



Effectiveness of *Amomum Cardamomum* and *Zingiber Officinale Roscoe* as Complementary Therapy for the Intensity of Emesis Gravidarum at Makassar City Health Center

Rahmiyani Saad^{1*}, Leli¹, Syahridayanti¹, Isah Fitri Weni¹, Siti Mahadia Watimena¹

¹Midwifery Study Program D-III, Faculty of Health Sciences, Cokroaminoto University, Makassar

*Email correspondence: rahmiyanisaad14@gmail.com

Track Record Article	Abstract
Revised: 31 July 2026 Accepted: 17 September 2026 Published: 26 September 2026 How to cite : Saad, R., Leli, Syahridayanti, Weni, I. F., & Watimena, S. M. (2026). Effectiveness of <i>Amomum Cardamomum</i> and <i>Zingiber Officinale Roscoe</i> as Complementary Therapy for the Intensity of Emesis Gravidarum at Makassar City Health Center. <i>Contagion : Scientific Periodical of Public Health and Coastal Health</i>, 8(3), 345–359.	<i>Emesis gravidarum is a complaint that is often experienced by pregnant women in the first trimester and has the potential to affect the quality of life if not handled appropriately. Herbal complementary therapy has the potential to be a safe non-pharmacological alternative. This study aims to evaluate the effectiveness of a combination of cardamom (<i>Amomum cardamomum</i>) and red ginger (<i>Zingiber officinale Roscoe</i>) in reducing the intensity of emesis gravidarum in pregnant women in the first trimester. This quantitative research uses a quasi-experimental design with a one-group pretest-posttest design. The research was carried out from May to July 2026 at the UPT Bara-Baraya Health Center, Makassar City. A total of 30 pregnant women in the first trimester who met the inclusion criteria were selected through purposive sampling. The intervention was in the form of brewing a combination of cardamom and red ginger drinks taken twice a day for 10 consecutive days. Measurement of the severity of emesis gravidarum was carried out before and after the intervention using the Pregnancy-Unique Quantification of Emesis and Nausea (PUQE) instrument. Data were analyzed using univariate and bivariate analyses with the Wilcoxon Signed-Rank test. Before the intervention, the majority of respondents were in the moderate emesis category (76.7%) with an average PUQE score of 7.60 ± 1.61. After 10 days of intervention, the majority of respondents switched to the mild category (90.0%) with an average PUQE score of 4.70 ± 1.24. There was a decrease in the average PUQE score of 2.90 points. The results of the statistical test showed a significant decrease in the intensity of emesis gravidarum ($Z = -4.703$; $p < 0.001$) with a large effect size ($r = 0.86$; $CI\ 95\%: 0.74-0.93$). No serious side effects were found during the intervention period. The administration of a combination of cardamom and red ginger improved overall medication adherence, based on daily consumption records, i.e., 30/30 participants consumed 100% of the prescribed dose. This is effective in reducing the intensity of emesis gravidarum in pregnant women in the first trimester. This intervention has the potential to be integrated into antenatal services in primary health facilities, although further research in the Randomized Controlled Trial (RCT) design is still needed.</i> Keywords: <i>Emesis Gravidarum, Amomum Cardamomum, Zingiber Officinale Roscoe, Pregnant Women, Complementary Therapy</i>

INTRODUCTION

Emesis gravidarum, or nausea and vomiting during pregnancy, is a common complaint experienced by pregnant women, especially in the first trimester (Gunarti, 2023). The condition occurs in about 70–80% of pregnancies, with severity varying among individuals (Kitamura et al., 2026). In the ASEAN region, the prevalence of nausea and vomiting during pregnancy is also reported to be quite high (Organization, 2024). In Indonesia, this problem is one of the important complaints in antenatal services (Scott, 2024). Although most cases are mild to moderate and can develop into hyperemesis gravidarum, which has the potential to cause

dehydration, electrolyte disorders, weight loss, impaired nutritional intake, and decreased quality of life in pregnant women (Asrida & Saad, 2023).

Nausea and vomiting during pregnancy can cause significant clinical and psychosocial impacts, including decreased food and fluid intake, disruption of daily activities, fatigue, anxiety, and psychological stress (Walker et al., 2025). Therefore, managing nausea and vomiting should focus not only on reducing symptom frequency and intensity, but also on preventing deterioration in health and maintaining nutritional status and quality of life (Jin et al., 2024).

Physiologically, nausea and vomiting during pregnancy are affected by hormonal factors such as hCG, estrogen, and progesterone, as well as changes in gastrointestinal function, genetic factors, psychological conditions, and the involvement of *Helicobacter pylori*, all of which contribute to the pathogenesis of this condition (Liu et al., 2022).

Based on information from the Makassar City Health Office in 2023, complaints of nausea and vomiting are problems that pregnant women often report during pregnancy checks. Data from the Bara-Baraya Health Center in Makassar City show that 67.4% of pregnant women who make antenatal visits report experiencing nausea and vomiting of varying severity. These figures show that the condition of nausea and vomiting at the primary health service level in Makassar City remains high and has a high prevalence reported in the international literature. Therefore, direct comparisons must be made carefully because of differences in population, service settings, measurement periods, and diagnostic instruments; however, the local figures confirm that this issue has clinical significance at the primary service level in Makassar (Sulawesi, 2023).

In addition, the local social and cultural context is important when selecting complementary interventions. Herbal medicines are part of traditional health practices, including foods and spices available in the family environment (Diana & Sumarni, 2024).

Cardamom and red ginger are common kitchen spices available in households in the city of Makassar, with feasibility and acceptance rates in real practice; their availability distinguishes our study from trials that use extracts or pure formulations. This condition shows that nausea and vomiting during pregnancy are relevant problems and require management that is effective, safe, easy to apply, and acceptable to pregnant women (Suminar et al., 2025). This research is important not only for estimating intervention effectiveness but also for generating contextual evidence on the acceptance and potential application of complementary therapy in antenatal service practice.

Management of nausea and vomiting during pregnancy can be done through pharmacological and nonpharmacological approaches. Some antiemetics, including ondansetron, metoclopramide, and certain antihistamines, can control symptoms (Bachtiar, 2025). However, considerations regarding side effects, safety, and a pregnant woman's preference for non-pharmacological approaches influence therapy choices (Nelson-Piercy et al., 2024). These conditions encourage exploration of complementary interventions, including herbal ingredients whose effectiveness and safety still need scientific evaluation based on dosage, dosage form, and the characteristics of the population studied.

Roscoe's *zingiber officinale*, or ginger, is effective in managing nausea and vomiting during pregnancy, especially in the first trimester. Bioactive compounds such as gingerol and shogaol play an important role in ginger's antiemetic mechanisms, which include modulation of serotonin receptors (5-HT₃) and increased gastrointestinal motility (Rezkyana et al., 2024). These compounds modulate gastrointestinal motility and affect serotonergic pathways, as well as neurokinins associated with nausea and vomiting (Hasna et al., 2024). In addition, *Amomum cardamomum* contains a variety of volatile and bioactive compounds with gastrointestinal activity, including carminative and antispasmodic effects (Diana & Sumarni, 2024).

Combining *Amomum cardamomum* and *Zingiber officinale* Roscoe is intriguing because both ingredients contain bioactive compounds and pharmacological mechanisms that may complement each other (Jin et al., 2024). However, scientific evidence regarding the effectiveness of the combination of the two in reducing nausea and vomiting during pregnancy is limited. Most previous studies have evaluated red ginger as a single intervention or compared one herbal intervention with another. Studies that specifically evaluate the combination of cardamom and red ginger in pregnant women are still rare.

This study aimed to evaluate changes in the severity of nausea and vomiting in pregnant women after the combined administration of *Amomum cardamomum* and *Zingiber officinale* Roscoe using the *Pregnancy-Unique Quantification of Emesis and Nausea* (PUQE-24). The PUQE-24 score allowed assessment of symptom change as an effective nonpharmacological intervention to reduce nausea and vomiting, with a significant decrease after ginger brewing (Marlina et al., 2023). In this study, clinical success is explicitly defined as a decrease of at least 3 points on the PUQE-24 score from the initial score and is set as a specific research objective. Such limits allow the effectiveness of the intervention to be assessed based on the magnitude of the change in symptoms, rather than solely on the value of the *p* (Gynecologists, 2024; Koot et al., 2022).

Thus, this study aimed not only to determine whether the combination of *Amomum cardamomum* and *Zingiber officinale Roscoe* was associated with changes in PUQE-24 scores but also to test whether administering the combination resulted in a decrease of at least 3 points in PUQE-24 scores compared with pre-intervention scores.

METHODS

This study used a quantitative approach with a quasi-experimental (pseudo-experimental) one-group *pretest-posttest design*. This study was carried out in May–July 2026 at the Bara-Baraya Health Center in Makassar City. The PUQE score classifies emesis gravidarum into three levels: mild (≤ 6), moderate (7–12), and severe (≥ 13). This study aims to evaluate the effectiveness of PUQE scores in managing emesis in pregnancy up to 12 weeks (Bharambe & Kakade, 2022).

The study population is all pregnant women in the first trimester with emesis gravidarum who visit the Bara-Baraya Health Center, Makassar City. Selection of respondents used the technique of *purposive sampling* with the following respondent criteria: 4–14 weeks gestation, experienced emesis gravidarum with a PUQE score of ≤ 6 indicating a mild level and 7–12 indicating a moderate level, not using antiemetic drugs or vitamin B6 supplements, no history of allergies, not experiencing hyperemesis gravidarum with dehydration, and willing to participate in the study and sign an *informed consent* (O'Brien et al., 2024).

During the study, all first-trimester pregnant women who met the research criteria were screened based on inclusion and exclusion criteria. A total of 48 pregnant women underwent eligibility screening; 18 people were excluded (5 did not meet the PUQE score criteria, 4 had used antiemetic drugs, and 9 refused to participate). The remaining 30 women were included, completed pre-test and post-intervention assessments, and were included in the final analysis; none of the participants withdrew during the follow-up period. Based on the screening results, we recruited pregnant women who met all criteria and were willing to participate. A total of 30 respondents were recruited based on the minimum sample size calculation for a paired t-test with a 95% confidence level and 80% power, and considering previous research on changes in PUQE scores after herbal therapy. The research flow included eligibility screening, *pre-test*, intervention administration, *post-test*, and analysis, and no respondents withdrew (*loss to follow-up*). Thus, 30 respondents were recruited, and all completed the study.

In this design, all respondents completed a *pre-test* using the PUQE instrument, which involved a combination of *Amomum cardamomum* and *Zingiber officinale Roscoe* prepared as brewed herbal drinks. In contrast, 2 fingers of *Zingiber officinale Roscoe* were used in fresh

conditions (peeled and bruised), along with 500 ml of clean water and 50 gr of palm sugar. All ingredients are boiled together until boiling, then filtered before consumption. Herbal drinks are given twice a day, namely in the morning and evening, 250 ml each, and should be drunk after meals. The ginger used is local red ginger, which is generally cultivated in South Sulawesi and has gingerol and shogaol content based on regional reference values, considering that internal phytochemical analysis is not carried out. Cardamom contains essential oils in higher levels and has carminative properties, so it can cause irritation to the stomach wall due to the content of strong and hot active compounds, especially in mothers who have a history of digestive disorders. Since the variability of bioactive compounds between batches was not quantified, this is one of the limitations in the study.

The intervention was administered routinely for 10 consecutive days. After the intervention was completed, a remeasurement (*post-test*) was carried out using the same instrument to assess changes in the level of emesis gravidarum. Respondents' compliance was monitored through daily consumption sheets and daily WhatsApp or phone communication to remind them of the consumption schedule and ensure protocols were implemented. Side effects such as allergic reactions, ulcers, gastrointestinal discomfort, or other complaints were monitored during the intervention. When complaints that required treatment appeared, respondents were referred, and the intervention was stopped.

The analysis used SPSS version 26.0. Univariate analysis was used for respondent characteristics and PUQE score distribution. The normality of score differences was checked before bivariate analysis, while *pre-test* and *post-test changes* were analyzed with the *Wilcoxon signed-rank test* on data that were not normally distributed. Statistical significance was established at a p- value of 0.05.

Exploratory analysis was conducted to assess the relationship between Δ PUQE and age, gestational age, parity, and early severity. Age and gestational age were analyzed using Spearman correlation; parity and initial severity were analyzed using Mann–Whitney U according to the grouping of variables. This analysis was intended to identify response variations, rather than establish causal relationships. In addition to statistical significance, clinical success was assessed based on a decrease in PUQE score of at least 3 points from baseline scores, and then the proportion of respondents who reached that limit was calculated.

This research has received ethical approval from the Health Research Ethics Committee, Faculty of Public Health, Hasanuddin University, Makassar, with the number: 2877/UN4.14.1/TP.01.02/2026. All respondents were provided with information about the

purpose of the study, benefits, procedures, and potential risks, as well as their right to withdraw at any time without affecting the health services they received. Respondents' confidentiality was maintained throughout the research process.

RESULTS

Respondent Characteristics

The study involved 30 pregnant women in the first trimester with emesis gravidarum who underwent examination at the Bara-Baraya Health Center in Makassar City. The characteristics of the respondents included age, gestational age, parity, and education. The results of the analysis of the characteristics of the respondents were presented in the form of frequency and percentage distribution, as shown in the following table.

Table 1. Frequency Distribution of Respondent Characteristics

Features	Frequency (n)	Percentage (%)
Mother's Age (Years)		
< 20 years old	4	13,3
20–35 years old	22	73,3
> 35 years old	4	13,3
Gestational age (weeks)		
4–8 weeks	8	26,7
9–11 weeks	15	50,0
12–14 weeks	7	23,3
Parity		
Primigravida	13	43,3
Multigravity	15	50,0
Grandmultigravida	2	6,7
Education Level		
Elementary/Junior High School	5	16,7
High School/Vocational School	16	53,3
Diploma/Bachelor's	9	30,0
Total	30	100,0

Source: Primary Data of UPT Bara-Baraya Health Center in Makassar City, 2026

Table 1 shows that the majority of respondents aged 20–35 years old were 22 people (73.3%); gestational age was in the range of 9–11 weeks, as many as 15 people (50.0%), and the majority of respondents had a high school/vocational education, as many as 16 people (53.3%). Based on parity, multigravida was the largest group, with as many as 15 people (50.0%). However, respondents who experienced emesis gravidarum in the moderate category were most dominant among primigravida, with as many as 11 people (47.8%), multigravida as many as 10 people (43.5%), and grand multigravida as many as 2 people (8.7%). These results show that most of the respondents are pregnant women of healthy reproductive age with a high level of education and are pregnant women who are vulnerable to experiencing emesis gravidarum.

Table 2. Distribution of PUQE scores before intervention (pre-test) and after intervention (post-test)

Categories Emesis Gravidarum	Before Intervention (pre-test)		After Intervention (post-test)	
	Frequency (n)	Percentage (%)	Frequency (n)	Percentage (%)
Mild (score ≤ 6)	7	23,3	27	90,0
Moderate (score 7–12)	23	76,7	3	10,0
Severe (score ≥ 13)	0	0,0	0	0,0
Total	30	100	30	100
PUQE Score	Average: 7.60±1.61 Median: 8.0 Min-Max: 4-11		Average: 4.70±1.24 Median: 5.0 Min-Max: 3-7	
Difference between Pre-test and Post-test	Average: 2.90±1.21; Medieval: 3.0; Min-Max: 0-6			

Source: Primary Data of UPT Bara-Baraya Health Center in Makassar City, 2026

Table 2: Assessment of PUQE scores before the intervention: 7 respondents (23.3%) were in the mild category, and 23 (76.7%) were in the moderate category. There were no respondents in the severe category (score ≥ 13). The average PUQE score was 7.60 $\pm$ 1.61, a median of 8.0, and a score range of 4–11. After 10 days of intervention, 27 respondents (90.0%) were in the mild category, and 3 (10.0%) were in the moderate category. The average PUQE score after the intervention decreased to 4.70 $\pm$ 1.24, with a median of 5.0 and a score range of 3–7. Compared to the score before the intervention, there was a decrease in the average score of 2.90 points.

Based on the category of emesis gravidarum, before the intervention, most of the respondents were in the moderate category, namely 23 people (76.7%), while 7 people (23.3%) were in the mild category, and there were no respondents in the severe category. Medium category respondents had a PUQE score of 7–12, with an average PUQE score of 7.60 $\pm$ 1.61, a median of 8.0, and a range of 4–11. After the 10-day intervention, the number of moderate category respondents decreased to 3 people (10.0%), while the mild category increased to 27 people (90.0%). The three respondents who remained in the moderate category showed that despite the decrease in the frequency of nausea, vomiting, and retching, the total PUQE score was still in the range of 7–12. No respondents in the severe categories were found before or after the intervention. Overall medication adherence, based on daily consumption records, was 100% (30/30 participants consumed 100% of the prescribed dose), consumed in the morning and evening through close monitoring.

Table 3. Normality Test and Difference Test

Statistical Test	Value	Remarks
Wilcoxon Signed Rank (W)	-4,703	p<0.001
Effect size (r)	0,86	Large effect category

Statistical Test	Value	Remarks
Paired t-test	t=13.09	P<0.001; df=29
Average score difference	2,90	95% CI: 2.45 – 3.35

Source: Primary data from UPT Bara-Baraya Health Center in Makassar City, 2026

Table 3. The results of the Wilcoxon test showed a statistically significant decrease in the emesis gravidarum score after the administration of cardamom and red ginger ($Z = -4.703$; $p < 0.001$). An r value of 0.86 indicates a large *magnitude of effect*. In comparison, the parametric *paired t-test* produced consistent conclusions ($t = 13.09$; $p < 0.001$), with an average score difference of 2.90 points and a 95% confidence interval between 2.45 and 3.35 points, which does not include a zero value and thus reinforces evidence of a significant decrease in scores. Based on the results of the study, no significant correlation was found between age and gestational age and the decrease in score ($p > 0.05$ for both), indicating that the effectiveness of the combination of cardamom and red ginger in this study was relatively unaffected by these characteristics. This intervention has the potential to be widely applied to pregnant women in the first trimester with emesis gravidarum regardless of certain age groups or gestational age.

Figure 1. Waterfall Plot of Decline in Emesis Gravidarum Score

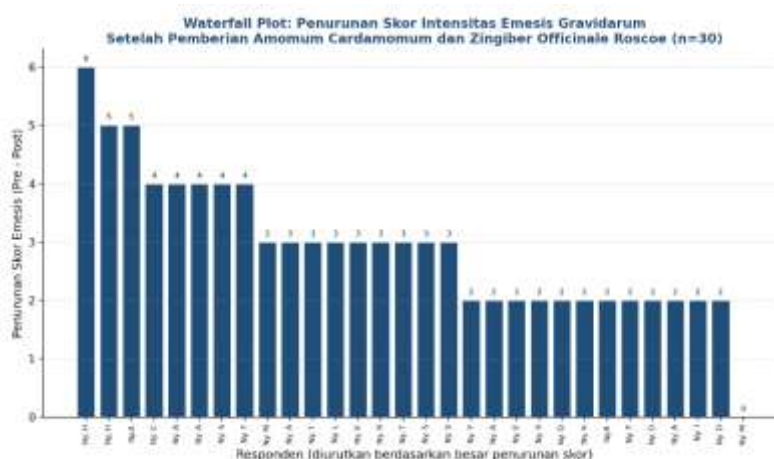


Figure 1. Waterfall Plot of Decrease in Emesis Gravidarum Intensity Score per Respondent (n=30)

Figure 1. The waterfall plot shows the magnitude of the decrease in the emesis gravidarum score (pre-post test score) in each respondent, sorted from largest to smallest. All respondents (30 people) experienced a decrease in score or remained unchanged (none experienced adverse conditions), with the largest decrease reaching 6 points, and only one respondent (3.3%) showed no change in score (difference = 0).

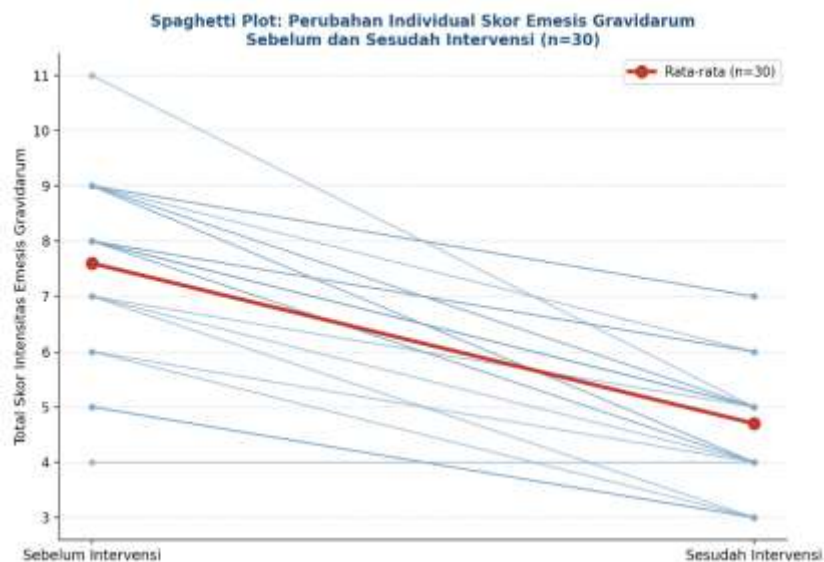
Figure 2. Spaghetti Plot: Individual Change**Figure 2. Spaghetti Plot: Emesis Gravidarum Score before and after intervention (n=30)**

Figure 2. The spaghetti plot shows the trajectory of each respondent's emesis gravidarum score change individually from before to after the intervention, with a bold red line indicating the group average. The pattern of lines consistently decreasing from left to right illustrates a downward trend in emesis scores in almost all respondents, reinforcing the results of statistical tests that the intervention provides a consistent decreasing effect at the individual level, not just at the group average.

DISCUSSION

The results of this study showed that the administration of *Amomum cardamomum* (cardamom) and *Zingiber officinale Roscoe* (red ginger) as complementary therapy significantly reduced the intensity of emesis gravidarum in pregnant women in the first trimester, with an average score reduction of 2.90 points (95% CI: 2.45–3.35) and a large effect size ($r = 0.86$).

The results of this study showed that the administration of *Amomum cardamomum* (cardamom) and *Zingiber officinale Roscoe* (red ginger) as complementary therapy significantly reduced the intensity of emesis gravidarum in pregnant women in the first trimester. The Wilcoxon Signed Rank test showed a difference in PUQE scores before and after the intervention ($Z = -4.703$; $p < 0.001$), with an effect size of $r = 0.86$, which was in the large category. The average decrease in PUQE score was 2.90 points, with a 95% confidence interval of 2.45–3.35 points.

In this study, the intervention was administered twice daily for 10 consecutive days to provide repeated and consistent exposure to herbal preparations, as well as to allow adequate observation of changes in nausea and vomiting symptoms using PUQE scores. Given that symptoms of nausea and vomiting in early pregnancy can fluctuate from day to day, a continuous observation period of 10 days is required to allow for cumulative exposure to gingerol/shogaol, given the prevalent half-life of elimination reported in the pharmacokinetic literature, while explicitly stating that this selection is based on empirical/practical considerations for this study and is not evidence of a universally accepted optimal duration.

Given that symptoms of nausea and vomiting in early pregnancy can fluctuate from day to day, a continuous observation period of 10 days was chosen as an empirical and practical consideration for this study. This period allows for repeated observation of changes in symptoms but cannot yet be considered a universally accepted optimal duration. Similarly, the discussion of cumulative exposure to gingerol and shogaol needs to be placed with caution, as this study did not measure the levels of active compounds in plasma, tissues, or intervention preparations, nor did it conduct pharmacokinetic analyses. Therefore, the duration of 10 days cannot be directly associated with the achievement of certain therapeutic levels or the half-life of elimination of active compounds.

The results showed that red ginger (*Zingiber officinale*) was effective in reducing nausea and vomiting in pregnant women in the first trimester, consistent with the findings of several studies in Indonesia in the last five years. Research by Kundaryanti et al. showed that there was an influence on the level of emesis gravidarum before and after giving ginger drinks in the intervention group, so it can be concluded that ginger drinks were effective against emesis gravidarum in pregnant women in the first trimester (Kundaryanti et al., 2024). Research by Efendi et al. shows that ginger brewing can reduce nausea and vomiting in pregnant women in the first trimester (Efendi et al., 2025). In addition, Maisaroh et al. reported that there was an effect of ginger-brewed water on nausea and vomiting in TM I pregnant women in the Gedung Negara Health Center area in 2023. It was found that the average nausea and vomiting before being given ginger-brewed water was 8.9, and the average nausea and vomiting after being given ginger infusion water was 5.1 (Maisaroh et al., 2024). These findings support that the decrease in the frequency of nausea and vomiting in the intervention group occurred more quickly compared to the control group. It can be concluded that the administration of red ginger brewing was effective in reducing the frequency of nausea and vomiting in pregnant women in the first trimester who experienced hyperemesis gravidarum (Fitra, 2023). Research on ginger

aromatherapy in the Harjamukti area, Cirebon City, also reported an effect on nausea and vomiting scores in pregnant women (Suminar et al., 2025).

The content of gingerol and shogaol also needs to be explained based on their chemical form and the process of processing the ingredients. Gingerol is the main group of phenolic compounds in fresh ginger, with 6-gingerol being one of the most researched components. Other compounds in this group include 8-gingerol and 10-gingerol. Meanwhile, shogaol, especially 6-shogaol, is formed through the process of dehydration of gingerol, especially during drying or heating. Thus, fresh ginger and dried ginger do not always have the same content of gingerol and shogaol. Drying can decrease the proportion of gingerol and increase the proportion of shogaol, while heating conditions, storage length, size of ingredients, and extraction methods can affect the final composition. Because this study used red ginger at a dose of 250 mg but did not report levels of 6-gingerol, 6-shogaol, total gingerol, total shogaol, or chromatographic profiles of the preparation, quantitative levels of the active compounds actually received by respondents could not be determined. Doses of the ingredient in milligrams could not be directly converted to milligrams of gingerol or shogaol without data on ingredient standardization and phytochemical analysis.

From a mechanism perspective, gingerol and shogaol are thought to contribute to the antiemetic effects of ginger through several pathways, including modulation of gastrointestinal tract activity, interactions with serotonergic pathways, and effects on sensory mechanisms related to nausea. The observed clinical effects are the result of the administration of a whole red ginger preparation that also contains essential oil components and other bioactive compounds.

The antiemetic mechanism of red ginger is also pharmacologically linked to the content of active compounds such as gingerol and shogaol that can affect serotonergic pathways, including the 5-HT₃ serotonin receptors in the gastrointestinal tract and central nervous system. These mechanisms can theoretically reduce the stimulation of nausea and vomiting, but the relative contribution of each compound in humans is still influenced by the form of the preparation, bioavailability, metabolism, and characteristics of the ingredients. Verified ginger intervention studies reported a comparable decrease in PUQE scores in order to avoid gaps in arguments. This mechanism supports the findings in this study, where the decrease in emesis score was consistent in almost all symptom components (duration of nausea, frequency of vomiting, and frequency of retching) (Sudiksha et al., 2022).

Meanwhile, *Amomum cardamomum*, or cardamom, is traditionally known to have carminative properties and soothe the gastrointestinal tract and is used to treat nausea and

vomiting in pregnant women, especially during the first trimester of pregnancy, where 70-85% of women experience symptoms (Sukini et al., 2022; Tono & Intiyaswati, 2023). Research shows that cardamom aromatherapy can significantly reduce the intensity of nausea and vomiting, with p-values showing significant differences before and after the intervention (Tono & Intiyaswati, 2023). The combination of cardamom and red ginger has also been shown to be effective, where ginger provides an antiemetic effect through the serotonergic pathway, while the aroma of cardamom provides a relaxing effect (Tono & Intiyaswati, 2023).

The results showed a statistically significant decrease in PUQE score after the combination of cardamom and red ginger, with a large effect magnitude ($r = 0.86$). The average score decrease of 2.90 points with a 95% CI of 2.45–3.35 indicates that the estimated average change is within this range. The value of $r = 0.86$ in this study is the effect size of the Wilcoxon Signed-Rank test, not the correlation coefficient between the score before and after the intervention. This value indicates a large magnitude of effect. Meanwhile, the 95% confidence interval of 2.45–3.35 points is an estimate of the average decrease in PUQE score, not the confidence interval for r . Therefore, the two parameters need to be interpreted separately. The waterfall plot and spaghetti plot patterns showing a decrease in scores in almost all respondents provide a descriptive picture of the consistency of individual changes but do not replace correlation analysis or CI for effect size.

Respondents with a heavier degree of emesis at the beginning of the measurement tended to still show a relatively higher final score than other respondents, even though they both experienced improvement. The results of the initial PUQE score during recruitment were 23 respondents in the medium category (score 9) before intervention. Meanwhile, after intervention, the moderate category decreased to 3 respondents (10.0%). The change in the frequency of nausea, vomiting, and retching continued to decrease, but the total score was still in the medium category (score 7).

This is in line with the clinical understanding that the severity of emesis gravidarum is influenced by individual factors such as sensitivity to *human chorionic gonadotropin* (hCG) hormones and psychological factors, so responses to complementary therapies may vary even if the direction of change is consistently decreasing.

The absence of a meaningful correlation between age and gestational age with a significant decrease in score ($p > 0.05$ for both) suggests that the effectiveness of the combination of cardamom and red ginger in this study was relatively unaffected by these characteristics, so this intervention has the potential to be widely applied in pregnant women in the first trimester with emesis gravidarum regardless of age group or specific gestational

age. These findings strengthen the position of complementary therapies made from natural ingredients as a safe, accessible, and integrable nonpharmacological option in antenatal care in primary health care facilities such as health centers.

However, this study has methodological limitations, namely the *design of a one-group pre-post test* without a control/comparator group, so that the observed decrease in scores cannot be completely separated from the possibility of natural improvement in emesis gravidarum symptoms as gestational age increases towards the second trimester. The limited number of samples (n=30) in one work area of the Puskesmas also limits the generalization of results. Follow-up research with a *randomized controlled trial* (RCT) design and a control group is recommended to strengthen the evidence of causality of the effectiveness of the combination of cardamom and ginger against emesis gravidarum.

CONCLUSION

The combination of *Amomum cardamomum* (cardamom) and *Zingiber officinale Roscoe* (red ginger) was given twice daily for 10 days as complementary therapy and was significantly and consistently proven to be effective in reducing the intensity of emesis gravidarum in pregnant women in the first trimester, both as a group and at the individual level, without being affected by age or gestational age factors. This effectiveness is achieved through the complementary mechanism of action between gingerol and shogaol in red ginger, which inhibits serotonin receptors (5-HT₃), as well as cardamom essential oil, which provides carminative and relaxing effects. In addition, this intervention is relatively safe without causing side effects in respondents, so it has the potential to be integrated as a safe and affordable nonpharmacological care option in primary health care facilities. However, given that this study still has methodological limitations in the form of a *one-group pre-post test* design without a control group and a limited number of samples (n=30), further research with a *Randomized Controlled Trial* (RCT) design is needed to strengthen the evidence of causality and support a broader generalization of results.

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