



## The Effect of Peppermint Aromatherapy on The Incidence of Emesis Gravidarum in The First and Second Trimester Pregnant Women in The Working Area of South Denpasar Public Health Center I, Denpasar City

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### ABSTRACT

Emesis gravidarum is a condition that can cause weight loss, impaired body metabolism, malnutrition, weakness, and dehydration felt by the mother. Peppermint aromatherapy administered by inhalation can be a therapy that is able to overcome or eliminate nausea and vomiting in the first and second trimesters of pregnant women. The purpose of this study was to determine the effect before and after administering peppermint aromatherapy on the incidence of Emesis gravidarum in the first and second trimesters of pregnant women. This study was pre-experimental research with one group pretest-posttest design. The sampling technique used was accidental sampling consisting of 20 pregnant women in the first and second trimesters. Data was collected using observation sheets and PUQE-24 questionnaires. The results showed that the average value of nausea and vomiting before being administered peppermint aromatherapy was 8.15 (moderate category) and after being administered peppermint aromatherapy was 4.80 (mild category) with a difference of 3.35 and a significance value of 0.001 ( $p < 0.05$ ), statistically there was a significant difference in the mean of nausea and vomiting after being administered peppermint aromatherapy intervention. This study is expected to provide an overview of the importance of maintaining nutrition during pregnancy so that mothers are avoided chronic energy deficiency and prevent the long-term effects of emesis gravidarum. Mothers are expected to be able to independently implement the use of peppermint aromatherapy as an effort to reduce nausea and vomiting by using easily available ingredients.

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### Kata kunci:

Ibu Hamil  
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### ABSTRAK

Emesis gravidarum merupakan keadaan yang dapat menyebabkan penurunan berat badan, gangguan metabolisme tubuh, kekurangan gizi, lemah, dan dehidrasi pada ibu. Aromaterapi peppermint yang diberikan secara inhalasi dapat menjadi salah satu terapi yang mampu mengatasi atau menghilangkan mual muntah pada ibu hamil trimester I dan II. Tujuan dari penelitian ini untuk mengetahui pengaruh sebelum dan setelah pemberian aromaterapi peppermint terhadap kejadian Emesis gravidarum pada ibu hamil trimester I dan II. Penelitian ini merupakan penelitian *pre-eksperimental* dengan desain *One Group Pretest Posttest*. Teknik pengambilan sampel yang digunakan yaitu dengan *Accidental Sampling* yang terdiri dari 20 ibu hamil trimester I dan II. Pengumpulan data dilakukan dengan menggunakan lembar observasi dan kuesioner PUQE-24. Hasil penelitian menunjukkan nilai rata-rata mual muntah sebelum diberikan aromaterapi peppermint sebesar 8,15 (kategori sedang) dan setelah diberikan aromaterapi peppermint sebesar 4,80 (kategori ringan)

dengan selisih 3,35 dan nilai signficancy 0,001 ( $p < 0,05$ ) sehingga secara statistik terdapat perbedaan rerata mual muntah yang bermakna setelah diberikan intervensi aromaterapi peppermint. Penelitian ini diharapkan dapat memberikan gambaran terkait pentingnya menjaga nutrisi selama hamil agar ibu terhindari dari KEK serta mencegah efek jangka panjang dari emesis gravidarum. Ibu diharapkan dapat mengimplementasikan secara mandiri penggunaan aromaterapi pappermint sebagai salah satu upaya untuk mengurangi mual dan muntah dengan menggunakan bahan yang mudah didapatkan.

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## INTRODUCTION

Pregnancy is a happiest thing for a woman, although it can give a woman happiness and pride, according to Joulaerad (2018) pregnancy for the first time can be a difficult situation that must be passed because it causes various physical and psychological changes (Igarashi, 2013). Physical changes in pregnant women will begin from the first trimester, such as the mother will experience changes in body shape and an increase in the hormones estrogen and progesterone which causes morning sickness, fatigue, weakness, and feelings of nausea (Safajou et al., 2021).

But sometimes there is a situation where nausea and vomiting in pregnant women is so severe that causes everything they eat and drink to vomit. This event is known as emesis gravidarum. Emesis gravidarum is a condition that is quite dangerous for mothers' health which if it lasts for a long enough duration can cause weight loss and also disorders of the body's metabolism.

The incidences of obstetric complications in Bali, especially in Denpasar City, one of them is Hyperemesis Gravidarum (excessive nausea and vomiting) around 2.3% and NVP (Nausea and Vomiting in Pregnancy) or nausea and vomiting during pregnancy with an incidence of as much as 97.7% (Bali Provincial Health Office, 2016). During the 2019 period, 2.827 pregnant women with complications were found and had been treated by public health centre. The public health centre with the lowest achievement was public health centre I, South Denpasar amounted to 61.9%. Public health centre I South Denpasar had carried out various handling of obstetric complications, namely by implementing integrated ANC, classes for pregnant women, delivery insurance programs, maternal and child referral systems, and specifically for the incidence of emesis gravidarum handled with nutritional therapy.

In addition to nutritional therapy, the management of nausea and vomiting can also be done by providing non-pharmacological therapy, namely by using easily available complementary therapies such as peppermint aromatherapy (Sridharan & Sivaramakrishnan, 2018). Peppermint (*Mentha piperita*) from mint leaves contains essential oil, namely menthol which has a carminative and antispasmodic effect that works in the small intestine in the gastrointestinal tract therefore it can overcome or eliminate nausea and vomiting and facilitate the digestive system (Fattah et al., 2019).

The results of a preliminary study conducted in the working area of public health centre I South Denpasar obtained a recapitulation of the average visit of pregnant women with gestational age in the first and second trimesters as many as 15 respondents. Researchers conducted interviews with six mothers, four out of six pregnant women experienced nausea and vomiting in the

morning and two did not experience nausea and vomiting. The results of interviews conducted on mothers who experienced nausea and vomiting said that they could overcome their nausea and vomiting by eating dry and warm food. In addition, three pregnant women said to overcome the nausea experienced by consuming sweets. Actually the management of nausea and vomiting in pregnancy depends on the severity of the symptoms. However, pregnant women will be better if they are able to overcome the problem of nausea in early pregnancy by using non-pharmacological complementary therapies because they are non-instructive, non-invasive, inexpensive, simple, effective, and without adverse side effects (Koh et al., 2019).

Based on this background, the authors were interested in taking the title of "The Effect Of Peppermint Aromatherapy on the Incidence of Emesis Gravidarum in the First and Second Trimester Pregnant Women in the Working Area of Public Health Center I South Denpasar, Denpasar City"

## METHOD

### *Characteristics of Respondents and Research Design*

The characteristics of the respondents in this study were all pregnant women in the first and second trimesters in the working area of Public Health Center I South Denpasar, Denpasar City and had met the inclusion and exclusion criteria of the study. This study was pre-experimental research with one group pretest posttest design. This study began by submitting a letter of ethical clearance to the research ethics commission of the STIKES Bina Usada Bali. Ethical clearance license that had been obtained from the ethics commission with No: 180/EA/KEPK-BUB-2021. Furthermore, before being given an intervention, research respondents would be given a pretest (initial test) first through a Google form. Then the respondents were asked to carry out an intervention with the WhatsApp media (intervention was carried out for 4 days, namely in the morning and afternoon for 5-10 minutes) which would be proven through photos or video calls. Furthermore, on the fourth day, respondents would be given a post-test as the final evaluation of the study.

### *Sampling Procedure*

The sampling used was accidental sampling, namely pregnant women in the first and second trimesters who visited Public Health Center South Denpasar during the research period from December to January 2022 (1 month) totaling 20 respondents.

### Research Instrument

In this study, two research instruments were used, namely the demographic data questionnaire and the Pregnancy Unique Quantification of Emesis and Nausea (PUQE-24) Scoring System. The PUQE-24 score respondents in this study was calculated using three criteria to assess the severity of nausea and vomiting during pregnancy consisting of the length duration of feeling nausea, the number of episodes of vomiting, and the number of episodes of dry vomiting in the last 24 hours which would then be calculated by adding the value of each criteria, and can range from a minimum of 1 to a maximum of 15, by adding the values of each criteria consisting of a value of 3 (no vomiting), 4-7 (mild category), 8-11 (moderate category) , and 12-15 (severe category).

**Table 1**  
**Characteristics of Respondents (n = 20)**

Characteristics of Respondents	Median ± SD	Min – Max
Respondent's Age (years)	26 ± 7,47	22 – 33
Gestational Age (weeks)	13 ± 29,92	3 – 22
<b>Pregnancy</b>	<b>Frequency (n)</b>	<b>Percentage (%)</b>
1 <sup>st</sup> Pregnancy	11	55
2 <sup>nd</sup> Pregnancy	5	25
3 <sup>rd</sup> Pregnancy	4	20
<b>Level of education</b>	<b>Frequency (n)</b>	<b>Percentage (%)</b>
Elementary school and did not finish elementary	0	0
Junior high school	0	0
Senior High School	6	30
Tertiary institutions	14	70
<b>Profession</b>	<b>Frequency (n)</b>	<b>Percentage (%)</b>
Civil servant	1	5
Private employees	15	75
Entrepreneur	2	10
Etc	2	10

Based on table 1, it is found that the minimum age of the respondent was 22 years old and the maximum age of the respondent was 33 years old. The lowest gestational age was 3 weeks and the highest gestational age was 22 weeks. Most of the respondents who experienced emesis gravidarum based on the order of pregnancy were in their 1st pregnancy, namely 11 respondents (55%). Most of respondents' level of education in this study was tertiary institutions, as many as 14 respondents (70%). For the profession criteria, the majority of respondents were private employees, as many as 15 respondents (75%).

**Table 3**  
**The Analysis Results of the Effect of Peppermint Aromatherapy on the Incidence of Emesis Gravidarum in the First and Second Trimester Pregnant Women (n = 20)**

	Mean (SD)	Deviation (SD)	IK 95%	Nilai p
Nausea and Vomiting Before Intervention	8,15 (2,08)	3,35 (1,13)	3,88 – 2,82	<b>0,001</b>
Nausea and Vomiting After Intervention	4,80 (1,15)			

Based on table 2, it was found that before being administered peppermint aromatherapy as many as 12 respondents (60%) experienced moderate nausea, seven respondents (35%) experienced mild nausea, one respondent (5%) experienced severe nausea, and none (0%) experienced severe nausea, none felt nausea and vomiting. After being

### Data analysis

Data analysis in this study used Paired T-test analysis, which would first be tested for normality. The normality test used was the Shapiro Wilk test because the research sample consisted of 20 respondents (<50 respondents).

### RESULTS AND DISCUSSION

The result of this study presented in the previous chapter would be described in the result and discussion of the study in accordance with the specific research objectives as follows.

**Table 2**  
**The Analysis Results of the Intensity of Nausea in the First and Second Trimesters Pregnant Women Before and After Being Administered Peppermint Aromatherapy (n = 20)**

Intensity of Nausea	Before		After	
	F	%	F	%
No nausea (0-3)	0	0	3	15
Mild (4-7)	7	35	17	85
Moderate (8-11)	12	60	0	0
Severe (12-15)	1	5	0	0
<b>Total</b>	<b>20</b>	<b>100</b>	<b>20</b>	<b>100</b>

given peppermint aromatherapy as many as 17 respondents (85%) experienced mild nausea and three respondents (15%) did not experience nausea and vomiting. Based on table 3, the analysis result of the effect of peppermint aromatherapy on the incidence of emesis gravidarum in the first and second trimesters pregnant

women using a paired t-test with a significance of 0.001 ( $p < 0.05$ ) with a difference of 3.35 (95% CI 2.818 to 3.882) were obtained. Because  $p < 0.05$  and CI (Confidence Interval) did not pass zero, statistically there was a statistically significant difference in the mean of nausea and vomiting after being administered peppermint aromatherapy intervention for 4 days.

## DISCUSSION

### Description of Respondents Characteristics

In this study, the mother's age showed an average age of 26 years old, the youngest age was the mother who was 22 years old and the oldest age was 33 years old. It is due to that age was a productive age and gestational age which did not have many risks. Maternal age greatly determined maternal health and related to pregnancy conditions (Ozgoli & Saei Ghare Naz, 2018).

Gestational age in this study showed an average age of 13 weeks. The youngest gestational age was three weeks and the oldest gestational age was 22 weeks. Gestational age can be the cause of emesis gravidarum, it was related to the levels of HCG, estrogen, and progesterone in the mother's blood (Mascarenhas *et al.*, 2021). HCG levels were one of the etiologies that could cause emesis gravidarum (Magfirah *et al.*, 2020).

The distribution pregnancy order showed that the majority of mothers who experienced the incidence of emesis gravidarum in their first child pregnancy (primigravida) were 11 respondents. Mothers with primigravida pregnancies in general had not been able to adapt to the hormones estrogen and HCG therefore it could cause the occurrence of emesis gravidarum (Hines *et al.*, 2012).

Based on the level of education, it showed that most of the respondents with a tertiary institutions level were 14 respondents. The profession aspect showed that most of them worked as private employees, as many as 15 people. During pregnancy, the mother's time would be spent more at work therefore mother would feel tired and stressed more quickly due to work (Khorasani *et al.*, 2020). The correlation between psychological factors and the incidence of emesis gravidarum was probably due to the fact that mothers tend to be tired during work, and stress can cause anxiety which can trigger the occurrence of emesis gravidarum (Jafarimanesh *et al.*, 2020).

### Description of the Intensity of Nausea and Vomiting Before and After Being Administered Peppermint Aromatherapy in the First and Second Trimester Pregnant Women

The results showed that before being administered peppermint aromatherapy as many as 12 respondents (60%) experienced moderate levels of nausea. After being administered peppermint aromatherapy, 17 respondents (85%) experienced mild nausea. The data showed that there was a decrease in the intensity of nausea in pregnant women in the first and second trimesters after being given peppermint aromatherapy. It was in accordance with research from Ramadhanti (2021) which stated that administering peppermint aromatherapy could provide a relaxed, calm, and refreshing sensation therefore it could reduce autonomic stimulation by reducing saliva production

and reducing nausea and vomiting reactions in pregnant women (Reis & Jones, 2017). In addition, peppermint aromatherapy contained menthol molecules or chemical particles that were able to give a positive reaction in the stomach and suppress the stimulation of vomiting in pregnant women due to the increase in the HCG hormone (Abdel Ghani & Ahmed Ibrahim, 2013). When inhaled through the nasal cavity these molecules could stimulate the limbic system in the brain which would also affect the parts of the body that regulated heart rate, blood pressure, stress, body balance and breathing. Therefore it can be concluded that peppermint aromatherapy had an effect on reducing nausea and vomiting in pregnant women (Cash *et al.*, 2016).

### The Effect of Peppermint Aromatherapy on the Incidence of Emesis Gravidarum in the First and Second Trimester Pregnant Women

The results of this study indicated that there was a statistically significant difference in the incidence of emesis gravidarum in the first and second trimester mothers before and after being administered peppermint aromatherapy intervention for four days. The significance p-value was 0.001 ( $p < 0.05$ ), which means that there was a difference in the average (mean) score for nausea and vomiting of pregnant women before and after administering peppermint aromatherapy by inhalation. In this study, peppermint aromatherapy was administered by inhalation by mixing four drops of peppermint aromatherapy with 20 ml of warm water into a mini diffuser for 5-10 minutes. It was in accordance with research from Pasha *et al.* (2012) that peppermint aromatherapy could be inhaled twice a day for 10 minutes for four days. The intervention in this study was carried out in the morning and afternoon for four days. It was due to nausea and vomiting during pregnancy were usually caused by changes in the endocrine system, mainly due to high fluctuations in HCG levels and increased saliva in the morning and afternoon (Masruroh *et al.*, 2020). The molecules in peppermint aromatherapy oil when inhaled through the nose could stimulate the limbic system in the brain. The limbic system in the brain was an area that affected emotions and memory and directly related to adrenaline, pituitary gland, hypothalamus, body parts that regulated heart rate, blood pressure, stress, body balance, and breathing (Dabaghian, 2012). It was in line with the statement of Stea, Beraudi, and Pasquale (2014) who stated that peppermint aromatherapy contained menthol essential oil which had a carminative effect (relieves flatulence) and antispasmodic (relaxes smooth muscles) which worked in the small intestine in the digestive tract therefore it could overcome or eliminate nausea and vomiting in the first and second trimesters pregnant women (Amzajerdi *et al.*, 2019).

According to the researcher's assumption, peppermint aromatherapy was effective in reducing the intensity of nausea and vomiting in the first and second trimesters pregnant women. Basically, the mechanism of decreasing the intensity of nausea and vomiting in pregnant women administered peppermint aromatherapy could provide a comfort effect and increased body relaxation in order to improve psychological conditions that trigger nausea and vomiting in pregnant women. It was in line with research from Pakniat (2018) which stated that by inhaling peppermint aromatherapy regularly with a specified dose, it could provide a relaxed, calm, and refreshing sensation in order to reduce autonomic stimulation by reducing saliva production and reducing nausea and vomiting reactions in pregnant women. In addition, peppermint aromatherapy

could also be used as an antiemetic and antispasmodic in the lining of the stomach and intestines, namely by inhibiting muscle contractions caused by serotonin (Ferruggiari et al., 2012). This reaction would later facilitate digestion and help relax the digestive muscles during stomach cramps or in acute digestive disorders (Lua & Zakaria, 2012). Based on this, it could be seen that the administration of peppermint aromatherapy through the inhalation method had an effect on reducing the incidence of emesis gravidarum in the first and second trimesters pregnant women.

#### RESEARCH LIMITATIONS

This study had limitations, namely the follow-up research intervention method using video call media because it was still in the Covid-19 pandemic situation, therefore it could lead to a lack of sufficient control of research respondents in administering peppermint aromatherapy intervention.

#### CONCLUSIONS AND RECOMMENDATIONS

Based on the results of the univariate description of the respondents' characteristics in the first and second trimesters of pregnant women who experienced the incidence of emesis gravidarum with an average age of 26 years old, the average gestational age of respondents was 13 weeks, most of them occurred in the 1st child pregnancy (55%), the majority of respondents' education levels were tertiary institutions (70%), and most of the respondents' occupations were private employees (75%). The description of the intensity of nausea and vomiting before and after administering peppermint aromatherapy to pregnant women in the first and second trimesters showed that before being administered peppermint aromatherapy as many as 12 respondents (60%) experienced moderate level of nausea. After being administered peppermint aromatherapy, 17 respondents (85%) experienced mild nausea. The administration of peppermint aromatherapy had an effect on the incidence of emesis gravidarum in the first and second trimesters pregnant women in the working area of Public Health Centre I, South Denpasar with a significance value of 0.001 ( $p < 0.05$ ), which means that there was a statistically significant difference in the mean of nausea and vomiting after being administered peppermint aromatherapy intervention.

Researchers also proposed suggestions for health workers to be able to administer peppermint aromatherapy as an intervention to reduce nausea and vomiting in the first and second pregnant women, while in the first and second trimester pregnant women were expected to be able to independently implement the use of peppermint aromatherapy as an effort to reduce nausea and vomiting by using easily available ingredients. For the next researchers it is suggested to be able to develop this study into a multivariate study or to continue this study by providing interventions in the form of combining peppermint aromatherapy with other complementary therapies in a wider scope.

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#### Conflict of Interest Statement

There is no conflict of interest in this review.

#### REFERENCES

- Abdel Ghani, R. M., & Ahmed Ibrahim, A. T. (2013). The Effect of Aromatherapy Inhalation on Nausea and Vomiting in Early Pregnancy: A Pilot Randomized Controlled Trial. *Journal of Natural Sciences Research*, 3(6), 10–22. <https://core.ac.uk/download/pdf/234654121.pdf>
- Amzajerdi, A., Keshavarz, M., Montazeri, A., & Bekhradi, R. (2019). Effect of mint aroma on nausea, vomiting and anxiety in pregnant women. *Journal of Family Medicine and Primary Care*, 8(8). [https://journals.lww.com/jfmpc/Fulltext/2019/08080/Effect\\_of\\_mint\\_aroma\\_on\\_nausea\\_vomiting\\_and.11.aspx](https://journals.lww.com/jfmpc/Fulltext/2019/08080/Effect_of_mint_aroma_on_nausea_vomiting_and.11.aspx)
- Cash, B. D., Epstein, M. S., & Shah, S. M. (2016). A Novel Delivery System of Peppermint Oil Is an Effective Therapy for Irritable Bowel Syndrome Symptoms. *Digestive Diseases and Sciences*, 61(2), 560–571. <https://doi.org/10.1007/s10620-015-3858-7>
- Dabaghian, F. H. (2012). Knowledge of Pregnant Women About the Efficacy and Safety of Herbal Medicine and Their Practice During Pregnancy. In *CMJA* (Vol. 2, Issue 3, pp. 246–256). <http://cmja.arakmu.ac.ir/article-1-149-en.html>
- Dinas Kesehatan Provinsi Bali. (2016). *Profil Kesehatan Provinsi Bali Tahun 2015*. [www.depkes.go.id/](http://www.depkes.go.id/)
- Fattah, A., Hesarinejad, Z., Rajabi Gharaii, N., & Nasibi, M. (2019). The Effect of Aromatherapy on Nausea and Vomiting during Pregnancy: A Systematic Review and Meta-Analysis. *Iranian Journal of Pediatric*, 3(3), 9061–9070. <https://doi.org/https://dx.doi.org/10.22038/ijp.2018.34857.3068>
- Ferruggiari, L., Ragione, B., Rich, E. R., & Lock, K. (2012). The Effect of Aromatherapy on Postoperative Nausea in Women Undergoing Surgical Procedures. *Journal of PeriAnesthesia Nursing*, 27(4), 246–251. <https://doi.org/10.1016/j.jopan.2012.01.013>
- Hines, S., Steels, E., Chang, A., & Gibbons, K. (2012). Aromatherapy for treatment of postoperative nausea and vomiting. *Cochrane Database of Systematic Reviews*, 4(4), 1–9. <https://doi.org/10.1002/14651858.CD007598.pub2>
- Igarashi, T. (2013). Physical and Psychologic Effects of Aromatherapy Inhalation on Pregnant Women: A Randomized Controlled Trial. *The Journal of Alternative and Complementary Medicine*, 19(10), 805–810. <https://doi.org/10.1089/acm.2012.0103>
- Jafarimanesh, H., Akbari, M., Hoseinian, R., Zarei, M., & Harorani, M. (2020). The Effect of Peppermint ( *Mentha piperita* ) Extract on the Severity of Nausea, Vomiting and Anorexia in Patients with Breast Cancer Undergoing Chemotherapy: A Randomized Controlled Trial. *Integrative Cancer Therapies*, 19, 1534735420967084. <https://doi.org/10.1177/1534735420967084>
- Joulaeerad, N., Ozgoli, G., Hajimehdipoor, H., Ghasemi, E., & Salehimoghaddam, F. (2018). Effect of Aromatherapy with Peppermint Oil on the Severity of Nausea and Vomiting in Pregnancy: A Single-blind, Randomized, Placebo-controlled trial. *Journal Reprod Infertil*, 19(1), 32–38. <https://pubmed.ncbi.nlm.nih.gov/29850445/>
- Khorasani, F., Aryan, H., Sobhi, A., Aryan, R., Abavi-Sani, A., Ghazanfarpour, M., Saeidi, M., & Rajab Dizavandi, F. (2020). A

- systematic review of the efficacy of alternative medicine in the treatment of nausea and vomiting of pregnancy. *Journal of Obstetrics and Gynaecology*, 40(1), 10–19. <https://doi.org/10.1080/01443615.2019.1587392>
- Koh, L. M., Percival, B., Pauley, T., & Pathak, S. (2019). Complementary Therapy and Alternative Medicine: Effects on Induction of Labour and Pregnancy Outcome in Low Risk Post-Dates Women. *Heliyon*, 5(11), e02787. <https://doi.org/10.1016/j.heliyon.2019.e02787>
- Lua, P. L., & Zakaria, N. S. (2012). A Brief Review of Current Scientific Evidence Involving Aromatherapy Use for Nausea and Vomiting. *The Journal of Alternative and Complementary Medicine*, 18(6), 534–540. <https://doi.org/10.1089/acm.2010.0862>
- Magfirah, M., Fatma, S., & Idwar, I. (2020). The Effectiveness of Acupressure Therapy and Aromatherapy of Lemon on the Ability of Coping and Emesis Gravidarum in Trimester I Pregnant Women at Langsa City Community Health Centre, Aceh, Indonesia. *Open Access Macedonian Journal of Medical Sciences*, 8(E), 188–192. <https://doi.org/10.3889/oamjms.2020.4008>
- Mascarenhas, V. H. A., Caroci-Becker, A., & Riesco, M. L. (2021). Effectiveness of Aromatherapy Versus Standard Care on Physiological and Psychological Symptoms in Pregnant Women. *JBI Evidence Synthesis, Publish Ah*. <https://doi.org/10.11124/JBIES-20-00562>
- Masruroh, N., Safitri, Y. I., Laili, U., Dwi Andriani, R. A., & Abidah, S. N. (2020). The Effectiveness Of Giving Ginger And Mint Leaves To The Incidence Of Emesis Gravidarum. *International Journal of Psychosocial Rehabilitation*, 24(9), 1003–1010.
- Ozgoli, G., & Saei Ghare Naz, M. (2018). Effects of complementary medicine on nausea and vomiting in pregnancy: A systematic review. *International Journal of Preventive Medicine*, 9(1), 75. [https://doi.org/10.4103/ijpvm.IJPVM\\_430\\_16](https://doi.org/10.4103/ijpvm.IJPVM_430_16)
- Pakniat, H., Memarzadeh, M. R., Azh, N., Mafi, M., & Ranjkesh, F. (2018). Comparison of the effect of chamomile, Ginger and vitamin B6 on treatment of nausea and vomiting in pregnancy: A randomized clinical trial. *Iranian Journal of Obstetrics, Gynecology and Infertility*, 21, 47–54. <https://doi.org/10.22038/ijogi.2018.11969>
- Pasha, H., Behmanesh, F., Mohsenzadeh, F., Hajahmadi, M., & Moghadamnia, A. A. (2012). Study of the Effect of Mint Oil on Nausea and Vomiting During Pregnancy. *Iranian Red Crescent Medical Journal*, 14(11), 744–747. <https://doi.org/10.5812/ircmj.3477>
- Ramadhanti, I. P., & Lubis, U. H. (2021). Ginger (Zingiber Officinale) and Mint Leaves (Mentha Piperita L) Alleviate Emesis Gravidarum. *Women, Midwives and Midwifery*, 1(2), 37–45. <https://doi.org/10.36749/wmm.1.2.37-45.2021>
- Reis, D., & Jones, T. (2017). Aromatherapy: Using Essential Oils as a Supportive Therapy. *Clinical Journal of Oncology Nursing*, 21(1), 16–19. <https://doi.org/10.1188/17.CJON.16-19>
- Safajou, F., Soltani, N., Taghizadeh, M., Amouzeshi, Z., & Sandrous, M. (2021). The Effect of Combined Inhalation Aromatherapy with Lemon and Peppermint on Nausea and Vomiting of Pregnancy: A Double - Blind, Randomized Clinical Trial. *Iranian Journal of Nursing and Midwifery Research*, 25(5), 401–406. [https://doi.org/10.4103/ijnmr.IJNMR\\_11\\_19](https://doi.org/10.4103/ijnmr.IJNMR_11_19)
- Sridharan, K., & Sivaramakrishnan, G. (2018). Interventions for treating nausea and vomiting in pregnancy: a network meta-analysis and trial sequential analysis of randomized clinical trials. *Expert Review of Clinical Pharmacology*, 11(11), 1143–1150. <https://doi.org/10.1080/17512433.2018.1530108>
- Stea, S., Beraudi, A., & De Pasquale, D. (2014). Essential Oils for Complementary Treatment of Surgical Patients: State of the Art. *Evidence-Based Complementary and Alternative Medicine*, 2014. <https://doi.org/10.1155/2014/726341>