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Original Research

Peppermint aromatherapy for nausea and vomiting in first-trimester pregnant women

Hendrita A. Mohi[1], Heppy Rina Mardiana*[2], Hayun Manudyaning Susilo[3]
1, Bongo Nol Community Health Center, Paguyaman District, Boalemo Regency, Gorontalo Province, Indonesia
2, Poltekkes Kemenkes Malang, Indonesia
3, Universitas Muhammadiyah Ponorogo, Indonesia

* Corresponding author.
Heppy Rina Mardiana
E-mail address:
deeana.luv321@gmail.com

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Abstract
Emesis gravidarum is a common condition experienced by first-trimester pregnant women and may negatively affect maternal well-being and daily activities. Peppermint (Mentha piperita) contains menthol, which has antiemetic and antispasmodic properties that may help reduce nausea and vomiting. This study aimed to determine the effectiveness of peppermint aromatherapy in reducing the frequency of nausea and vomiting among first-trimester pregnant women. A pre-experimental one-group pretest–posttest design was conducted involving 10 pregnant women with emesis gravidarum selected through purposive sampling. Data were collected using questionnaires and observation sheets. The intervention followed a Standard Operating Procedure (SOP), consisting of inhaling 2–3 drops of peppermint essential oil applied to a tissue for approximately 10 minutes. Data were analyzed using a paired sample t-test. Before the intervention, 60% of respondents experienced moderate and 40% severe emesis gravidarum. After the intervention, 90% were categorized as mild and 10% as moderate. Statistical analysis showed a significant reduction in symptoms ($p < 0.001$). These findings indicate that peppermint aromatherapy is an effective, safe, and simple non-pharmacological intervention for reducing nausea and vomiting and improving maternal comfort during early pregnancy.

1. Introduction

Emesis gravidarum is one of the most common discomforts experienced during early pregnancy, affecting approximately 60–80% of primigravida women and 40–60% of multigravida women. Symptoms generally occur between 4 and 16 weeks of gestation and may negatively affect maternal nutritional status, daily activities, emotional well-being, and quality of life (Kresna Wati et al., 2021; Herrell, 2014). If not managed appropriately, emesis gravidarum may develop into hyperemesis gravidarum, a more severe condition associated with dehydration and maternal complications (Deepika et al., 2022).

The occurrence of emesis gravidarum is closely related to hormonal changes during pregnancy, particularly increased levels of human chorionic gonadotropin (HCG), which are produced by the placenta (Ayubbana & Hasanah, 2021). In addition to hormonal factors, psychological conditions, gastrointestinal sensitivity, and maternal adaptation to pregnancy may contribute to the severity of nausea and vomiting (Tiran, 2022). Because these symptoms can interfere with maternal comfort and daily functioning, safe and effective management strategies are needed.

Non-pharmacological therapies have increasingly been used to manage nausea and vomiting during pregnancy because they are considered relatively safe and easy to apply. One of the complementary therapies commonly used is aromatherapy. Aromatherapy utilizes essential oils

extracted from plants to provide therapeutic effects through stimulation of the olfactory and limbic systems, which are associated with emotional regulation and physiological responses (Pratiwi & Subarnas, 2020).

Peppermint (*Mentha piperita*) is one of the essential oils frequently used to relieve nausea and vomiting. Peppermint contains menthol and menthone, which possess antiemetic, antispasmodic, and carminative properties that may help reduce gastric spasms and alleviate nausea symptoms (Zurida, 2019; Yusmalharani et al., 2021). Previous studies have demonstrated that peppermint aromatherapy can effectively reduce the severity of emesis gravidarum and improve maternal comfort during early pregnancy (Lubis et al., 2019; Hasibuan & Hasanah, 2021).

Although several studies have reported positive effects of peppermint aromatherapy, evidence regarding its effectiveness in community-based primary healthcare settings remains limited. Differences in population characteristics and implementation procedures may influence intervention outcomes. Therefore, further investigation is needed to strengthen evidence regarding the effectiveness of peppermint aromatherapy among pregnant women receiving maternal healthcare services.

A preliminary survey conducted at Bongo Nol Community Health Center in January–February 2024 identified 33 first-trimester pregnant women experiencing nausea and vomiting. Considering the high prevalence of emesis gravidarum and the need for safe non-pharmacological management, this study aimed to determine the effectiveness of peppermint aromatherapy in reducing the frequency of nausea and vomiting among first-trimester pregnant women at Bongo Nol Community Health Center.

2. Research Method

This study aimed to determine the effectiveness of peppermint aromatherapy in reducing the frequency of nausea and vomiting (emesis gravidarum) among first-trimester pregnant women. The independent variable was peppermint aromatherapy, while the dependent variable was the frequency of nausea and vomiting experienced by pregnant women during the first trimester.

This study employed a pre-experimental design using a one-group pretest–posttest approach. This design was selected to evaluate changes in the frequency of nausea and vomiting before and after the administration of peppermint aromatherapy. A single intervention group was observed without a control group.

2.1. Ethical considerations

This study received ethical approval from the Health Research Ethics Committee of Institut Teknologi Sains dan Kesehatan RS dr. Soepraoen, Malang, Indonesia, under approval number **KEPK-EC/584/VIII/2025**. Prior to data collection, all respondents received an explanation regarding the study objectives, procedures, benefits, and potential risks. Written informed consent was obtained from all participants before enrollment. Participation was voluntary, and respondents had the right to withdraw from the study at any stage without affecting the healthcare services they received. Confidentiality and anonymity of participants were maintained throughout the study.

2.2. Population and sample

The population consisted of all 32 first-trimester pregnant women experiencing nausea and vomiting who attended Bongo Nol Community Health Center during the study period. The sample comprised 10 respondents selected using a purposive sampling technique. The sample size was based on Sugiyono (2018), who suggested that simple experimental studies may involve approximately 10–20 participants.

The inclusion criteria were: (1) pregnant women aged 18–40 years; (2) gestational age between 6 and 12 weeks; (3) experiencing mild to severe emesis gravidarum during antenatal assessment; (4) singleton pregnancy; (5) able to communicate effectively; and (6) willing to participate by signing informed consent. The exclusion criteria were: (1) diagnosed hyperemesis gravidarum requiring hospitalization; (2) known allergy or hypersensitivity to peppermint essential oil; (3) respiratory disorders affecting inhalation therapy; (4) current use of antiemetic medications; and (5) participation in other complementary therapies intended to reduce nausea and vomiting.

2.3. Research instruments

Data were collected using documentation forms, Maternal and Child Health (MCH) handbooks, observation sheets, and a questionnaire assessing the frequency of nausea and vomiting. A Standard Operating Procedure (SOP) was developed to ensure consistency in the administration of peppermint aromatherapy throughout the study.

2.4. Intervention procedure

The intervention was conducted according to the established SOP. Participants were instructed to sit comfortably in a quiet and well-ventilated room. Two to three drops of peppermint essential oil were applied to a clean tissue and positioned approximately 5 cm from the participant's nose at chin level. Participants inhaled the aroma slowly and deeply for approximately 10 minutes under researcher supervision to ensure procedural consistency.

2.5. Data analysis

Data on the frequency of nausea and vomiting were collected before (pretest) and after (posttest) the intervention. Descriptive statistics were used to summarize respondent characteristics and the severity of emesis gravidarum. Prior to inferential analysis, data normality was assessed. Because the study compared two related measurements obtained from the same participants before and after the intervention, a paired sample *t*-test was used to determine the effectiveness of peppermint aromatherapy. Statistical analysis was performed using SPSS version 23.0 with a significance level of $p < 0.05$.

3. Results and Discussion

3.1. Results

Table 1. Frequency distribution of emesis gravidarum among first-trimester pregnant women

Characteristics	Frequency (n)	Percentage (%)
Emesis Gravidarum (Pretest – Before Peppermint Aromatherapy)		
Mild	0	0.0
Moderate	6	60.0
Severe	4	40.0
Emesis Gravidarum (Posttest – After Peppermint Aromatherapy)		
Mild	9	90.0
Moderate	1	10.0
Severe	0	0.0
Total	10	100.0

Based on Table 1, it can be observed that the pretest results (before the administration of peppermint aromatherapy) conducted on 10 respondents showed that the majority of respondents experienced moderate emesis gravidarum, accounting for 6 respondents (60%), while 4 respondents (40%) were categorized as having severe emesis gravidarum.

After the intervention, the posttest results indicated a significant shift in the distribution of emesis gravidarum severity. Most respondents experienced mild emesis gravidarum, accounting for 9 respondents (90%), while only 1 respondent (10%) remained in the moderate category, and none were categorized as severe.

These findings suggest that peppermint aromatherapy may contribute to a reduction in the severity of nausea and vomiting during early pregnancy. This result is consistent with previous studies reporting that peppermint essential oil has antiemetic, antispasmodic, and relaxing effects that can help alleviate nausea and vomiting in pregnant women (Ghani & Ibrahim, 2013; Hasibuan & Hasanah, 2021). Furthermore, aromatherapy is known to stimulate the limbic system, which plays a role in regulating emotions and physiological responses, thereby helping reduce discomfort associated with emesis gravidarum (Pratiwi & Subarnas, 2020).

Table 2. Bivariate analysis

Analysis	N	Correlation	Sig. (2-tailed)
Pretest–Posttest of Peppermint Aromatherapy	10	0.408	0.000

Based on Table 2, the results indicate that the administration of peppermint aromatherapy has an effect on nausea and vomiting among first-trimester pregnant women. The statistical analysis was conducted using a paired sample t-test with the assistance of SPSS version 23.0. The results showed a p-value of 0.000, which is lower than the significance level of $\alpha = 0.05$ ($p < 0.05$).

This finding means that the alternative hypothesis (Ha) is accepted, indicating that there is a statistically significant effect of peppermint aromatherapy on reducing nausea and vomiting (emesis gravidarum) in first-trimester pregnant women. These results support previous research demonstrating that peppermint aromatherapy can effectively reduce the severity of nausea and vomiting due to its antispasmodic and relaxing effects on the gastrointestinal system and central nervous system.

3.2. Discussion

The findings of this study demonstrated that peppermint aromatherapy significantly reduced the frequency and severity of emesis gravidarum among first-trimester pregnant women. Before the intervention, most respondents experienced moderate to severe symptoms, whereas after the intervention the majority were categorized as having mild emesis gravidarum. Statistical analysis using a paired sample t-test showed a significant difference between pretest and posttest measurements ($p < 0.05$), indicating that peppermint aromatherapy may be an effective complementary intervention for managing nausea and vomiting during early pregnancy.

The reduction in symptom severity observed in this study may be explained by the pharmacological properties of peppermint essential oil. Peppermint contains menthol and menthone, which possess antiemetic, antispasmodic, and carminative effects that help relax gastrointestinal smooth muscles, reduce gastric spasms, and alleviate nausea and vomiting. In addition, inhaled peppermint aroma stimulates the olfactory system and limbic system, producing relaxation and emotional comfort that may further contribute to symptom relief (Ayubbana & Hasanah, 2021; Pratiwi & Subarnas, 2020; Yusmalharani et al., 2021). These mechanisms support the biological plausibility of peppermint aromatherapy as a complementary intervention for emesis gravidarum.

The findings are consistent with previous studies. Lubis et al. (2019) reported a significant reduction in nausea and vomiting scores following peppermint aromatherapy, while Hasibuan and Hasanah (2021) found that peppermint aromatherapy administered over several days effectively decreased the frequency of emesis gravidarum. Similarly, Zurida (2019) demonstrated that peppermint essential oil inhalation reduced nausea and vomiting among first-trimester pregnant women. The consistency of findings across different studies strengthens the evidence supporting peppermint aromatherapy as a safe and effective non-pharmacological therapy during pregnancy.

Despite these positive findings, several factors should be considered when interpreting the results. The severity of nausea and vomiting during pregnancy may be influenced by maternal age, parity, nutritional status, psychological stress, family support, hormonal fluctuations, and individual sensitivity to odors. These variables were not specifically measured or controlled in the present study and therefore may have acted as confounding factors. Furthermore, emesis gravidarum often improves naturally as pregnancy progresses, which may partially contribute to symptom reduction independent of the intervention.

Another important consideration is the study design. The one-group pretest–posttest approach does not include a control group, limiting the ability to establish a definitive causal relationship between peppermint aromatherapy and symptom improvement. Consequently, external influences cannot be completely excluded. Therefore, the observed effectiveness should be interpreted with caution, despite the statistically significant findings.

Several limitations of this study should be acknowledged. First, the sample size was relatively small ($n = 10$), which may limit the generalizability of the findings. Second, all participants were recruited from a single primary healthcare facility, potentially limiting representation of the wider population of pregnant women. Third, the measurement of nausea and vomiting relied on self-reported responses, which may introduce reporting bias. Finally, the short duration of observation did not allow assessment of the long-term effectiveness of peppermint aromatherapy.

Despite these limitations, this study has important implications for maternal healthcare practice. Peppermint aromatherapy may serve as a safe, inexpensive, and easy-to-administer complementary therapy for reducing nausea and vomiting among first-trimester pregnant women, particularly in primary healthcare settings. Midwives and other healthcare providers may consider incorporating

peppermint aromatherapy into antenatal care education and counseling programs to improve maternal comfort and support non-pharmacological management of emesis gravidarum.

Future research should involve larger sample sizes, multicenter settings, and randomized controlled trial designs to strengthen the evidence regarding the effectiveness of peppermint aromatherapy. In addition, future studies should control potential confounding variables and compare peppermint aromatherapy with other complementary therapies to identify the most effective intervention for managing emesis gravidarum.

4. Conclusion

Peppermint aromatherapy was found to be effective in reducing the frequency and severity of emesis gravidarum among first-trimester pregnant women. The intervention contributed to improved maternal comfort and may serve as a beneficial complementary therapy for managing nausea and vomiting during early pregnancy.

As a safe, simple, inexpensive, and non-pharmacological intervention, peppermint aromatherapy has the potential to be incorporated into antenatal care services, particularly in primary healthcare settings. Midwives and other healthcare providers may consider using peppermint aromatherapy as part of health education and supportive care for pregnant women experiencing emesis gravidarum.

However, the findings should be interpreted in light of the study limitations, including the small sample size and the absence of a control group. Therefore, future studies involving larger sample sizes, multicenter settings, and randomized controlled trial designs are recommended to further evaluate the effectiveness of peppermint aromatherapy and strengthen the evidence for its integration into routine maternal healthcare practice.

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