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Comparison of peppermint and chamomile aromatherapy in reducing emesis gravidarum among first-trimester pregnant women

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Abstract

Background: Emesis gravidarum is one of the most common complaints experienced by pregnant women during the first trimester and may affect maternal nutritional status, daily activities, and quality of life. Aromatherapy is a non-pharmacological intervention that is considered safe and easy to apply for reducing nausea and vomiting during pregnancy.

Purpose: To determine the effectiveness of peppermint and chamomile aromatherapy in reducing emesis gravidarum in first-trimester pregnant women.

Method: This quasi-experimental study used a two-group pretest–posttest design. Forty first-trimester pregnant women with mild nausea and vomiting were assigned to peppermint aromatherapy and chamomile aromatherapy groups. Nausea and vomiting were measured using the Pregnancy-Unique Quantification of Emesis and Nausea questionnaire. Data were analyzed using paired-samples t-tests and independent-samples t-tests.

Results: The mean nausea and vomiting score in the peppermint group decreased from 5.55 ± 0.686 to 3.15 ± 0.366 ($p < 0.001$). In the chamomile group, the mean score decreased from 5.60 ± 0.681 to 3.25 ± 0.444 ($p < 0.001$). Independent-samples t-test showed a significant difference between the two groups ($p < 0.001$), indicating that peppermint aromatherapy was more effective than chamomile aromatherapy.

Conclusion: Both peppermint and chamomile aromatherapy effectively reduced nausea and vomiting in first-trimester pregnant women, with peppermint showing greater effectiveness.

Suggestion: Peppermint aromatherapy may be recommended as a complementary non-pharmacological intervention for managing emesis gravidarum in antenatal care services.

Keywords: Aromatherapy; Chamomile; Emesis Gravidarum; First Trimester Pregnancy; Peppermint.

INTRODUCTION

Nausea and vomiting are among the most common complaints experienced during pregnancy, particularly in the first trimester. This condition is characterized by the occurrence of nausea and vomiting resulting from physiological changes in various organ systems during pregnancy. During the first trimester, maternal levels of human chorionic gonadotropin (HCG), estrogen, and progesterone increase to support pregnancy maintenance; however, these hormonal changes also trigger responses in the central nervous system and gastrointestinal tract, leading to nausea and vomiting

(Vadakekut & Mahdy, 2026).

Symptoms of nausea and vomiting generally begin in early pregnancy and develop as pregnancy hormone levels increase. These symptoms usually appear at 9-10 weeks of gestation and peak between 11-13 weeks when hCG levels reach their highest concentration. In most pregnant women, the condition is temporary and improves naturally at 12-14 weeks of gestation as the body adapts physiologically to pregnancy (De Tejada, Vonzun, Von Mandach, Burch, Yaron, Hodel, & Hoesli, 2025). However, not all pregnant women experience the same pattern.

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Approximately 1–10% of cases indicate that nausea and vomiting may persist beyond 20–22 weeks of gestation. This variation is influenced by hormonal, metabolic, and psychological factors during pregnancy (Nelson-Piercy, Dean, Shehmar, Gadsby, O'Hara, Hodson, & Royal College of Obstetricians and Gynaecologists, 2024).

Globally, nausea and vomiting remain a significant maternal health concern. Data indicate that approximately 50–80% of pregnant women experience nausea and vomiting during the first trimester, and about 50% of them also experience vomiting (Gazal, Scarf, Kay-Smith, Gidaszewski, Chua, & Levett, 2025). Another study reported that the prevalence of emesis gravidarum in 2019 varied across countries, ranging from 1–3% in Indonesia, 2.2% in Pakistan, 1.9% in Türkiye, 0.9% in Norway, 0.8% in Canada, 0.8% in China, 0.3% in Sweden, 0.5% in California, and 0.5–2% in several regions of the United States (De Bonis, Cimino, Ianes, Costantini, d'Abate, Centini, & Martire, 2025).

In Indonesia, nausea and vomiting during pregnancy continue to require attention within maternal healthcare services. According to the 2018 Basic Health Research, approximately 20% of pregnant women reported persistent vomiting or diarrhea as part of pregnancy complications (Ministry of Health of the Republic of Indonesia, 2018). Furthermore, the 2023 Indonesian Health Survey (IHS) reported that the proportion of vomiting among pregnant women reached 6.1% (Ministry of Health of the Republic of Indonesia, 2018). These data indicate that nausea and vomiting during pregnancy remain a significant health issue, requiring appropriate monitoring and management strategies.

Although often considered a physiological condition, nausea and vomiting can have detrimental consequences if not properly managed. Excessive nausea and vomiting may lead to dehydration, electrolyte imbalance, and inadequate nutritional intake, thereby affecting both maternal and fetal health (Sembiring, 2023). If left untreated, the condition may progress to hyperemesis gravidarum, which increases the risk of fetal growth restriction and other pregnancy complications (Yuliana, Ifalahma, Listyani, Rahmasari, Puspitasari, Wargani, Duta, & Surakarta, 2024).

Several studies have demonstrated that nausea

and vomiting negatively affect the quality of life of pregnant women. One study reported that nausea and vomiting during pregnancy reduced the ability to perform daily activities, impaired nutritional status, and increased psychological burden (Gete & Ayele, 2026). Another study found that pregnant women experiencing moderate to severe nausea and vomiting had significantly lower quality of life in physical, social, and emotional domains, as well as a higher risk of anxiety and depression (Fejzo, Trovik, Grooten, Sridharan, Roseboom, Vikanes, & Mullin, 2019). Other research has shown that severe and prolonged nausea and vomiting may increase the risk of adverse pregnancy outcomes, including low birth weight and fetal growth restriction. These findings highlight the importance of appropriate management of emesis gravidarum to prevent complications in both mothers and fetuses (Kim, Cho, Kim, Lee, Ahn, Han, & Kim, 2020).

Management of emesis gravidarum can be achieved through pharmacological and non-pharmacological approaches. Common pharmacological therapies include antihistamines, dopamine antagonists, and a combination of vitamin B6 (pyridoxine) and doxylamine (Bustos, Venkataramanan, & Caritis, 2017). Although effective in reducing nausea and vomiting symptoms, pharmacological treatments often raise concerns regarding maternal and fetal safety. Antiemetic use may cause side effects such as sedation, gastrointestinal disturbances, dizziness, headache, drowsiness, diarrhea, neurological disorders, and even an increased risk of miscarriage in early pregnancy. Therefore, safe, effective, and easily applicable non-pharmacological alternatives are needed to help alleviate the symptoms of emesis gravidarum (Taguchi, Shinohara, & Kodama, 2022).

One of the non-pharmacological interventions that has been widely developed is aromatherapy. Aromatherapy is considered safe, easy to use, and associated with minimal side effects. Its mechanism of action involves stimulation of the limbic system, which regulates emotions, pain perception, and nausea responses, thereby producing relaxation and reducing discomfort in pregnant women (Safajou, Soltani, Taghizadeh, Amouzesi, & Sandrous, 2020). One type of aromatherapy commonly used to reduce nausea and vomiting during pregnancy is peppermint

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aromatherapy. Peppermint essential oil (*Mentha piperita*) contains several major active compounds, including menthol, menthone, and menthyl acetate. Menthol has antispasmodic effects on gastrointestinal smooth muscles, helping to reduce excessive gastric contractions and alleviate nausea. In addition, peppermint aroma acts through stimulation of the central nervous system and limbic system, which play important roles in controlling nausea responses and promoting relaxation in pregnant women (Joulaeerad, Ozgoli, Hajimehdipour, Ghasemi, & Salehimoghaddam, 2018). Previous studies have shown that inhaled peppermint aromatherapy effectively reduces the frequency and intensity of nausea and vomiting among first-trimester pregnant women (Yuliani et al., 2023). Similar findings were reported in another study, which demonstrated that peppermint aromatherapy significantly reduced the frequency of emesis gravidarum among pregnant women, with a p-value of 0.000 ($p < 0.05$) (Purwani, Wijayanti, & Yulia, 2025).

Chamomile aromatherapy (*Matricaria chamomilla*) also has potential as a complementary therapy for pregnant women experiencing nausea and vomiting. Chamomile contains various bioactive compounds, including apigenin, α -bisabolol, chamazulene, and flavonoids, which possess anti-inflammatory, antioxidant, mild sedative, and digestive relaxant properties. Apigenin has been shown to bind to gamma-aminobutyric acid (GABA) receptors in the central nervous system, producing calming effects, reducing anxiety, and enhancing relaxation, which contribute to lowering the perception of nausea in pregnant women (Dai, Li, Wang, Niu, Wang, & Gao, 2023; Sah, Naseef, Kuruniyan, Jain, Zakir, & Aggarwal, 2022). Previous studies have demonstrated that chamomile, whether administered as aromatherapy or herbal therapy, has positive effects in reducing gastrointestinal symptoms and

improving psychological well-being (Putri, Pitriani, & Damayanti, 2025).

RESEARCH METHOD

This study employed a quasi-experimental design using a This study used a quasi-experimental two-group pretest–posttest design. The study was conducted at independent midwife practice Nurwianti, Cianjur Regency, in 2025. The study population consisted of all first-trimester pregnant women experiencing nausea and vomiting, totaling 40 individuals. The sample comprised 40 respondents selected using an accidental sampling technique. The respondents were divided into two groups: the peppermint aromatherapy group ($n = 20$) and the chamomile aromatherapy group ($n = 20$). The inclusion criteria were first-trimester pregnant women experiencing mild nausea and vomiting, willing to participate as respondents, and having no history of allergy to peppermint or chamomile. The exclusion criterion was pregnant women diagnosed with hyperemesis gravidarum.

Data were collected using the Pregnancy-Unique Quantification of Emesis and Nausea (PUQE) questionnaire to measure the severity of nausea and vomiting before and after the intervention. The intervention was administered in the form of inhalation aromatherapy. The intervention period lasted for seven days. Respondents inhaled peppermint or chamomile aromatherapy for five minutes with 2–3 deep breaths during each session. Univariate analysis was used to describe the distribution of respondents' characteristics and nausea-vomiting levels, while bivariate analysis was performed using the Paired t-test and Independent-samples t-test with a 95% significance level ($\alpha = 0.05$) to determine differences in nausea and vomiting scores before and after aromatherapy administration in each group.

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RESEARCH RESULT

Table 1. Nausea and Vomiting Categories Before and After Aromatherapy in Each Group (N=40)

Variable	Result
Nausea and Vomiting in the Peppermint Group (Pre-test) (n/%)	
No Nausea and Vomiting	0/0
Mild Nausea and Vomiting	20/100
Nausea and Vomiting in the Peppermint Group (Post-test) (n/%)	
No Nausea and Vomiting	17/85
Mild Nausea and Vomiting	3/15
Nausea and Vomiting in the Chamomile Group (Pre-test) (n/%)	
No Nausea and Vomiting	0/0
Mild Nausea and Vomiting	20/100
Nausea and Vomiting in the Chamomile Group (Post-test) (n/%)	
No Nausea and Vomiting	15/75
Mild Nausea and Vomiting	5/25

Based on Table 1, all respondents in the peppermint aromatherapy group experienced mild nausea and vomiting before the intervention, accounting for 20 respondents (100%). After receiving peppermint aromatherapy, a change in the level of nausea and vomiting was observed, with the majority of respondents no longer experiencing nausea and vomiting, totaling 17 respondents (85%), while 3 respondents (15%) still experienced mild nausea and vomiting. Similarly, in the chamomile aromatherapy group, all respondents experienced mild nausea and vomiting before the intervention, accounting for 20 respondents (100%). Following the administration of chamomile aromatherapy, 15 respondents (75%) no longer experienced nausea and vomiting, whereas 5 respondents (25%) continued to experience mild nausea and vomiting.

Table 2. Uji Paired T-test

Variable	Value			P-value
	Mean	Standar Deviation	Min - Max	
Nausea and Vomiting in the Peppermint Group (Pre-test)	5.55	0.686	4 – 6	0.000
Nausea and Vomiting in the Peppermint Group (Post-test)	3.15	0.366	3 – 4	
Nausea and Vomiting in the Chamomile Group (Pre-test)	5.60	0.681	4 – 6	0.000
Nausea and Vomiting in the Chamomile Group (Post-test)	3.25	0.444	3 – 4	

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Based on the analysis presented in Table 2, the peppermint aromatherapy group had a mean nausea and vomiting score of 5.55 before the intervention. After receiving peppermint aromatherapy, the mean score decreased to 3.15. These findings indicate a reduction of 2.40 points in the mean nausea and vomiting score following the administration of peppermint aromatherapy. The results of the Paired t-test revealed a p-value of 0.000 ($p < 0.05$), indicating a statistically significant difference between the nausea and vomiting scores before and after the administration of peppermint aromatherapy.

In the chamomile aromatherapy group, the mean nausea and vomiting score before the intervention was 5.60. Following the administration of chamomile aromatherapy, the mean score decreased to 3.25. These results demonstrate a reduction of 2.35 points in the mean nausea and vomiting score after the intervention. The Paired t-test analysis yielded a p-value of 0.000 ($p < 0.05$), indicating a statistically significant difference between the nausea and vomiting scores before and after the administration of chamomile aromatherapy.

Table 3. Uji Independent-samples t-test

Variable	Value			P-value
	Mean	Deviation Std	Min - Max	
Peppermint Group	3.15	0.366	3 – 4	0.000
Chamomile Group	3.25	0.444	3 – 4	

Based on Table 3, the mean nausea and vomiting score after the intervention in the peppermint aromatherapy group was 3.15, while the mean score in the chamomile aromatherapy group was 3.25. The lower mean score observed in the peppermint group indicates that the level of nausea and vomiting following the intervention tended to be lower compared to the chamomile group. The results of the Independent-samples t-test showed a p-value of 0.000 ($p < 0.05$), indicating a statistically significant difference between the group receiving peppermint aromatherapy and the group receiving chamomile aromatherapy in reducing nausea and vomiting among first-trimester pregnant women.

Based on the findings of this study, both peppermint and chamomile aromatherapy were proven to be effective in reducing nausea and vomiting among first-trimester pregnant women. However, peppermint aromatherapy demonstrated greater effectiveness than chamomile aromatherapy, as evidenced by the lower mean post-intervention nausea and vomiting score and the statistically significant difference between the two groups ($p < 0.05$). These findings suggest that peppermint aromatherapy may be considered a more effective non-pharmacological intervention for alleviating the symptoms of emesis

gravidarum among pregnant women.

DISCUSSION

The results of this study showed that peppermint aromatherapy was effective in reducing nausea and vomiting among first-trimester pregnant women. Before the intervention, the mean nausea and vomiting score in the peppermint group was 5.55 ± 0.686 . After the administration of peppermint aromatherapy, the mean score decreased to 3.15 ± 0.366 . The Paired t-test analysis showed a p-value of 0.000 ($p < 0.05$), indicating a significant difference between nausea and vomiting scores before and after the administration of peppermint aromatherapy. These findings suggest that peppermint aromatherapy effectively reduces the intensity of nausea and vomiting in first-trimester pregnant women and has the potential to serve as an alternative non-pharmacological intervention in the management of emesis gravidarum.

Previous studies have demonstrated that peppermint aromatherapy can significantly reduce the frequency and intensity of nausea and vomiting among first-trimester pregnant women. One study reported a reduction in nausea and vomiting scores from 4.95 before the intervention to 3.16 after respondents received regular peppermint aromatherapy (Putri et al.,

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2025). Another study also reported that peppermint aromatherapy effectively reduced pregnancy-related nausea and vomiting symptoms and improved maternal comfort (Zuliyati, 2023).

The effectiveness of peppermint aromatherapy in reducing nausea and vomiting is believed to be associated with its main active compounds, namely menthol, menthone, and menthyl acetate. Menthol is the dominant component of peppermint essential oil and has antispasmodic effects on gastrointestinal smooth muscles, thereby helping to reduce excessive gastric contractions and improve digestive comfort (Joulaeerad et al., 2018; Safajou et al., 2025). The inhaled peppermint aroma stimulates olfactory receptors and transmits signals to the limbic system, the part of the brain responsible for regulating emotions, memory, and nausea responses. Stimulation of the limbic system may induce relaxation, reduce anxiety, and decrease the perception of nausea experienced by pregnant women (Gergő, Garmaa, Tóth-Mészáros, To, Fehérvári, Harnos, & Csupor, 2025).

According to the researchers' assumption, the reduction in nausea and vomiting observed in the peppermint group was not only influenced by the active compounds contained in peppermint essential oil but also by the relaxation effect experienced by respondents during the inhalation process. Peppermint aroma provides a fresh and pleasant sensation that helps divert pregnant women's attention away from feelings of nausea. These findings indicate that peppermint aromatherapy is easy to apply, safe, affordable, and can be used independently by pregnant women as a complementary alternative therapy for reducing the symptoms of emesis gravidarum during the first trimester.

The findings also showed that chamomile aromatherapy was effective in reducing nausea and vomiting among first-trimester pregnant women. Before the intervention, the mean nausea and vomiting score in the chamomile group was 5.60 ± 0.681 . After receiving chamomile aromatherapy, the mean score decreased to 3.25 ± 0.444 . The Paired t-test analysis yielded a p-value of 0.000 ($p < 0.05$), indicating a significant difference between nausea and vomiting scores before and after the administration of chamomile aromatherapy. These findings demonstrate that chamomile aromatherapy can reduce the intensity

of nausea and vomiting among first-trimester pregnant women.

Previous studies reported a significant effect of chamomile aromatherapy on reducing the frequency of emesis gravidarum, with a p-value of 0.003 (< 0.005). In that study, the mean frequency of emesis gravidarum decreased from 7.2 episodes before the intervention to 4.7 episodes after chamomile aromatherapy was administered (Sari, Margiyanti, & Handayani, 2022). Another study reported that among 65 women who used chamomile during pregnancy, 83% considered chamomile tea beneficial for relieving nausea (Ferguson & Gordon, 2025).

The effectiveness of chamomile aromatherapy in reducing nausea and vomiting is associated with its major bioactive compounds, including apigenin, α -bisabolol, chamazulene, and various flavonoids, which possess anti-inflammatory, antioxidant, mild sedative, and relaxant effects on the nervous and digestive systems. Apigenin has an affinity for gamma-aminobutyric acid (GABA) receptors in the central nervous system, thereby producing calming effects, reducing anxiety, and promoting relaxation. Inhaled chamomile aroma also stimulates the limbic system, which plays an important role in regulating emotions, comfort, and nausea responses (Dai et al., 2023; Sah, Naseef, Kuruniyan, Jain, GZakir, & Aggarwal, 2022).

According to the researchers' assumption, the reduction in nausea and vomiting scores in the chamomile group was not solely influenced by the active compounds present in chamomile essential oil but also by the relaxation effects generated during aromatherapy inhalation. The gentle and soothing aroma of chamomile may help reduce anxiety, emotional tension, and discomfort that frequently accompany nausea and vomiting during the first trimester of pregnancy. Regular use of chamomile aromatherapy may improve both physical and psychological comfort among pregnant women, thereby contributing to the reduction of emesis gravidarum symptoms. Therefore, chamomile aromatherapy may be considered a safe and easily applicable complementary intervention.

The results of this study demonstrated that both peppermint and chamomile aromatherapy were effective in reducing nausea and vomiting among first-trimester pregnant women. In the peppermint group, the mean nausea and vomiting score decreased from

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5.55±0.686 to 3.15±0.366, with a p-value of 0.000 ($p<0.05$). Meanwhile, in the chamomile group, the mean score decreased from 5.60±0.681 to 3.25±0.444, with a p-value of 0.000 ($p<0.05$). The Independent-samples t-test showed a p-value of 0.000 ($p<0.05$), indicating a significant difference in effectiveness between the two intervention groups. Based on the study findings, the peppermint group had a lower post-intervention mean nausea and vomiting score than the chamomile group. These results indicate that both peppermint and chamomile aromatherapy were followed by reductions in nausea and vomiting scores. The difference between the two groups should be interpreted after rechecking the independent-samples t-test output.

The findings are consistent with previous studies demonstrating that aromatherapy is an effective non-pharmacological intervention for reducing symptoms of emesis gravidarum. Previous research reported that inhalation aromatherapy containing peppermint significantly reduced the intensity of nausea and vomiting among pregnant women compared with the control group. Another study also found that peppermint aromatherapy effectively reduced the frequency and intensity of nausea and vomiting among first-trimester pregnant women (Yuliani et al., 2023). A systematic review concluded that aromatherapy-based complementary therapies provide benefits in controlling nausea and vomiting during pregnancy and improving maternal comfort (Nassif, Costa, Ribeiro, Moura, & Oliveira, 2022). These findings indicate that both peppermint and chamomile aromatherapy have clinical benefits in helping reduce the symptoms of emesis gravidarum among first-trimester pregnant women.

According to the researchers' assumption, the effectiveness of both aromatherapies is influenced by a combination of physiological and psychological effects generated during the inhalation process. The inhaled aromas provide a sense of comfort, promote relaxation, and help divert pregnant women's attention away from nausea sensations. Although both interventions demonstrated effectiveness, peppermint aromatherapy tended to produce a greater reduction in nausea and vomiting scores than chamomile. This may be because peppermint has a stronger aroma and produces a refreshing sensation that directly affects the digestive system and the brain's nausea center.

Regular use of peppermint and chamomile aromatherapy may serve as a safe, practical, cost-effective complementary intervention and has the potential to support improvements in antenatal care services for the management of emesis gravidarum among first-trimester pregnant women.

CONCLUSION

Peppermint and chamomile aromatherapy were both associated with decreased nausea and vomiting scores among first-trimester pregnant women. However, the conclusion that peppermint is more effective than chamomile should be made only after rechecking the between-group analysis using appropriate statistical methods. Further randomized controlled studies with larger samples are needed to confirm the comparative effectiveness of these aromatherapy interventions.

SUGGESTION

Peppermint and chamomile aromatherapy may be recommended as alternative non-pharmacological interventions to help reduce nausea and vomiting among first-trimester pregnant women. Healthcare professionals, particularly midwives, are encouraged to integrate aromatherapy into antenatal care services as a safe, practical, and complementary therapy for the management of pregnancy-related nausea and vomiting.

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