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Boiled ginger and honey intervention for hyperemesis gravidarum

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ABSTRACT

Hyperemesis gravidarum is excessive vomiting which can cause dehydration, lack of carbohydrate and fat reserves in the body, and Mallary Weiss syndrome due to gastrointestinal bleeding. Boiled ginger and honey were administered as an initial complementary treatment to reduce nausea and vomiting in pregnant women with hyperemesis gravidarum. This study aims to determine the effect of giving ginger and honey decoction on the frequency of hyperemesis gravidarum in pregnant women. This study employed a quasi-experimental design with a one-group pretest–posttest approach. The population was all pregnant women who experienced nausea and vomiting, outpatients, and inpatients at Inche Abdoel Moeis Hospital. The sample consisted of 18 people using consecutive sampling technique. The severity of nausea and vomiting was measured using the pregnancy-unique quantification of emesis and nausea (PUQE) questionnaire. Statistical analysis was performed using the Wilcoxon signed-rank test to compare pretest and posttest scores. The Wilcoxon Test results obtained a significance value of 0.000 < 0.05. There is an effect of giving ginger and honey decoction on the frequency of hyperemesis gravidarum. Pregnant women are advised to use a decoction of ginger and honey, apart from that, other researchers are advised to use a control group in subsequent studies.

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1. INTRODUCTION

One of the physiological changes that occur in pregnancy is nausea and vomiting, known as emesis gravidarum. Emesis gravidarum often occurs (50-80%) in early pregnancy, 28% experience nausea alone, while 52% have nausea and vomiting. Emesis gravidarum in pregnant women is physiological, but if it is not immediately addressed with effective therapy it will become pathological, namely hyperemesis gravidarum (HEG) [1].

World Health Organization (WHO) data shows that the incidence of hyperemesis gravidarum reaches 12.5% of all pregnancies. About 60-80% of primigravida and 40-60% of multigravida experience emesis gravidarum, affecting approximately 0.3 to 3% of pregnancies [2]. The incidence of hyperemesis gravidarum in Indonesia during 2022 was 1.5% and in 2023 there was an increase of 3% pregnant women who checked themselves at the health service [3].

Preliminary studies conducted at Inche Abdoel Moeis Samarinda Hospital from January to December 2023 found 148 cases of pregnant women with nausea and vomiting, which based on the data this

number has increased from the previous year by 30%. Most cases experienced several additional symptoms in addition to excessive nausea and vomiting such as weakness, pallor, and dehydration due to continuous vomiting [4].

Hyperemesis gravidarum occurs in approximately 0.3–3% of pregnancies and is associated with an increased risk of hospitalization, which may subsequently affect fetal growth and pregnancy outcomes. The most common symptoms include persistent vomiting, acute dehydration, and weight loss exceeding 5% of pre-pregnancy body weight [5]. Pregnant women with excessive nausea and vomiting symptoms have a high potential for dehydration, lack of carbohydrate and fat reserves in the body, small tears in the mucous membranes of the esophagus and stomach, or Mallory-Weiss syndrome due to gastrointestinal bleeding [6]. If not properly managed, hyperemesis gravidarum can lead to serious maternal complications such as electrolyte imbalance, malnutrition, growth, and pregnancy outcome [7], [8]. According to Tinti *et al.* [5], the cause of nausea and vomiting is multifactorial, such as hormonal changes, psychological tendencies, evolutionary adaptations (food avoidance), and genetic risk factors, but the main cause is caused by hormonal changes, especially increased levels of human chorionic gonadotropin (hCG), estrogen, and progesterone hormones [5], [9]. Hyperemesis gravidarum can affect 80% of pregnant women psychologically and can also have a considerable effect on quality of life. Most pregnant women feel that nausea and vomiting can be an uncomfortable complaint and can interfere with the activities of pregnant women [10].

Although pharmacological treatments such as antiemetics (e.g., doxylamine-pyridoxine, metoclopramide, and ondansetron) are commonly used to manage hyperemesis gravidarum, their efficacy and safety profiles are variable and supported by limited high-quality evidence. Some studies have reported potential concerns regarding fetal risk with certain agents, highlighting the need for cautious use during pregnancy [11]. These limitations have led pregnant women and clinicians to explore non-pharmacological alternatives. Approaches such as ginger supplementation, dietary adjustments, and acupressure have shown promise in reducing nausea and vomiting with minimal adverse effects, offering potential safe options to complement or replace drug therapy for nausea and vomiting in pregnancy [12]. Symptoms of nausea and vomiting in pregnant women can be treated by pharmacological and non-pharmacological means, the aim is to prevent a more severe condition or to reduce existing symptoms [13]. Pharmacological treatment consists of vitamin administration (vitamin B complex, mediamer B6 as a vitamin, and antiemetic) and mild sedative treatment. Non-pharmacological treatments for nausea and vomiting can use herbal ingredients around the mother, such as honey and ginger. Ginger has pharmacological effects as an antiemetic [14].

Hyperemesis gravidarum is excessive or uncontrollable nausea and vomiting during pregnancy. The main cause of hyperemesis gravidarum is unknown, but it is likely to be a combination of hormonal changes and psychological factors [15]. Nausea and vomiting begin at around 6-8 weeks, peaks at nine weeks' gestation, and persists for around 12 weeks. A small proportion of pregnant women still feel nausea and vomiting at 20 weeks of gestation [16]. Ginger (*Zingiber officinale*) has been widely recognized as a natural antiemetic agent. Its bioactive compounds, including gingerols and shogaols, have been shown to reduce nausea and vomiting by modulating gastrointestinal motility and inhibiting serotonin (5-HT3) receptors involved in the emetic pathway. In addition, ginger exhibits anti-inflammatory properties that may contribute to gastrointestinal comfort [17]. Honey, on the other hand, serves as a readily available source of energy and contains bioactive compounds with antioxidant, anti-inflammatory, and prebiotic properties. These components may help protect the gastric mucosa, improve gastrointestinal comfort, and support nutritional intake, which is often compromised in pregnant women experiencing hyperemesis gravidarum [18]. The combination of ginger and honey is therefore hypothesized to produce a synergistic effect, in which ginger primarily alleviates nausea and vomiting while honey enhances gastrointestinal tolerance and energy replenishment. This complementary mechanism provides a strong theoretical basis for the use of ginger and honey decoction as a simple, safe, and non-pharmacological intervention for managing hyperemesis gravidarum in pregnant women [19]. Ginger and honey boiled water are one of the effective ways as an initial treatment to reduce nausea and vomiting in first trimester pregnancy and in pregnant women with hyperemesis gravidarum [20]. The advantages of ginger are that it contains essential oils that refresh and block the vomiting reflex, gingerol can improve blood circulation, and nerves work well [21]. While honey contains minerals, vitamins B1, B2, B6, and others that can reduce nausea and vomiting [22]. The combination of ginger and honey is presumed to provide a synergistic effect, where ginger acts as an antiemetic agent while honey contributes to energy replenishment and gastrointestinal comfort, potentially enhancing the overall effectiveness in reducing nausea and vomiting during pregnancy [23]. This study is expected to contribute novel evidence regarding the effectiveness of ginger and honey decoction as a simple, affordable, and locally available non-pharmacological intervention for hyperemesis gravidarum in pregnant women. From a public health perspective, the use of herbal-based interventions such as ginger and honey may support maternal health promotion strategies by reducing dependency on pharmacological treatments and improving maternal well-being during early pregnancy.

Research conducted by Ashebir *et al.* [24] said pregnant women who did not consume ginger had a three times higher chance of experiencing hyperemesis gravidarum compared to always consuming ginger. Ginger is an effective preventive and nonpharmacological option for the treatment of hyperemesis gravidarum. Furthermore, research by Sarecka-Hujar and Szulc-Musioł [25] concluded that ginger is one of the most widely used herbal medicines for therapy in pregnancy. A dose of ginger <1000 mg per day can alleviate hyperemesis gravidarum and this dose does not cause side effects on the mother or fetus.

Numerous studies have explored non-pharmacological interventions to reduce hyperemesis gravidarum during pregnancy. Among these approaches, ginger has been widely studied and shown to be effective in reducing nausea and vomiting. Ginger is commonly used as a spice, food flavoring, beverage ingredient, and traditional medicine, and its advantages include low cost and easy accessibility within the community. However, most existing studies have primarily focused on ginger as a single intervention. Evidence regarding the combined use of ginger and honey as an alternative therapy for reducing hyperemesis gravidarum remains limited. Honey, which may provide additional benefits such as energy supplementation and gastrointestinal comfort, has rarely been examined in combination with ginger. Consequently, empirical data on the effectiveness of ginger and honey decoction in reducing the frequency of hyperemesis gravidarum are still scarce, particularly in hospital-based settings. This evidence gap is more pronounced in Eastern Indonesia, including Samarinda, where research on combined herbal interventions for hyperemesis gravidarum is limited. Therefore, further studies are needed to evaluate the effectiveness of ginger and honey decoction as a complementary therapy for reducing the frequency of hyperemesis gravidarum among pregnant women, particularly using quasi-experimental designs in clinical settings. Based on the theory that has been presented previously regarding the benefits of giving ginger and honey, the researcher is interested in examining "The Effect of Ginger and Honey Decoction on the Frequency of Hyperemesis Gravidarum in Pregnant Women at Hospital". This study aimed to assess the effectiveness of ginger and honey decoction as a complementary therapy for reducing the frequency of hyperemesis gravidarum among pregnant women using a quasi-experimental approach.

2. METHOD

This study was a quantitative study using a quasi-experimental design with a one-group pretest–posttest approach. This design aimed to test hypotheses through an intervention in a single sample group without a control group. The research was conducted at Inche Abdoel Moeis Samarinda Hospital.

The population in this study consisted of all pregnant women who experienced nausea and vomiting, both outpatients and inpatients, at Inche Abdoel Moeis Samarinda Hospital during the period October–December 2023, totaling 20 individuals. A total of 18 respondents were included as samples. The sampling technique used was consecutive sampling. The inclusion criteria were: i) pregnant women in the first and second trimesters, ii) pregnant women experiencing hyperemesis gravidarum who underwent examination at the emergency room of Inche Abdoel Moeis Samarinda Hospital, iii) pregnant women who were willing to participate as respondents, and iv) pregnant women with urine ketone test results ≥ +2. The exclusion criteria were pregnant women who were allergic to ginger or honey.

In this study, the independent variable was the administration of ginger and honey decoction, while the dependent variable was hyperemesis gravidarum. The ginger and honey decoction were prepared by peeling and slicing 250 grams of small ginger, which was then boiled in 1,000 ml of water for 10 minutes. After cooling to a warm temperature, the decoction was divided into nine portions of 100 ml each. One tablespoon of honey was added to each portion and stirred using a wooden spoon. The intervention was administered twice daily for three consecutive days. Nausea and vomiting experienced by pregnant women aged 4–20 weeks of gestation were measured twice, before and after the intervention.

The instruments used in this study included the pregnancy-unique quantification of emesis and nausea (PUQE-24) questionnaire, standard operating procedures (SOP), and an observation sheet. The PUQE-24 results were categorized as mild (≤6), moderate (7–12), and severe (13–15). However, in this study, the PUQE-24 score was analyzed using a numerical scale ranging from 0 to 15. Statistical analysis was conducted to assess the effect of ginger and honey decoction on the frequency of hyperemesis gravidarum in pregnant women. The Wilcoxon signed-rank test was used to compare pre- and post-intervention scores. A significance level of $p < 0.05$ was set to determine statistical significance.

3. RESULTS AND DISCUSSION

Table 1 presents the sociodemographic and obstetric characteristics of the participants. A total of 18 pregnant women were included in the study. Most participants were aged 20–35 years (83.3%). Regarding educational background, the majority had secondary education (61.1%), followed by higher education

(22.2%). Most respondents were housewives (88.9%). In terms of obstetric history, 61.1% were multigravida, and most participants were in the first trimester of pregnancy (72.2%).

Table 2 shows the distribution of hyperemesis gravidarum severity before and after the administration of ginger and honey decoction. Before the intervention, most participants experienced moderate hyperemesis gravidarum (88.9%), while 11.1% experienced severe hyperemesis gravidarum. After the intervention, all participants (100%) were classified as having mild hyperemesis gravidarum.

As presented in Table 3, the mean PUQE score before the intervention was 9.67 ± 1.75. After the intervention, the mean score decreased to 4.06±0.24. The mean difference between pre- and post-intervention PUQE scores was 5.61.

Table 4 summarizes the comparison of PUQE scores before and after the intervention. The median PUQE score before treatment was 9 (range 8–13), while after treatment the median score decreased to 4 (range 4–5). The Wilcoxon signed-rank test demonstrated a statistically significant difference between pre- and post-intervention PUQE scores ($p < 0.001$).

Table 1. Frequency distribution of respondents based on characteristic

No.	Characteristics	n	%
1	Age		
	<20 years	2	11.1
	20–35 years	15	83.3
	>35 years	1	5.6
	Total	18	100
2	Education history		
	Basic education (elementary, junior high, equivalent)	3	16.7
	Secondary education (high school, equivalent)	11	61.1
	Higher education (College)	4	22.2
	Total	18	100
3	Jobs		
	Housewife (IRT)	16	88.9
	Private	2	11.1
	Total	18	100
4	Parity		
	Primigravida	6	33.3
	Multigravida	11	61.1
	Grande multigravida	1	5.6
	Total	18	100
5	Pregnancy age		
	Trimester I (1-12 weeks)	13	72.2
	Trimester II (>12-24 weeks)	5	27.8
	Total	18	100

Table 2. Frequency of hyperemesis gravidarum in pregnant women before and after consumption of a ginger–honey decoction

No.	Frequency of hyperemesis gravidarum	Before		After	
		n	%	n	%
1	Mild (Score 1-6)	0	0	18	100
2	Medium (Score 7-12)	16	88.9	0	0
3	Severe (Score 13-15)	2	11.1	0	0
	Total	18	100	18	100

Table 3. Mean frequency score of hyperemesis gravidarum in pregnant women before and after ginger and honey decoction

No.	HEG frequency	n	Mean	Mean difference	SD
1	Before	18	9.6667	5.6111	1.74895
2	After	18	4.0556		0.23570

Table 4. Effect of ginger and honey decoction on the frequency of hyperemesis gravidarum in pregnant women

Frequency of hyperemesis gravidarum	n	Median (Min-Max)	Mean ± SD	p*
Before	18	9 (8-13)	9.6667 ± 1.74895	0.000
After	18	4 (4-5)	4.0556 ± 0.23570	

4. DISCUSSION

4.1. Characteristics of respondents in the form of age, education, occupation, parity, and pregnancy age of respondents

Table 1 presents the demographic and obstetric characteristics of the respondents, including age, educational level, occupation, parity, and gestational age. The majority of respondents were aged 20–35 years (83.3%), which represents the optimal reproductive age range. This finding is consistent with previous studies, Putri [26] reporting that hyperemesis gravidarum most commonly occurs among women within this age group. Aprilasari *et al.* [27] also demonstrated a significant association between maternal age and the incidence of hyperemesis gravidarum, with a moderate correlation strength ($r = 0.426$), indicating that age may influence the occurrence of pregnancy-related nausea and vomiting.

Pregnancies occurring at maternal ages below 20 years or above 35 years have been associated with an increased risk of hyperemesis gravidarum due to biological and psychological factors. Younger pregnant women may experience emotional instability and inadequate nutritional adaptation, while advanced maternal age is often associated with decreased physiological resilience and increased pregnancy-related complications [28]. However, in the present study, most respondents were within the optimal reproductive age, suggesting that factors other than age, such as psychological stress, gravidity, or parity, may have contributed to the occurrence of hyperemesis gravidarum.

Regarding educational background, most respondents had completed secondary education (61.1%). Similar findings were reported by Reni *et al.* [29] who observed that hyperemesis gravidarum was most prevalent among pregnant women with a high school education level. Hijrawati *et al.* [30], further reported a statistically significant relationship between education level and hyperemesis gravidarum incidence ($p < 0.05$). Education is generally associated with knowledge acquisition and health-seeking behavior; however, knowledge related to pregnancy health is not exclusively obtained through formal education. Informal sources such as personal experience, health counseling, media exposure, and social interactions also play a critical role in shaping maternal health awareness [26]. In this study, the occurrence of hyperemesis gravidarum among women with relatively higher educational backgrounds suggests that educational level alone may not be a protective factor against pregnancy-related nausea and vomiting.

In terms of occupation, the majority of respondents were housewives (88.9%). Previous studies have shown mixed findings regarding the relationship between maternal employment and hyperemesis gravidarum. Fauziah and Suryani [31] reported that non-working pregnant women had a significantly higher risk of experiencing hyperemesis gravidarum compared to working women (OR = 2.842). Conversely, other studies suggest that working women may experience increased psychological stress due to dual roles as employees and homemakers, which may exacerbate pregnancy-related symptoms [29]. In the present study, the predominance of housewives among respondents indicates that domestic workload, childcare responsibilities, and limited access to health information may contribute to increased susceptibility to hyperemesis gravidarum.

Most respondents were multigravida (61.1%). Several studies have reported a significant association between gravidity or parity and hyperemesis gravidarum Safari *et al.* [28] found a significant relationship between gravidity and hyperemesis gravidarum ($p < 0.05$), while Aprilasari *et al.* [27] reported a moderate correlation between parity and hyperemesis gravidarum incidence ($r = 0.580$). Although hyperemesis gravidarum is more frequently reported among primigravida women due to heightened psychological stress and fear associated with first-time pregnancy, the present study found a higher proportion of multigravida women experiencing hyperemesis gravidarum. This finding suggests that psychological factors, previous pregnancy experiences, and cumulative stress may play a role in symptom severity regardless of parity.

With respect to gestational age, most respondents were in the first trimester (1–12 weeks) (72.2%). This finding aligns with previous studies indicating that hyperemesis gravidarum predominantly occurs during early pregnancy [32]. Elevated levels of hCG during the first trimester are considered a major contributing factor to nausea and vomiting. hCG levels typically peak between 8 and 11 weeks of gestation, coinciding with the peak incidence of hyperemesis gravidarum [29]. Additionally, increased progesterone levels may reduce gastric motility, while elevated cortisol levels associated with psychological stress may further exacerbate gastrointestinal symptoms [29].

Overall, the characteristics of respondents in this study reflect commonly reported demographic and obstetric patterns among pregnant women experiencing hyperemesis gravidarum. However, the findings suggest that hyperemesis gravidarum is a multifactorial condition influenced by biological, psychological, and social factors rather than a single demographic determinant.

4.2. Frequency of hyperemesis gravidarum in pregnant women before and after ginger and honey decoction

The results of this study demonstrate a significant change in the severity of hyperemesis gravidarum experienced by pregnant women after the administration of ginger and honey decoction. Prior to the intervention, most respondents were classified as having moderate hyperemesis gravidarum, with a relatively

high mean score and notable variability among participants. After receiving the ginger and honey decoction, all respondents experienced a shift to mild hyperemesis gravidarum, accompanied by a substantial decrease in the mean score and a markedly lower standard deviation. This indicates not only an overall reduction in symptom severity but also a more uniform response among pregnant women following the intervention.

The difference in mean hyperemesis gravidarum scores before and after treatment suggests that the intervention had a meaningful impact on reducing nausea and vomiting during pregnancy. This reduction is particularly important in the context of maternal health, as persistent hyperemesis gravidarum can interfere with daily activities, reduce nutritional intake, and negatively affect both physical and psychological well-being. If left unmanaged, hyperemesis gravidarum may progress to dehydration, electrolyte imbalance, and weight loss, which can further compromise maternal and fetal health outcomes. Therefore, the observed improvement highlights the potential of ginger and honey decoction as a supportive intervention in maternal care.

The findings of this study are consistent with previous research, including the study conducted by Soa *et al.* [33], which reported a decrease in the frequency and severity of nausea and vomiting among first-trimester pregnant women after the administration of red ginger and mint leaf decoction. In that study, respondents predominantly transitioned from moderate to mild nausea and vomiting categories following the intervention. The similarity between these results and the findings of the present study reinforces the evidence that ginger-based herbal preparations are effective in managing hyperemesis gravidarum and supports their broader application in maternal health interventions.

The observed reduction in hyperemesis gravidarum severity after the ginger and honey decoction intervention is supported by international evidence on ginger's antiemetic effects in pregnancy. A recent systematic review and meta-analysis demonstrated that ginger supplementation significantly reduces nausea and vomiting symptoms in pregnant women with minimal side effects, supporting its safety and efficacy as a complementary therapy for hyperemesis gravidarum [12]. Similarly, a quasi-experimental study reported that a ginger, lemon, and honey decoction significantly decreased nausea and vomiting scores compared to an education-only group, indicating the potential benefit of combinations involving ginger and honey in clinical practice [34]. Other quasi-experimental research also found that regular consumption of ginger beverages significantly reduced the frequency of emesis gravidarum symptoms, aligning with the present study's findings [35], [36]. Furthermore, supplementation with standardized ginger extract resulted in meaningful improvements in nausea and vomiting severity, which reinforces the role of ginger within antenatal care protocols as a safe and effective non-pharmacological intervention.

From a physiological perspective, hyperemesis gravidarum is closely associated with hormonal changes that occur during early pregnancy, particularly fluctuations in hCG and progesterone levels. During the first trimester, hCG levels increase rapidly and reach a peak between 12 and 16 weeks of gestation, which coincides with the period when nausea and vomiting are most commonly reported. Elevated progesterone levels contribute to relaxation of smooth muscle in the gastrointestinal tract, leading to decreased gastric motility and delayed gastric emptying. These physiological changes can exacerbate nausea and vomiting and increase the risk of hyperemesis gravidarum when symptoms persist continuously [37], [38].

Prolonged hyperemesis gravidarum can result in dehydration, hemoconcentration, and impaired circulation, thereby reducing the delivery of nutrients and oxygen to maternal tissues. In severe cases, continuous vomiting may lead to depletion of carbohydrate and fat reserves as alternative energy sources, which further worsens the maternal condition. These mechanisms help explain why effective management of nausea and vomiting during pregnancy is essential to prevent more serious complications and to maintain maternal nutritional status.

In addition to physiological factors, psychosocial conditions play a crucial role in the development and severity of nausea and vomiting during pregnancy. Emotional stress, anxiety related to pregnancy, concerns about maternal and fetal health, financial issues, and changes in social roles can exacerbate symptoms or reduce a woman's ability to cope with discomfort. Psychological distress may also amplify the perception of nausea and vomiting, thereby worsening the overall experience of hyperemesis gravidarum. Addressing these psychosocial factors is therefore an important component of comprehensive maternal health care [38].

The use of ginger and honey decoction may contribute not only to physiological symptom relief but also to improved psychological comfort among pregnant women. Ginger contains several bioactive compounds, including gingerols, shogaols, zingiberene, and essential oils, which possess antiemetic, anti-inflammatory, and gastrointestinal regulatory properties. Ginger is known to exert its antiemetic effect by inhibiting serotonin receptors in the gastrointestinal tract and central nervous system, thereby reducing the stimulation of the vomiting center. Additionally, ginger can enhance gastrointestinal motility and reduce gastric irritation, which helps alleviate nausea and vomiting during pregnancy [32], [39].

Honey complements the effects of ginger by providing a natural source of energy and supporting gastrointestinal protection. Honey can coat the esophageal and gastric mucosa, reducing irritation caused by

gastric acid and preventing reflux that may trigger nausea. Furthermore, honey may stimulate the proper functioning of gastric sphincter muscles, helping to prevent the regurgitation of stomach contents. This combination of ginger and honey therefore offers a synergistic effect in reducing the frequency and severity of hyperemesis gravidarum.

From the perspective of maternal health services, the findings of this study have important implications for antenatal care. Ginger and honey decoction represents a simple, affordable, and culturally acceptable non-pharmacological intervention that can be easily implemented by midwives and other maternal health providers. Incorporating this intervention into routine antenatal education and counseling may help pregnant women manage mild to moderate hyperemesis gravidarum effectively, reduce discomfort, and prevent progression to more severe conditions that require pharmacological or hospital-based treatment.

In the context of midwifery practice, providing education on the preparation and safe consumption of ginger and honey decoction empowers pregnant women to actively participate in self-care during pregnancy. This approach aligns with promotive and preventive maternal health strategies, emphasizing early intervention, patient education, and the use of locally available natural resources. Ultimately, the integration of ginger and honey decoction into maternal health services may contribute to improved maternal comfort, better nutritional intake, and enhanced quality of antenatal care.

4.3. Effect of ginger and honey decoction on the frequency of hyperemesis gravidarum in pregnant women

The results of this study indicate a statistically significant reduction in the frequency and severity of hyperemesis gravidarum following the administration of ginger and honey decoction. Prior to the intervention, the median hyperemesis gravidarum score was 9 (range 8–13), indicating that most respondents experienced moderate to severe symptoms. After the intervention, the median score decreased markedly to 4 (range 4–5). The Wilcoxon test demonstrated a significance value of $p < 0.05$, confirming that the observed reduction was statistically significant and unlikely to be due to chance.

Beyond statistical significance, the clinical interpretation of these findings is particularly meaningful. The substantial reduction in the median score, accompanied by a narrower post-intervention range, suggests not only a decrease in symptom severity but also a more homogeneous therapeutic response among participants. This pattern indicates that the ginger and honey decoction may have contributed to stabilizing symptom intensity across individuals. In maternal health care, consistency of response is clinically important, as hyperemesis gravidarum can significantly disrupt daily activities, reduce oral intake, impair hydration status, and negatively affect emotional well-being. Therefore, the intervention appears to provide both symptomatic relief and improved functional stability during early pregnancy.

Persistent hyperemesis gravidarum is associated with dehydration, electrolyte imbalance, hemoconcentration, and weight loss. Hemoconcentration may compromise effective blood circulation, thereby reducing oxygen and nutrient delivery to maternal tissues and potentially affecting fetal development if prolonged. From a preventive care perspective, early and effective symptom management is essential to prevent progression to severe hyperemesis gravidarum requiring pharmacological therapy or hospitalization. The findings of this study suggest that ginger and honey decoction may serve as an early supportive strategy to maintain maternal physiological stability during the critical first trimester.

These results are consistent with previous studies demonstrating the effectiveness of ginger-based interventions in reducing nausea and vomiting during pregnancy. Sulistyowati [38] reported a statistically significant reduction in nausea and vomiting scores among first-trimester pregnant women receiving ginger and honey decoction ($p < 0.005$). Other quasi-experimental and clinical studies have similarly shown that ginger beverages and ginger supplementation significantly reduce emesis gravidarum severity scores, supporting the therapeutic value of ginger as a complementary intervention.

The findings of the present study are further supported by recent international evidence. A 2025 systematic review and meta-analysis conducted by Gao [12] evaluated the clinical effectiveness of ginger supplementation in alleviating hyperemesis gravidarum across multiple studies and healthcare settings. The meta-analysis demonstrated that ginger significantly reduced the risk and severity of nausea and vomiting symptoms among pregnant women with hyperemesis gravidarum, with an odds ratio of 0.41 (95% CI: 0.22–0.79; $p = 0.008$). Importantly, the review reported no major adverse maternal or fetal effects associated with ginger use, reinforcing its safety profile as a complementary therapy during pregnancy. These findings strengthen the biological and clinical plausibility of the current study, as the significant reduction in hyperemesis gravidarum scores observed after the administration of ginger and honey decoction is consistent with high-level evidence derived from systematic evaluation. The convergence of results between the present quasi-experimental study and this recent meta-analysis suggests that ginger-based interventions, whether administered as standardized supplements or herbal decoctions, may offer a reliable and evidence-informed approach for managing hyperemesis gravidarum within maternal healthcare services [12].

The results of this study are supported by a randomized, placebo-controlled trial conducted by Saberi *et al.* [40], which demonstrated that ginger significantly reduced nausea and vomiting symptoms in pregnant women under 16 weeks of gestation compared to placebo. Although the participants were primarily experiencing nausea and vomiting of pregnancy rather than severe hyperemesis gravidarum, the findings remain relevant because both conditions lie within the same clinical spectrum. The randomized controlled design strengthens the evidence for ginger's antiemetic effectiveness. The consistency between the RCT findings and the symptom reduction observed in this study reinforces the role of ginger, including in decoction form combined with honey, as a safe and effective non-pharmacological intervention in maternal health care [40].

Previous systematic evidence has also consistently supported the effectiveness and safety of ginger in managing pregnancy-related nausea and vomiting. A widely cited systematic review and meta-analysis by Viljoen *et al.* [41] concluded that ginger significantly reduced nausea symptoms without increasing adverse maternal or fetal outcomes. Although published earlier, this study remains an important foundational reference, demonstrating that ginger has long been scientifically evaluated and recognized as a safe complementary therapy in pregnancy. The findings of the present study therefore align with established scientific trends supporting ginger use in the management of nausea and vomiting during pregnancy [41].

A recent quasi-experimental study further strengthens the evidence supporting herbal combination therapies in managing pregnancy-related nausea and vomiting. Nurmasyithah *et al.* [34] reported that a decoction containing ginger, lemon, and honey significantly reduced nausea and vomiting scores among pregnant women with emesis gravidarum compared to a control group receiving standard education. The study demonstrated meaningful clinical improvement after regular consumption of the herbal decoction, highlighting the potential synergistic effect of combining ginger with other natural ingredients such as honey. These findings are highly relevant to the present study, as the intervention similarly utilized a ginger and honey decoction, thereby reinforcing the scientific justification for implementing such herbal combinations in clinical and primary maternal health care settings [34].

A systematic review published in BMC Complementary Medicine and Therapies concluded that ginger is one of the most consistently effective complementary therapies for reducing nausea and vomiting in pregnancy. The review reported that ginger significantly decreased nausea severity compared to placebo, with no serious adverse effects on mothers or fetuses. These findings support the results of the present study, which also demonstrated a significant reduction in hyperemesis gravidarum severity after the administration of ginger and honey decoction.

The biological plausibility of these findings can be explained by the pharmacological properties of ginger. Ginger contains bioactive compounds such as gingerols, shogaols, zingiberene, and essential oils that exhibit antiemetic and anti-inflammatory effects. Ginger has been shown to inhibit serotonin (5-HT3) receptors in the gastrointestinal tract and central nervous system, thereby reducing stimulation of the vomiting center. Additionally, ginger may enhance gastric motility and accelerate gastric emptying, counteracting the progesterone-induced relaxation of smooth muscle that contributes to nausea during pregnancy [42]. These mechanisms provide a physiological basis for the observed reduction in symptom severity.

Honey may complement the action of ginger through gastrointestinal protective and nutritional mechanisms. Honey contains minerals such as sodium, calcium, magnesium, iron, phosphorus, and potassium, as well as small amounts of vitamins including B-complex vitamins [43]. Its demulcent properties allow honey to coat the esophageal and gastric mucosa, potentially reducing irritation caused by gastric acid and minimizing reflux-related nausea. Honey may also help regulate gastric sphincter function and provide readily absorbable carbohydrates, which can support energy restoration in pregnant women experiencing reduced intake due to vomiting [42]. The combination of ginger and honey, therefore, may produce a synergistic effect, addressing both neurochemical pathways of nausea and gastrointestinal comfort.

The hormonal context of early pregnancy further supports the interpretation of these findings. Hyperemesis gravidarum is strongly associated with elevated levels of hCG and progesterone. During the first 12–16 weeks of gestation, hCG levels peak, coinciding with the highest incidence of nausea and vomiting. Progesterone reduces gastrointestinal motility by relaxing smooth muscle, contributing to delayed gastric emptying and increased nausea [42]. While these hormonal changes are physiological, excessive sensitivity can result in severe symptoms. The effectiveness of ginger and honey decoction suggests that non-pharmacological modulation of gastrointestinal function may mitigate the symptomatic impact of hormonal fluctuations without interfering with normal pregnancy processes.

Importantly, the interpretation of these findings extends beyond biological mechanisms to the context of maternal health services. Ginger and honey decoction represents a low-cost, culturally acceptable, and easily accessible intervention that can be implemented in primary health care settings. In resource-limited areas where access to pharmacological antiemetics may be restricted or accompanied by concerns regarding fetal safety, evidence-based non-pharmacological alternatives can strengthen antenatal care

services. Integrating such interventions into routine antenatal counseling may reduce the burden of mild to moderate hyperemesis gravidarum and potentially decrease unnecessary medicalization.

For midwifery practice, education on the preparation, dosage, and safe consumption of ginger and honey decoction aligns with promotive and preventive maternal health strategies. Midwives play a pivotal role in early pregnancy counseling and can empower pregnant women to engage in supervised self-management. This approach enhances patient-centered care, improves maternal confidence, and supports holistic antenatal service delivery.

In conclusion, the reduction in hyperemesis gravidarum frequency observed in this study is not only statistically significant but also clinically relevant. The combination of ginger and honey demonstrates biological plausibility, consistency with prior research, and practical applicability within maternal health services. These findings support the integration of ginger and honey decoction as an evidence-informed complementary intervention in antenatal care, particularly for the management of mild to moderate hyperemesis gravidarum.

Despite these promising findings, this study has several limitations. The absence of a control group limits the ability to establish causal inference, and the relatively small sample size may affect generalizability. Future randomized controlled trials with larger populations are recommended to confirm the effectiveness of ginger and honey decoction in diverse clinical settings.

5. CONCLUSION

This study demonstrates that the administration of ginger and honey decoction significantly reduces the frequency and severity of hyperemesis gravidarum ($p<0.05$), indicating that the intervention effectively achieved the research objective. The marked decline in median symptom scores reflects both statistical and clinical improvement among pregnant women. Practically, this finding supports the integration of ginger and honey decoction as a low-cost, safe, and accessible complementary therapy within antenatal care services. Future research is recommended to employ controlled designs and larger samples to further strengthen the evidence base.

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AUTHOR CONTRIBUTIONS STATEMENT

This journal uses the Contributor Roles Taxonomy (CRediT) to recognize individual author contributions, reduce authorship disputes, and facilitate collaboration.

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C : **C**onceptualization
M : **M**ethodology
So : **So**ftware
Va : **Va**lidation
Fo : **Fo**rmal analysis
I : **I**nvestigation
R : **R**esources
D : **D**ata Curation
O : Writing - **O**riginal Draft
E : Writing - Review & **E**diting
Vi : **Vi**sualization
Su : **Su**pervision
P : **P**roject administration
Fu : **Fu**nding acquisition

CONFLICT OF INTEREST STATEMENT

Authors state no conflict of interest.

ETHICAL APPROVAL

Ethical permission was obtained from the Research Ethics Commission of Poltekkes Ministry of Health East Kalimantan with Letter Number LB.02.01/7/2068/2024. Informed consent was recorded in the subject's consent form to participate in this study and conveyed a guarantee of the confidentiality of information from each respondent.

DATA AVAILABILITY

The data that support the findings of this study are available from the corresponding author, [NS], upon reasonable request.

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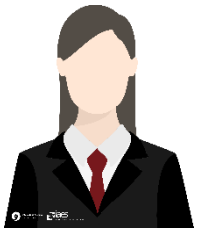

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