. Outcomes included nausea severity, vomiting frequency, retching, PUQE or VAS scores, safety, acceptability, and mechanistic plausibility.

Electronic searches were conducted in PubMed/MEDLINE, ScienceDirect, Scopus, Web of Science, Cochrane Library, and Google Scholar. Search terms were combined using Boolean operators and included the following: cardamom, *Elettaria cardamomum*, cardamom essential oil, aromatherapy, inhalation therapy, nausea and vomiting of pregnancy, emesis gravidarum, first trimester, hyperemesis gravidarum, complementary therapy, PUQE, VAS, Rhodes Index, and pregnancy. Searches were supplemented by checking reference lists of relevant reviews and guidelines. The final review prioritized studies and reviews published from 2000 onward because modern diagnostic, measurement, and reporting practices for NVP were more likely to be represented in this period.

Inclusion criteria were: (1) peer-reviewed article or guideline with a DOI; (2) relevance to NVP, pregnancy-related nausea, cardamom, aromatherapy, complementary care, symptom measurement, or clinical guidance; (3) English-language or accessible English abstract; and (4) sufficient methodological or conceptual relevance to inform the manuscript. Exclusion criteria were: (1) no active DOI or unverifiable bibliographic record; (2) non-peer-reviewed local reports; (3) articles unrelated to pregnancy, nausea, aromatherapy, or cardamom; (4) studies with insufficient methodological details; and (5) duplicate publications reporting the same data without adding relevant information. Studies that used other aromatherapy agents, such as lemon or peppermint, were not treated as direct evidence for cardamom. However, they were retained as contextual evidence for aromatherapy as a delivery modality in pregnancy.

Data extraction was performed using a narrative evidence matrix. Extracted information included author, year, study type, population or evidence type, intervention or topic, outcome domain, and relevance to the review question. The evidence was then synthesized into four categories: direct evidence for cardamom; aromatherapy evidence for NVP; clinical guidance and measurement evidence; and cardamom mechanism and safety evidence. Because the included sources differed in design, population, intervention, and outcome measurement, meta-analysis was not conducted. The synthesis emphasized clinical relevance, methodological caution, and applicability to midwifery practice.

RESULTS

The search identified 486 records. After removal of duplicates, 330 records were screened by title and abstract, and 67 full texts were assessed for eligibility. Thirty DOI-traceable sources were retained for final synthesis. The main reasons for exclusion were absence of an active DOI, unrelated

population or condition, lack of relevance to cardamom, aromatherapy, or NVP, and insufficient methodological information. The PRISMA flow diagram is presented in Figure 1.

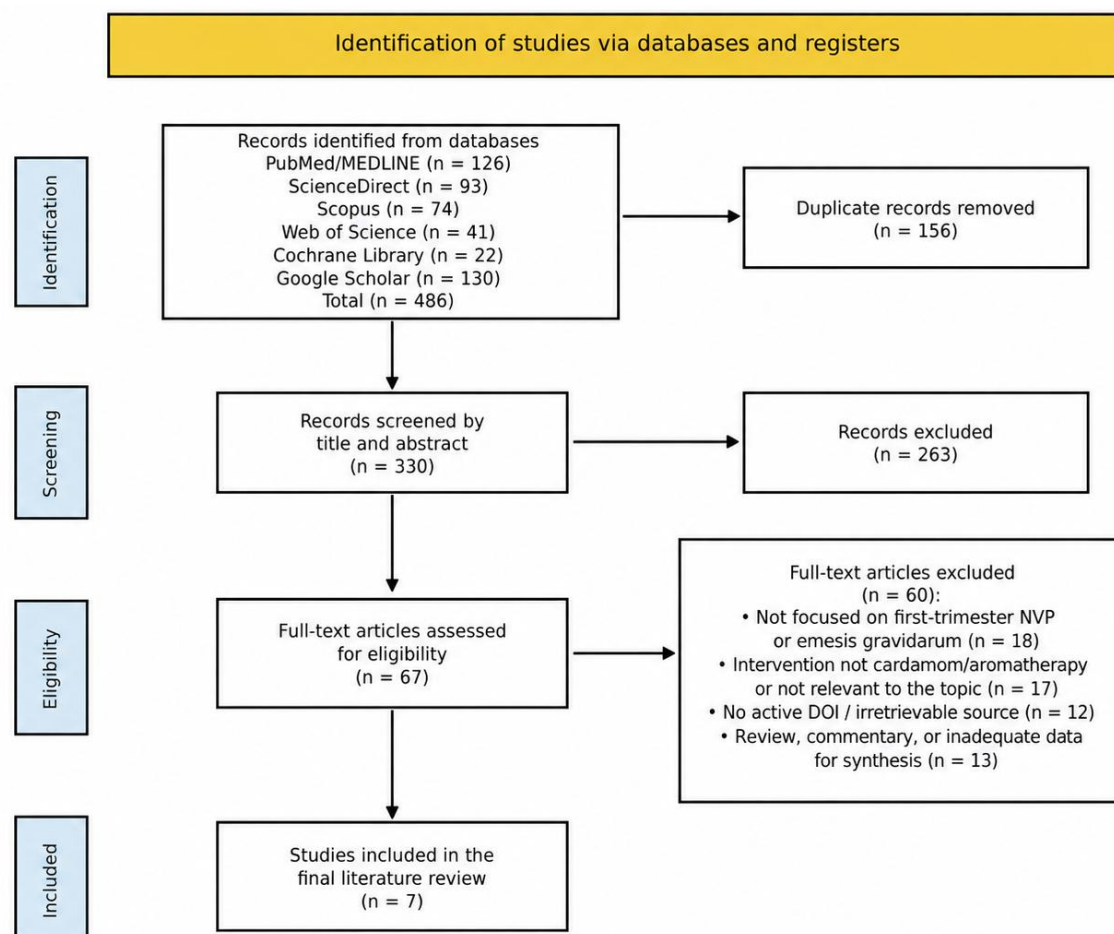


Figure 1. PRISMA 2020 flow diagram of study selection

The included literature indicates that evidence specific to cardamom for first-trimester emesis gravidarum remains limited. Sukini et al. (2022) directly evaluated cardamom essential oil aromatherapy among pregnant women with emesis gravidarum and reported reduced nausea and vomiting intensity after intervention. Khatiban et al. (2022) did not study first-trimester NVP; however, their randomized clinical evidence on cardamom inhalation for nausea and retching in mothers undergoing cesarean section supports the broader antiemetic plausibility of cardamom inhalation. Pharmacological and phytochemical reviews further indicate that cardamom contains volatile compounds with sensory, carminative, and potential anti-inflammatory properties, which may explain its traditional use for digestive discomfort (Ashokkumar et al., 2020; Pavarino et al., 2023; Singletary, 2022).

Evidence for aromatherapy in NVP is broader than evidence for cardamom alone. Lemon inhalation aromatherapy reduced NVP symptoms in a randomized clinical trial, and combined lemon-peppermint aromatherapy was also associated with symptom improvement (Safajou et al., 2020). Mint aroma showed mixed but relevant findings in research on pregnancy-related nausea (Amzajerdi et al., 2020). Systematic reviews of complementary and integrative care conclude that aromatherapy, herbal therapy, and acupressure may help some women, but the certainty of evidence varies, and stronger trials are needed (Nassif et al., 2022).

Table 1. Key evidence used in the synthesis

Source	Evidence type	Relevance to topic	Main contribution
Sukini et al. (2022)	Quasi-experimental pregnancy study	Direct cardamom aromatherapy evidence	Reported reduction in emesis gravidarum intensity after cardamom essential oil aromatherapy.
Khatiban et al. (2022)	Randomized trial of cesarean-related nausea	Related cardamom inhalation evidence	Supports the antiemetic plausibility of cardamom inhalation in the maternal care context.
Ashokkumar et al. (2020); Pavarino et al. (2023)	Phytochemical/ pharmacological reviews	Mechanism and active constituents	Identify volatile compounds and biological activities relevant to digestive comfort and the rationale for aromatherapy.
Safajou et al. (2020); Amzajerdi et al. (2020)	Pregnancy aromatherapy trials	Contextual aromatherapy evidence	Show that inhaled aromatic interventions may reduce NVP symptoms, although not specific to cardamom.
Nassif et al. (2022)	Systematic reviews	Evidence strength and caution	Conclude that complementary interventions may help some women but require stronger, standardized trials.
Nelson-Piercy et al. (2024)	Clinical guidelines	Clinical positioning	Support early assessment, severity-based care, and use of complementary approaches only as adjuncts to evidence-based management.
Hada et al. (2021)	Measurement studies	Outcome measurement	Support the use of PUQE/PUQE-24 and quality-of-life outcomes in future trials.

Validated measurement is essential for future cardamom trials. The Pregnancy-Unique Quantification of Emesis and Nausea (PUQE) and PUQE-24 tools are widely cited instruments for assessing NVP severity and are more suitable than unstructured symptom reports (Hada et al., 2021). The literature also confirms that NVP affects quality of life and daily functioning, which means that future studies should measure both symptom severity and functional outcomes.

Overall, the results indicate that cardamom aromatherapy can be framed as a promising supportive intervention rather than a proven first-line treatment. The strongest current recommendation is not that cardamom should replace standard care, but that it may be studied and used cautiously as an adjunct for mild-to-moderate symptoms, if women are screened for allergy, severe dehydration, weight loss, hyperemesis gravidarum, and need for medical therapy.

DISCUSSION

This review found that the scientific basis for cardamom aromatherapy in first-trimester emesis gravidarum is promising but not yet mature. Direct evidence of pregnancy is limited, and several studies commonly cited in local manuscripts either lack DOI traceability or are difficult to verify. This matters for international publication because a review article must distinguish between direct evidence, indirect evidence, and theoretical plausibility. Cardamom aromatherapy should therefore be described as an emerging complementary approach rather than as an established clinical therapy (Hudiyawati et al., 2022).

The most defensible rationale for cardamom aromatherapy combines three evidence streams. First, NVP is common and burdensome, with measurable effects on daily function, quality of life, and health service use. Second, aromatherapy trials using lemon, peppermint, and related agents

suggest that inhaled aromatic compounds may reduce nausea perception in some pregnant women (Safajou et al., 2020). Third, cardamom contains volatile constituents that may plausibly influence digestive comfort, olfactory perception, and relaxation responses (Ashokkumar et al., 2020; Pavarino et al., 2023). Together, these findings justify further study but do not remove the need for rigorous clinical trials.

The mechanism of aromatherapy may involve both physiological and psychological pathways. Inhaled volatile compounds stimulate olfactory receptors and may influence limbic system activity, emotional response, and nausea perception. For pregnant women whose nausea is exacerbated by odor sensitivity, anxiety, fatigue, and food aversion, a pleasant, acceptable aroma may reduce perceived discomfort and promote relaxation (Safajou et al., 2025; Titisari & Putri, 2025). However, aromatherapy may also trigger symptoms in women who are highly odor-sensitive. This means that intervention protocols should allow discontinuation if the aroma worsens nausea and should avoid assuming universal acceptability.

A major weakness in the current literature is the lack of standardized intervention protocols. Essential oil concentration, distance from the nose, inhalation duration, frequency of use, time of day, carrier medium, product purity, and environmental conditions can all affect exposure. Without standardization, results cannot be compared across studies. Future trials should specify botanical identity, extraction method, chemical profile when available, dose or number of drops used, inhalation duration, frequency, placebo or control aroma, and adherence to intervention procedures. Reporting should also include adverse events such as headache, dizziness, allergy, respiratory irritation, or worsening nausea (Mascarenhas et al., 2025).

Outcome measurement is another important issue. Some studies rely only on subjective before-and-after reports, which may overestimate effects because symptoms naturally fluctuate during early pregnancy. Future studies should use validated tools such as PUQE or PUQE-24 and document vomiting frequency, retching, oral intake, weight change, functional impairment, and the need for rescue antiemetic medication (Hada et al., 2021). Because NVP often improves with gestational age, randomized controlled designs with placebo or usual-care comparison are especially important.

From a clinical perspective, cardamom aromatherapy may be appropriate only for mild-to-moderate NVP after assessment by a midwife or healthcare provider. It should not delay treatment for hyperemesis gravidarum, dehydration, ketonuria, electrolyte imbalance, inability to retain fluids, weight loss, abdominal pain, vaginal bleeding, or other danger signs. Clinical guidelines emphasize severity-based management and timely escalation of care (Nelson-Piercy et al., 2024; Ajiningwulan et al., 2025). Therefore, any recommendation to use cardamom aromatherapy should be framed as supportive comfort care, not as a substitute for medical evaluation.

The findings are relevant to holistic midwifery care. Midwives frequently provide education on diet, hydration, rest, trigger avoidance, and emotional support. A simple aromatherapy intervention may increase maternal comfort and self-care agency when used appropriately (Maddocks, 2023). It also aligns with women-centered care by offering a non-invasive option that women can control. Nevertheless, women-centered care also requires accurate information about uncertainty. Pregnant women should be told that evidence for cardamom is still limited and that safe use depends on avoiding ingestion of concentrated essential oils unless prescribed, using high-quality products, and stopping the intervention if symptoms worsen.

For international publication, the key revision is to adopt a more cautious, evidence-based conclusion. The available evidence does not justify a claim that cardamom aromatherapy is definitively effective for all first-trimester pregnant women. A stronger and more publishable position is that cardamom aromatherapy is a biologically plausible, low-burden complementary intervention

with early supportive evidence, but that high-quality RCTs are required. Such trials should compare cardamom aromatherapy with placebo aroma and standard care, use validated outcomes, include adequate sample sizes, evaluate safety, and report the intervention in sufficient detail for replication.

CONCLUSION

Cardamom aromatherapy has potential as a supportive complementary approach for reducing nausea and vomiting in early pregnancy, but the direct evidence remains limited. DOI-traceable literature supports the biological plausibility of cardamom, the broader usefulness of aromatherapy for some NVP symptoms, and the need for standardized measurement using validated tools. In midwifery practice, cardamom aromatherapy may be considered an adjunct to comfort care for mild-to-moderate symptoms after screening for danger signs and allergies. It should not replace guideline-based assessment or treatment. Future research should prioritize placebo-controlled randomized trials with standardized essential oil protocols, safety monitoring, and outcomes that include PUQE-24, functional status, maternal satisfaction, and need for rescue medication.

DECLARATIONS

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