

# Yoga Pranayama as a Non-Pharmacological Approach to Managing Nausea and Vomiting in the First Trimester of Pregnancy

Sri Hadi Sulistiyaningsih\*, Siti Muawanah

Sekolah Tinggi Ilmu Kesehatan Bakti Utama Pati, Indonesia

\*Corresponding Author: [srihadi@stikesbup.ac.id](mailto:srihadi@stikesbup.ac.id)

**Abstract.** Background Nausea and vomiting are common symptoms in early pregnancy and may interfere with daily activities, appetite, physical comfort, and quality of life. Evidence-based guidance recognizes the importance of supportive and individualized approaches, including non-pharmacological strategies, for managing pregnancy-related symptoms. Objective: This study aimed to determine the effectiveness of Pranayama Yoga in reducing nausea and vomiting among first-trimester pregnant women. Methods: This pre-experimental study used a one-group pretest-posttest design. Seventeen first-trimester pregnant women experiencing nausea and vomiting in Tondomulyo Village, Jakenan District, Pati Regency, Indonesia, were selected using total sampling. Nausea and vomiting were assessed using the Pregnancy-Unique Quantification of Emesis (PUQE-24) questionnaire before and after the intervention. Participants practiced Pranayama Yoga twice daily for 15 minutes over one week. Data were analyzed using a paired t-test. Results: Before the intervention, 58.8% of participants were categorized as having moderate symptoms, whereas after the intervention, 70.6% were categorized as having mild symptoms and no participants remained in the severe category. The mean measurement decreased from  $1.00 \pm 0.791$  to  $0.29 \pm 0.470$ , representing a mean reduction of 0.71. The paired t-test showed a statistically significant difference between pre-intervention and post-intervention measurements ( $p < 0.001$ ). Conclusion: Pranayama Yoga was associated with a significant reduction in nausea and vomiting measurements among first-trimester pregnant women and may be considered a simple complementary non-pharmacological approach for managing pregnancy-related discomfort.

**Keywords:** Pranayama Yoga; nausea and vomiting; first-trimester pregnancy; non-pharmacological intervention

## INTRODUCTION

Physiological changes in pregnancy in the first trimester are mostly a response to pregnancy hormones, namely progesterone, estrogen, human chorionic gonadotropin, and human placental lactogen, which can cause various changes in organ systems. Complaints of discomfort experienced by pregnant women are based on various aspects, namely physiological aspects and anatomical and psychological changes. However, other factors contribute to it, requiring physiological and psychological adaptations that can cause discomfort for pregnant women at the beginning of the first trimester (Yanuaringsih *et al.*, 2020).

During pregnancy, a small number of mothers will experience complaints of nausea and vomiting at the beginning of the first trimester, accompanied by nausea often called morning sickness. It is estimated that the incidence of nausea and vomiting is as much as 70-85%. Changes experienced by pregnant women due to hormones can result in fluid and electrolyte imbalances in the body. About 75% of the incidence of nausea and vomiting is experienced by pregnant women because the body must adjust to changes during pregnancy, which usually begin in the fourth week and end in the sixteenth week. Of course, it is very uncomfortable for pregnant women to experience nausea and vomiting, so it is necessary to calm the mind and stay away from various pungent odors because the mother's sense of smell during pregnancy is more sensitive. (Ramadhani & Ayudia, 2019; World Health Organization, 2016).

Nausea and vomiting of pregnancy (NVP) are among the most common symptoms experienced during early pregnancy. The symptoms generally emerge during the first trimester and may vary in frequency and intensity between individuals. Although nausea and vomiting are commonly considered physiological manifestations of early pregnancy, their impact should not be underestimated because persistent symptoms can affect maternal comfort, nutritional intake, daily activities, and psychosocial well-being. Clinical guidance also emphasizes the importance of distinguishing common NVP from more severe conditions such as hyperemesis gravidarum, which require further clinical assessment and management (Lee, & Saha, 2011; American College of Obstetricians and Gynecologists, 2018/2024; Nelson-Piercy *et al.*, 2024).

The consequences of NVP extend beyond the immediate experience of nausea or vomiting. Pregnant

women may experience reduced appetite, difficulty maintaining usual activities, fatigue, sleep disturbance, and concern about their ability to maintain adequate nutrition and hydration. Previous research has demonstrated that the presence and severity of NVP may be associated with poorer quality of life and disruption of day-to-day functioning (Miller, F., 2017). Consequently, management of NVP should not be limited to women with severe symptoms but should also consider strategies that can improve comfort and support daily functioning among women with uncomplicated symptoms.

The cause of nausea and vomiting is not known with certainty, although predisposing factors such as primigravida, molahidatidosa, and multiple pregnancies are thought to be factors causing nausea and vomiting because, when pregnant, a mother may experience metabolic changes. It is thought that when patients with this habit experience normal mild nausea and vomiting in early pregnancy, it will react using exaggeration, resulting in vomiting. (Retni *et al.*, 2020)

Current management of NVP may include dietary advice, lifestyle modification, pharmacological treatment, and complementary or non-pharmacological approaches. The choice of management should be individualized according to symptom characteristics, clinical condition, patient preferences, and the need to prevent complications. Non-pharmacological and complementary approaches have received increasing attention because they may be accessible, relatively simple, and potentially integrated into routine antenatal care (Setiawati *et al.*, 2021). Evidence from systematic reviews suggests that complementary approaches, including ginger, acupressure, acupuncture, and other interventions, may provide benefits for nausea and vomiting, although the certainty and magnitude of evidence vary across intervention types (Matthews *et al.*, 2015; Nassif *et al.*, 2022; Tan *et al.*, 2023). Another intervention that is proven to reduce nausea and vomiting in pregnant women is hypnotherapy (Pitriani *et al.*, 2019).

Yoga is a mind-body approach that may combine movement, breathing, relaxation, and awareness of bodily sensations. In pregnancy, yoga-based interventions have been investigated for a range of maternal outcomes, although the interventions differ considerably in terms of type, frequency, duration, intensity, and the specific components delivered (Heryani *et al.*, 2019). A systematic review and meta-analysis of pregnancy yoga interventions emphasized the heterogeneity of existing protocols and the importance of describing the intervention in sufficient detail to support interpretation and reproducibility (Corrigan *et al.*, 2022). Other reviews have also reported potential maternal benefits associated with yoga-based interventions during pregnancy, while emphasizing the need for appropriate intervention selection and further high-quality evidence (Boopalan *et al.*, 2023).

Pranayama is a breathing-based practice that emphasizes conscious and controlled regulation of breathing. In the context of pregnancy, controlled breathing may be particularly relevant because it can be practiced without specialized equipment and may be incorporated into short sessions. The practice may also provide an opportunity for relaxation and focused attention. However, the potential benefits of Pranayama should be interpreted as complementary rather than as a replacement for clinical care. The physiological mechanisms underlying any effect on NVP remain complex and should not be assumed solely from changes in symptom scores.

Objective measurement is important when evaluating interventions for NVP. The Pregnancy-Unique Quantification of Emesis (PUQE-24) provides a structured assessment of nausea, vomiting, and retching during the previous 24 hours. The instrument has been used to quantify NVP symptoms and has demonstrated evidence of reliability and validity in research and clinical assessment (Ebrahimi *et al.*, 2009; Yilmaz *et al.*, 2022; Laitinen *et al.*, 2023). The use of a structured instrument allows changes before and after an intervention to be assessed more systematically than relying only on subjective general impressions.

Although previous studies have examined yoga, yogic breathing, and other complementary interventions during pregnancy, several gaps remain. First, yoga interventions are heterogeneous, making it difficult to generalize findings from one protocol to another. Second, evidence specifically evaluating a short, structured Pranayama Yoga intervention delivered regularly to first-trimester pregnant women remains limited, particularly in community-based settings. Third, local implementation evidence is important because the feasibility and acceptability of an intervention may be influenced by the characteristics of the population and the available antenatal care context.

In the present study setting, preliminary assessment indicated that pregnant women experiencing nausea and vomiting commonly used antiemetic medication and warm tea, whereas breathing-based interventions such as Pranayama Yoga had not been routinely practiced. This situation provided a

practical rationale for evaluating a simple, short-duration intervention that could potentially be integrated into maternal health education and complementary antenatal care. The novelty of this study lies in the evaluation of a structured Pranayama Yoga intervention performed twice daily for 15 minutes over one week among first-trimester pregnant women experiencing nausea and vomiting in a community setting.

Therefore, this study aimed to determine the effectiveness of Pranayama Yoga in reducing nausea and vomiting among first-trimester pregnant women. The findings are expected to contribute to the development of accessible complementary approaches for managing common pregnancy-related discomforts and to provide preliminary evidence for future controlled studies examining the effectiveness, feasibility, and sustainability of Pranayama Yoga interventions in antenatal care.

## METHODS

This study used a pre-experimental one-group pretest-posttest design. The study was conducted in Tondomulyo Village, Jakenan District, Pati Regency, Indonesia. The population and sample consisted of 17 first-trimester pregnant women who experienced nausea and vomiting. Total sampling was used. Participants' nausea and vomiting were assessed before the intervention using the Pregnancy-Unique Quantification of Emesis (PUQE-24) questionnaire. The PUQE-24 assesses nausea, vomiting, and retching during the previous 24 hours and is an established tool for quantifying NVP symptoms (Ebrahimi *at al*, 2009; Yilmaz *at al*, 2022). Participants then received Pranayama Yoga twice daily, with each session lasting 15 minutes, for one week. Nausea and vomiting were reassessed on the seventh day using the same instrument. Data were analyzed using descriptive statistics and a paired t-test to compare the pre-intervention and post-intervention measurements. Statistical significance was set at  $p < 0.05$ .

## RESULTS AND DISCUSSION

### RESULTS

The characteristics of the 17 participants are presented in Table 1. Most participants were 21–30 years old (52.9%), had completed senior high school (52.9%), and worked in the private sector (64.7%).

**Table 1.** Characteristics of the Participants (n = 17)

| No | Karakteristik      | f  | %    |
|----|--------------------|----|------|
| 1. | Age (years)        |    |      |
|    | ≤ 20               | 3  | 17,7 |
|    | 21 – 30            | 9  | 52,9 |
|    | > 30               | 5  | 29,4 |
| 2. | Education          |    |      |
|    | Elementary school  | 2  | 11,8 |
|    | Junior high school | 5  | 29,4 |
|    | Senior high school | 9  | 52,9 |
|    | Higher education   | 1  | 5,9  |
| 3. | Occupation         |    |      |
|    | Housewife          | 6  | 35,3 |
|    | Private sector     | 11 | 64,7 |
|    | Civil servant      | 0  | 0    |

Table 2. Before the intervention, most participants had moderate nausea and vomiting (58.8%). After one week of Pranayama Yoga, most participants were categorized as having mild symptoms (70.6%), and no participants remained in the severe category.

**Table 2.** Nausea and Vomiting Categories Before and After Pranayama Yoga (n = 17)

| Frequency of Nausea and Vomiting | Frequency |      |       |      |
|----------------------------------|-----------|------|-------|------|
|                                  | Before    | %    | After | %    |
| Mild ≤ 6                         | 5         | 29,4 | 12    | 70,6 |
| Moderate 7-12                    | 10        | 58,8 | 5     | 29,4 |
| Severe ≥ 13                      | 2         | 11,8 | 0     | 0    |
| Amount                           | 17        | 100  | 17    | 100  |

Table 3. The mean measurement decreased from  $1.00 \pm 0.791$  before the intervention to  $0.29 \pm 0.470$  after the intervention, representing a mean reduction of 0.71. The paired t-test demonstrated a statistically significant difference between the pre-intervention and post-intervention measurements

( $p=0.001$ ), which means that Yoga Pranayama is effective in reducing nausea and vomiting.

**Table 3.** Comparison of Nausea and Vomiting Measurements Before and After Pranayama Yoga

| Frequency of Nausea and Vomiting | Mean | N  | Std. Deviation | Std. Error Mean | Mean Difference | p-value |
|----------------------------------|------|----|----------------|-----------------|-----------------|---------|
| Before Pranayama Yog             | 1,00 | 17 | 0,791          | 0,192           | 0,71            | 0,001   |
| After Pranayama Yoga             | 0,29 | 17 | 0,470          | 0,114           |                 |         |

## DISCUSSION

The reduction in nausea and vomiting measurements observed after the intervention is consistent with the broader literature supporting complementary and mind-body approaches as potential components of supportive care for NVP. Systematic reviews have found that complementary interventions can reduce nausea and vomiting, although the magnitude of benefit and certainty of evidence differ by intervention (Nassif *at al*, 2022; Tan *at al*, 2023). The current findings add local evidence regarding a structured, short-duration Pranayama Yoga intervention delivered twice daily.

Yoga may be relevant to pregnancy care because it can integrate breathing, relaxation, and mindful awareness. A systematic review and meta-analysis of pregnancy yoga interventions found substantial variation in intervention components and delivery, highlighting the importance of describing the specific intervention protocol rather than treating “yoga” as a single uniform intervention (Corrigan *at al*, 2022). The present study used a simple Pranayama Yoga protocol with two daily sessions of 15 minutes over one week, which may enhance feasibility for community-based practice.

The observed improvement may be related to the relaxation and controlled-breathing components of Pranayama. Controlled breathing may help participants regulate breathing patterns and promote a calmer physiological state. However, the current study was not designed to investigate the biological mechanism of the intervention, and therefore the mechanism should be interpreted cautiously. Evidence from pregnancy yoga research supports potential maternal benefits, but intervention effects are heterogeneous and cannot be assumed to be identical across different yoga protocols (Corrigan *at al*, 2022; Boopalan *at al*, 2023).

The use of the PUQE-24 strengthened the assessment of symptoms because it provides a structured measure of nausea, vomiting, and retching over a defined 24-hour period. Recent psychometric evidence supports the reliability and validity of the instrument, and current clinical guidance recognizes objective tools such as PUQE for assessing NVP severity (Yilmaz *at al*, 2022; Nelson-Piercy *at al*, 2024).

The study has practical implications for midwifery and community antenatal care. Pranayama Yoga requires no medication and minimal equipment, and the intervention duration was short. It may therefore be considered a complementary approach for pregnant women with uncomplicated nausea and vomiting, while clinical assessment remains important to identify women who require medical management. The intervention should not be considered a substitute for appropriate clinical treatment in women with severe symptoms or suspected hyperemesis gravidarum (Nelson-Piercy *at al*, 2024).

Several limitations should be considered. The study used a one-group pretest-posttest design without a control group, included only 17 participants, and had a one-week follow-up. Consequently, changes over time or other factors cannot be completely excluded as explanations for the observed improvement. Future research should use randomized controlled designs, larger samples, longer follow-up, and clearer reporting of the specific breathing sequence and adherence to the intervention. These approaches would strengthen the evidence regarding the independent contribution of Pranayama Yoga to the management of NVP.

The present study found a statistically significant reduction in nausea and vomiting measurements after participants practiced Pranayama Yoga twice daily for 15 minutes over one week. The mean measurement decreased from  $1.00 \pm 0.791$  before the intervention to  $0.29 \pm 0.470$  after the intervention, with a mean reduction of 0.71 and a paired t-test result of  $p < 0.001$ . In addition, the distribution of symptom categories shifted from predominantly moderate symptoms before the intervention to predominantly mild symptoms after the intervention. Taken together, these findings suggest an improvement in the measured symptoms during the study period.

The observed change is clinically relevant in the context of early pregnancy because even symptoms that do not meet criteria for severe disease may interfere with daily functioning and maternal comfort.

The reduction in symptom measurements may therefore have practical importance for women who experience common NVP and seek approaches that can be incorporated into their daily routine. However, the present findings should be interpreted as evidence of an association between the intervention and improvement rather than definitive proof of a causal effect, because the study did not include a comparison group.

The findings are broadly consistent with previous evidence supporting the potential role of complementary approaches in the management of NVP. Systematic reviews have reported that complementary and alternative interventions may reduce nausea and vomiting during pregnancy, although the certainty of evidence varies according to the intervention and the methodological quality of the available studies (Nassif *et al*, 2022; Tan *et al*, 2023). The present study adds a community-based perspective by examining a specific breathing-focused intervention rather than treating yoga as a single, uniform intervention.

Musfirowati *et al.* (2017) conducted a study on the effectiveness of yoga breathing against discomfort during the first trimester of pregnancy. This research is a quantitative study using pseudo-experimental methods, using pre-tests and post-tests without a control group. This study was conducted for 2 months. A pre-test was conducted at the beginning of the study by giving a questionnaire to assess the comfort level of pregnant women in the first trimester of pregnancy. Respondents were given interventions, namely teaching yoga breathing techniques and giving leaflets to be used as guides at home. The subjects were advised to do yoga breathing twice a day. The results showed that discomfort in the first trimester showed the most symptoms of nausea and vomiting, which was 85.7%. After doing yoga breathing twice a day, the majority of 66.7% of respondents felt comfortable, and morning sickness was reduced (Musfirowati *et al.*, 2017)

The potential relevance of Pranayama Yoga may be related to the combination of controlled breathing and relaxation. The intervention requires participants to focus on the breathing process and to perform the exercise in a structured manner. This may provide a practical strategy for directing attention away from discomfort and promoting a calmer subjective state. Nevertheless, the current study did not measure autonomic activity, stress hormones, or other physiological markers. Therefore, possible mechanisms should be regarded as plausible explanations requiring further investigation rather than as mechanisms directly demonstrated by this study.

The structure of the intervention may also be important. Participants practiced Pranayama Yoga twice daily for 15 minutes over one week. This schedule represents a relatively short and potentially feasible practice that may be easier to incorporate into daily activities than longer or more complex programs. The feasibility of a complementary intervention is particularly relevant in community and antenatal care settings, where interventions should be simple, affordable, and acceptable to pregnant women. The absence of a requirement for specialized equipment may further support its potential use as a supportive intervention.

The present findings should also be considered in relation to the broader literature on pregnancy yoga. Evidence syntheses have demonstrated that pregnancy yoga interventions vary substantially in their content, intensity, duration, and delivery format (Corrigan *et al*, 2022). This heterogeneity means that the results of one yoga protocol should not automatically be generalized to all yoga-based interventions. By describing the frequency and duration of the Pranayama Yoga intervention, the present study provides a more specific basis for interpreting the observed outcome.

The use of the PUQE-24 strengthened the assessment of symptoms in this study. Nausea and vomiting are subjective experiences, and a structured instrument can improve consistency in assessing changes over time. The PUQE-24 evaluates nausea, vomiting, and retching over a defined 24-hour period and has been examined for reliability and validity (Ebrahimi *et al*, 2009; Yilmaz *et al*, 2022; Laitinen *et al.*, 2023). The use of this instrument also makes the findings more comparable with other studies that use structured assessments of NVP.

From a midwifery and community health perspective, the findings suggest that Pranayama Yoga may be considered as a complementary component of antenatal education for women with uncomplicated NVP. Midwives and other health professionals may provide appropriate education regarding breathing practice while continuing to assess symptom severity, hydration, nutritional intake, and warning signs requiring further clinical management. The intervention should therefore be positioned within a broader continuum of care and should not replace medical assessment or treatment when clinically indicated.

The findings also have implications for health promotion. A short, structured breathing practice may be suitable for individual education, group antenatal classes, or community-based maternal health activities. However, implementation should consider the ability of pregnant women to perform the technique correctly and consistently. Clear instruction, demonstration, monitoring of adherence, and attention to comfort and safety are important when introducing any physical or breathing-based intervention during pregnancy.

Several limitations must be acknowledged. First, the sample size was small, with only 17 participants, which limits statistical power and generalizability. Second, the one-group pretest-posttest design did not include a control group. As a result, spontaneous changes in NVP over time, changes in diet or rest, use of other treatments, and psychological factors cannot be completely excluded as alternative explanations for the observed improvement. Third, the intervention period was limited to one week, and the study did not evaluate whether the improvement was sustained over a longer period.

Further limitations include the absence of detailed analysis of adherence and potentially important co-interventions. Factors such as dietary changes, use of antiemetic medication, sleep quality, stress, and social support may influence NVP symptoms and should be considered in future studies. The present study also did not examine whether the intervention was equally effective across different levels of baseline symptoms or different maternal characteristics.

Future research should therefore consider randomized controlled designs, larger sample sizes, longer follow-up periods, and standardized intervention protocols. Studies should also report adherence, monitor concurrent interventions, and consider patient-reported outcomes such as quality of life and functional status in addition to symptom scores. Research comparing Pranayama Yoga with usual care or other non-pharmacological interventions may provide more clinically useful evidence regarding its relative effectiveness.

Despite these limitations, the study provides preliminary evidence supporting the potential use of Pranayama Yoga as a simple complementary approach for managing nausea and vomiting in first-trimester pregnancy. The combination of a brief intervention, routine practice, and a structured symptom measurement provides a useful foundation for further research. The main contribution of the study is not to replace established clinical management, but to support the development and evaluation of accessible, community-oriented strategies that may help pregnant women manage common pregnancy-related discomforts.

## CONCLUSION

Pranayama Yoga was associated with a significant reduction in nausea and vomiting among first-trimester pregnant women. After practicing Pranayama Yoga twice daily for 15 minutes over one week, the proportion of participants with mild symptoms increased, and the mean measurement decreased significantly ( $p=0.001$ ). Pranayama Yoga may therefore be considered a simple complementary non-pharmacological approach to help manage pregnancy-related nausea and vomiting, particularly as a supportive strategy within antenatal care. However, because this study used a small one-group pretest-posttest design, further controlled studies with larger samples and longer follow-up are needed to confirm the effectiveness and sustainability of the intervention.

## ACKNOWLEDGMENT

The authors would like to acknowledge the participants and local health personnel who supported the implementation of this study.

## REFERENCES

- American College of Obstetricians and Gynecologists. (2018, reaffirmed 2024). *Nausea and vomiting of pregnancy*. ACOG Practice Bulletin.
- Boopalan, D., Vijayakumar, V., Ravi, P., Shanmugam, P., Kunjumon, B., & Kuppusamy, M. (2023). *Effectiveness of antenatal yoga in reducing intensity of labour pain: A systematic review and meta-analysis*. 19(5), 100. <https://doi.org/https://doi.org/10.1016/j.explore.2023.100214>
- Corrigan, L., Moran, P., McGrath, N., Eustace-Cook, J., & Daly, D. (2022). The characteristics and effectiveness of pregnancy yoga interventions: A systematic review and meta-analysis. *BMC Pregnancy and Childbirth*, 22, 250. <https://doi.org/https://doi.org/10.1186/s12884-022-04474-9>

- Ebrahimi, N., Maltepe, C., Garcia-Bournissen, F., & Koren, G. (2009). Nausea and vomiting of pregnancy: Using the 24-hour Pregnancy-Unique Quantification of Emesis (PUQE-24) scale. *Journal of Obstetrics and Gynaecology Canada*, 31(9), 803–807.
- Heryani, H., Prenatal, Y., & Emesis, M. (2019). *Yoga Prenatal Mengurangi Emesis Gravidarum*. 6, 20–24.
- Laitinen, L., et al. (2023). Recalling the severity of nausea and vomiting of pregnancy: A study using Pregnancy-Unique Quantification of Emesis Questionnaire. *Journal of Obstetrics and Gynaecology*, 43(1). <https://doi.org/https://doi.org/10.1080/01443615.2022.2153025>
- Lee, N. M., & Saha, S. (2011). Nausea and vomiting of pregnancy. *Gastroenterology Clinics of North America*, 40(2), 309–334. <https://doi.org/https://doi.org/10.1016/j.gtc.2011.03.009>
- Matthews, A., Haas, D. M., O'Mathúna, D. P., & Dowswell, T. (2015). *Interventions for nausea and vomiting in early pregnancy*. *Cochrane Database of Systematic Reviews*. 9.
- Miller, F., et al. (2017). Nausea and vomiting of pregnancy: Effects on quality of life and day-to-day function. *Australian and New Zealand Journal of Obstetrics and Gynaecology*, 57(6), 678–684. <https://doi.org/https://doi.org/10.1111/ajo.12714>
- Musfirowati, F., Fahrudin, A., & Nursanti, I. (2017). The effectiveness of yogic breathing to comfort level of first trimester pregnant mothers at community health center of Kragilan district working area, Serang, Banten, Indonesia. *International Journal of Research in Medical Sciences*, 6(1), 51. <https://doi.org/10.18203/2320-6012.ijrms20175710>
- Nassif, M. S., Costa, I. C. P., Ribeiro, P. M., Moura, C. C., & Oliveira, P. E. (2022). Integrative and complementary practices to control nausea and vomiting in pregnant women: A systematic review. *Revista da Escola de Enfermagem da USP*, 56, e20210515. <https://doi.org/https://doi.org/10.1590/1980-220X-REEUSP-2021-0515>
- Nelson-Piercy, C., Dean, C., Shehmar, M., Gadsby, R., O'Hara, M., Hodson, K., Nana, M. (2024). The management of nausea and vomiting in pregnancy and hyperemesis gravidarum. *Royal College of Obstetricians and Gynaecologists*, 131(7), e1–e30. <https://doi.org/https://doi.org/10.1111/1471-0528.17739>
- Pitriani, P., Patimah, S., & Kurnia, H. (2019). Pengaruh hipnoterapi terhadap mual muntah pada ibu hamil trimester I di wilayah kerja Puskesmas Kota Tasikmalaya tahun 2019. *Midwife Journal*, 5(2), 1–10.
- Ramadhani, I. P., & Ayudia, F. (2019). Pengaruh Pemberian Minuman Jahe (Zingiber Officinale Var. Rubrum) Terhadap Penurunan Emesis Gravidarum Trimester Pertama. *Jik- Jurnal Ilmu Kesehatan*, 3(2), 97. <https://doi.org/10.33757/jik.v3i2.231>
- Retni, A., Handayani, F., & Mohamad, I. S. W. (2020). Literature Review : Pemberian Aromaterapi Essential Oil Lavender Terhadap Emesis Gravidarum Pada Kehamilan. *Journal of Borneo Holistic Health*, 3(2).
- Setiawati, N., Latifah, L., Kartikasari, A., & Anggraeni, M. D. (2021). Peningkatan pengetahuan penanganan morning sickness pada kader kesehatan melalui penyuluhan dan penerapan latihan yoga. *Journal of Community Health Development*, 2(2), 15–21.
- Tan, M.-Y., Shu, S.-H., Liu, R.-L., & Zhao, Q. (2023). The efficacy and safety of complementary and alternative medicine in the treatment of nausea and vomiting during pregnancy: A systematic review and meta-analysis. *Frontiers in Public Health*, 11, 1108756. <https://doi.org/https://doi.org/10.3389/fpubh.2023.1108756>
- World Health Organization. (2016). *Recommendations on antenatal care for a positive pregnancy experience*. World Health Organization.
- Yanuaringsih, G. P., Nasution, A. S., & Aminah, S. (2020). Efek seduhan jahe sebagai anti-muntah pada perempuan hamil trimester pertama. *Window of Health: Jurnal Kesehatan*, 3(2), 151–158. <https://doi.org/https://doi.org/10.33368/woh.v0i0.317>
- Yilmaz, T., Dinc Kaya, H., Gunaydin, S., Guducu, N., & Dissiz, M. (2022). Psychometric properties of the Pregnancy-Unique Quantification of Emesis (PUQE-24) Scale. *Journal of Obstetrics and Gynaecology*, 42(6), 1739–1745. <https://doi.org/https://doi.org/10.1080/01443615.2022.2036961>