

Comparative Study: The Effectiveness of Acupuncture, Acupressure, and Aromatherapy in Overcoming Nausea Vomiting in First Trimester Pregnant Women

Diani Aliansy¹
Intan Karlina^{2*}
Sri Maryati³

^{1,2} Faculty of Midwifery, Rajawali Health Institute, Bandung, Indonesia

³ Diploma Three Midwifery Study Program, Budi Luhur College Health, Cimahi, Indonesia

ABSTRACT

Some pregnant women cannot cope with ongoing nausea and vomiting. Untreated nausea and vomiting will increase the frequency of nausea, weight loss, emotional tension, psychological stress, metabolic disorders, malnutrition and dehydration which causes hemoconcentration which inhibits blood circulation to the tissues. The therapy for nausea and vomiting being practiced is pharmacological therapy, but not all pregnant women can consume drugs. There are various complementary therapies being recommended to treat nausea and vomiting based on several studies, including acupuncture and acupressure at point P6, and giving lemon aromatherapy. This study aims to compare the effectiveness of acupuncture and acupressure at point P6 and lemon aromatherapy in overcoming nausea and vomiting in pregnant women in the first trimester. The research method was quasi-experimental (pretest-posttest). The number of samples was 90 first trimester pregnant women who experienced nausea and vomiting, which were divided into three groups. The questionnaire used was pregnancy-unique quantification of emesis/nausea (PUQE). The results of the study in the acupuncture group showed the median pretest was 4 according to 2 in the posttest, in the lemon aromatherapy group the median in the pretest was 13 to 10 in the posttest, while the acupressure group had a median value of 7.5 pretest to 7 in the posttest. There are differences in the effectiveness of nausea and vomiting in first trimester pregnant women using the acupuncture, acupressure and lemon aromatherapy methods. The conclusion of this study is that acupuncture is more effective in treating nausea and vomiting in first trimester pregnant women than acupressure and lemon aromatherapy.

KEYWORDS

Nauseous vomit; Pregnancy;
acupressure; acupuncture;
Aromatherapy

Received: May 27, 2023

Accepted: December 18, 2023

Published: December 31, 2023

Introduction

Various changes occur in pregnant women in the first trimester, one of which is morning sickness, nausea and vomiting. Nausea and vomiting (*morning sickness*) are a natural symptom and are often found in the first trimester of pregnancy. Half of pregnant women experience nausea and vomiting (*emesis gravidarum*), even just because they smell certain foods. Nausea, vomiting or better known as emesis gravidarum is a condition that is often experienced by pregnant women in the first trimester with a frequency of vomiting less than 5 times per day during the first trimester of pregnancy. (Hada et al., 2021). Nausea and vomiting occur in 60-80% first pregnant women (primigravida) and 40-60% in multigravida mothers. WHO (*World Health Organization*) stated that nausea and vomiting reached at least 14% of all pregnancies in the world. There are 2.203 pregnancies in Indonesia, 24.6% of them experienced nausea and vomiting. Increased levels of the hormones estrogen and HCG caused this feeling of nausea in the serum. The physiological cause of this increase in hormones is unclear, perhaps because of reduced central nervous system or gastric emptying; so they cause nausea and vomiting in pregnant women (Health et al., n.d.). Nausea and vomiting will get worse, causing the mother continuously to vomit every time she drinks or eats. As a result, she feels fatigue; she looks pale, and the frequency of urination decreases drastically so that the body fluids decrease and the blood becomes thick (hemoconcentration), which can slow down blood circulation so the consumption of oxygen and food to the tissues is also reduced. Lack of food and oxygen will cause tissue damage, which can endanger the health of the mother and the development of the fetus she carries (Zhang et al., 2020). The first trimester is a critical period when the fetus is in the early stages of forming organs. If the fetus experiences certain nutritional deficiencies, the formation of perfect organs can fail. In addition, the fetus is at risk of being born with low birth weight. The management of nausea and vomiting of pregnancy includes prevention, reducing nausea and vomiting, and improving body fluid and electrolyte needs. Prevention and reduction of nausea and vomiting can be done by pharmacological and non-pharmacological methods (Committee on Practice Bulletins-Obstetrics, 2018).

Pharmacological treatment is carried out by taking drugs, such as antiemetic drugs or vitamin B6, but these drugs have side effects that may be experienced by pregnant women, such as headaches, diarrhea and drowsiness. Other treatments that can be given are non-pharmacological or complementary therapies which have the advantage of being cheaper and do not have pharmacological side effects, namely acupuncture, acupressure and aromatherapy (Tiara D, 2013). Aromatherapy is an alternative treatment that has been recognized by WHO; aromatherapy is most often applied topically, or through inhalation. Lemon aromatherapy is a type of aromatherapy that is safe during pregnancy and childbirth. Lemon contains limonene, which will inhibit the action of prostaglandins so that it can reduce nausea and vomiting (Maternity et al., 2017). Complementary therapies that can be done besides lemon aromatherapy are acupuncture and acupressure therapy. The difference between the two is in using needles and not to stimulate acupuncture points to speed up the flow of vital energy throughout the body. The points that are manipulated in conditions of nausea and vomiting are points P6. Point P6 is a point on the lining of the heart meridian. The heart meridian has two branches, one of which enters the pericardium and heart, then continues downward through the diaphragm to the middle and lower abdominal parts. This meridian also crosses the stomach and large intestine. Using acupressure in pregnancy has many positive results; easy to do, harm-free, and can be done alone in women who experience nausea and vomiting, while acupuncture is considered as having good effectiveness in stimulating the P6 point with a needle (Setyowati, 2018).

In providing midwifery care during pregnancy, especially in the treatment of nausea and vomiting, midwives have statutory authority. One of the midwives' authority in dealing with nausea and vomiting during pregnancy is by giving multivitamins such as vitamin B6, but not all pregnant women; some mothers don't really enjoy having to take drugs; other than that, medical intervention for nausea and vomiting during pregnancy, is not approved by the FDA (Food and Drug Administration), so that complementary therapy is currently more reliable to treat nausea and vomiting (Committee on Practice Bulletins-Obstetrics, 2018). Apart from pharmacology, certified midwives can also provide relevant complementary therapies in the treatment of nausea and vomiting, such as acupuncture, acupressure, and aromatherapy. Various studies have been conducted to find out the effectiveness of complementary methods in treating nausea and vomiting.

Magfirah and Fatma's research states that acupressure and lemon aromatherapy are effective in reducing nausea experienced by pregnant women. Acupressure therapy and lemon aromatherapy reduced the number of nausea with a decrease of 4.2 and 4.85 in each group. The duration of nausea and vomiting in the acupressure and lemon aromatherapy groups also decreased by 1.55 and 4.3 (Magfirah et al., 2020). Research done by Deny Eka Widyastuti, Eni Rumiati, Desy states that complementary acupressure therapy is effective for treating emesis gravidarum in pregnant women in the first trimester which the result $Asymp.sig.(2-tailed)$, obtained a value of $0.005 < 0.05$, this means that there is a significant difference between the results of the post test and the results of the pre test. This also implies that acupressure can significantly reduce the mother's total RINVR score (Widyastuti et al., 2019). Research done by Faisal Karim, James et al states that pregnant women who are given acupuncture therapy require less additional antiemetic treatment compared to those who are not given acupuncture therapy (Karim et al., 2019a). The same thing was also stated by the research of Siti Maesaroh and Mera Putri, giving lemon aromatherapy inhalation was effective in reducing the frequency of nausea and vomiting in pregnant women with a decrease of 4.86 times. The inhalation of the lemon aromatherapy is a method that can be applied as a complementary therapy to reduce the frequency of nausea and vomiting in taking care for pregnant women (Maesaroh & Putri, 2019). Various studies that have been conducted have compared two different methods for dealing with nausea and vomiting, but there is no research that has compared the three complementary therapies of acupressure, acupuncture and aromatherapy in dealing with such things during pregnancy. This study aims to compare the effectiveness of acupuncture and acupressure at point P6 and lemon aromatherapy in overcoming nausea and vomiting in pregnant women in the first trimester.

Literature Review

Nausea vomiting in pregnancy

Nausea and vomiting are a condition of nausea which is sometimes accompanied by vomiting with a frequency of less than 5 times a day during pregnancy. Nausea and vomiting are a feeling of dizziness, bloating, and feeling fatigue, the highest incidence of nausea and vomiting occurs at 6 -12 weeks of pregnancy. Nausea and vomiting commonly happen during pregnancy, 50% of pregnant women undergo mild nausea since they get up throughout the day with little vomiting during the first half of pregnancy and it lessens after 12 to 14 weeks of pregnancy as the placenta takes over to support the developing embryo. Nausea and vomiting is usually caused by changes in the endocrine system that occur during pregnancy, mainly due to high fluctuations in hCG levels (human chorionic gonadotropin), especially because the period of gestational nausea and vomiting generally occurs during the first 12-16 weeks of age, at which time, hCG reaches its highest level and is secreted by the trophoblast cells of the blastocyst. hCG passes ovarian control in the pituitary and causes the corpus luteum to continue producing estrogen and progesterone. Human chorionic gonadotropin is produced by the developing placenta, it is the cause of nausea and vomiting which works on (chemoreceptor trigger zone) in the vomiting center through muscle stimulation of the gastric shaft (Committee on Practice Bulletins-Obstetrics, 2018).

❖ Time and Duration of Nausea Vomiting

Nausea and vomiting may last all day, or may not occur at all when you wake up in the morning. Prospective study was done on 160 women; 74% of them reported nausea and vomiting, 1.8% experienced morning sickness. Meanwhile, 80% of women experienced nausea and vomiting throughout the day. According

to Vellacott et al., 76% of women are proven to experience nausea and vomiting. In the survey it was found that the case of nausea and vomiting during pregnancy usually decreases or increases at the end of the first semester, the symptoms disappear by 27%, although most pregnant women experience nausea and vomiting, it will decrease at 22 weeks of pregnancy. Some women experience nausea and vomiting again at the time of delivery, which is caused by a response to fluctuations in hormone levels to prepare for giving birth (Irianti et al., 2014).

❖ Measurement of Nausea Vomiting

The authority of midwives in cases of nausea and vomiting in pregnancy is to carry out management and early detection for the substitute of care. An instrument that can be used by midwives to assess hyperemesis gravidarum is by pregnancy-unique quantification of emesis/nausea (PUQE). PUQE is an assessment of the quantity of nausea and vomiting to avoid subjectivity from the condition of nausea and vomiting (Hada et al., 2021).

Management of nausea vomiting

❖ Method of Pharmacology

- 1) Give vitamin B6 tablets 1.5 mg/day, to increase metabolism and prevent encephalopathy.
- 2) Give Ondansetron 10 mg. The use of ondansetron 10 mg in 50 ml intravenously has almost the same effectiveness in reducing the type of emesis gravidarum with giving antihistamine Promethazine 50 mg in 50 mL intravenously.
- 3) *Promethazine hydrochloride*. Giving a dose of 20 -50 mg orally (Irianti et al., 2014).

❖ Non-Pharmacological Therapy

- 1) Making dietary adjustments by modifying the amount and portion size of food. Eat small amounts and have electrolyte drinks or supplements more often. Consuming foods that are high in protein can reduce nausea and slow down the activity of dysrhythmic waves in the stomach, especially in the first trimester compared to foods that are dominated by carbohydrates or fats. Avoid pressure that can increase stress and interfere with rest. Avoid consuming caffeine/coffee, tobacco and alcohol, besides causing nausea and vomiting. It can also have a detrimental effect on the embryo, as well as inhibit protein synthesis.
- 2) Complementary actions. Complementary interventions that have been started to be carried out as a companion to conventional therapy include:

a) Acupuncture and acupressure (Karim et al., 2019b)

This therapy has the same principle, namely stimulating meridian points to reduce conditions. The difference between these two therapies is the use of needles in acupuncture therapy and massage on meridian points. Acupressure and acupuncture have been proven by various studies, including through thermography, to visualize changes in peripheral perfusion during therapy using an infrared camera that can detect changes in temperature distribution. Stimulation of the pericardium 6 (P6) and large intestine II points has the effect of increasing energy delivery to the arm area. This resulted in a significant increase in peripheral temperature during therapy. Pericardium 6 point is located 3 "cun" from the wrist line parallel to the middle finger. This point reduces nausea and vomiting. In acupressure therapy, massage at that point is carried out 3 days for 15 minutes in the morning and evening with sedation or attenuation, with moderate pressure, by massaging counterclockwise, 60 times at point P6 (Net guan). Meanwhile, stimulation acupuncture therapy at point P6 is done by using a 0.25mm needle and left for 15 minutes while being manipulated counterclockwise, and is done twice in one week. Stimulation at point P6 aims to overcome nausea and vomiting. Manipulation of sedation makes the heart more relaxed so it can reduce nausea and vomiting. P6 (Net guan) has the characteristic of regulating Qi circulation, calming the reversed stomach Qi, calming the mind, relieving pain, and loosening the chest. It is useful for relieving nausea and digestive disorders.

b) Lemon aromatherapy (Safajou et al., 2020)

Lemon aromatherapy is an essential oil that is produced from the extraction of lemon peel (citrus lemon), which is often used in aromatherapy. Lemon aromatherapy is a type of aromatherapy that is safe for pregnancy and childbirth. It has an antibacterial character, which is good for lowering blood pressure, stops bleeding, a good source of potassium for the heart, increases stamina and energy, can relieve coughs and relax tiredness, and balances the body's pH. The benefits of lemon are to quench thirst, overcome scurvy or canker sores, can restore digestive function, lower blood pressure (hypotensive), antioxidant, antibacterial, antiseptic, reduce heat (antipyretic), and can increase the body's immunity against infection. Aromatherapy that uses inhalation usually uses a warming substance whose

steam will give off a fragrant aroma which will then be inhaled so that it can relax the body. Giving aromatherapy by inhalation is considered being more effective and efficient for mothers.

Method

The research method used was an analytic comparison of two variables with a quasi-experimental design with three pre and post test groups. This study aims to compare the differences in the level of nausea and vomiting before and after being given three different interventions, between acupuncture, acupressure and aromatherapy. In the acupuncture group, the respondents will be given treatment to stimulation P6 using a ½ "cum" needle (0.25mm diameter) and will be allowed to stand for 15 minutes by being stimulated counterclockwise. This therapy will be carried out 6 times in 2 weeks and evaluated every week. In the acupressure group, the sample will be taught acupressure techniques at point P6 with a counterclockwise massage direction carried out for 15 minutes in the morning and evening, for 2 weeks and will be evaluated every week. In the aromatherapy group, with lemon aromatherapy inhalation technique for 24 hours which was carried out at each respondent's home by: (1) when pregnant women felt or had nausea, they were ordered to spray of lemon aromatherapy on mask; (2) if the mother is still experiencing nausea, pregnant women will be instructed to inhale in 3 breaths and repeat 5-10 times. Evaluation will be done every 3 days for two weeks.

Participants

The population in this study were first trimester pregnant women, 6-10 weeks of pregnancy, who visited the Independent Midwife Practice during the study period. Determination of the sample size in this study was to use a simple sample size calculation by assuming the proportion of nausea and vomiting in the population was 80% and deviation was 10%, so the number of samples in each group was 31, considering the inclusion criteria, namely the mother was primigravida, did not have dental problems, did not have pregnancy complications in the first trimester, did not have GERD disease, and were not on pharmacological treatment of nausea and vomiting.

Instruments

The instrument that can be used by midwives to assess hyperemesis gravidarum is by pregnancy-unique quantification of emesis/nausea (PUQE). PUQE is an assessment of the quantity of nausea and vomiting to avoid subjectivity from the condition of nausea and vomiting. The level of nausea and vomiting that was assessed was such conditions in the last 24 hours with the following classification:

- 1) Mild nausea and vomiting if the PUQE index value ≤ 6 .
- 2) Moderate nausea and vomiting if the PUQE index value is 7-12
- 3) Severe nausea and vomiting if the PUQE index value ≥ 13

Data analysis

The pre and post test data that has been collected will be tested for normality of the data. After which, the data will be tested using the test *One Way Anova*, to compare the effectiveness of therapy.

Results

Table 1. Results of the Wilcoxon test analysis on the Effectiveness of Acupuncture in Overcoming Nausea Vomiting in First Trimester Pregnant Women

Method of Acupuncture	N	Median (Minimum-Maximum)	P
Pre	30	4 (2-9)	0,000
Post	30	2 (1-5)	

Based on the table above, the results show that there are differences before and after being given the acupuncture method in treating nausea and vomiting in the first trimester, with a value of $p = 0.000$ ($p < 0.05$). This can be seen from the median value, which is from 4 to 2.

Table 2. Results of Wilcoxon test analysis on the Effectiveness of Aromatherapy in Overcoming Nausea Vomiting in First Trimester Pregnant Women

Method of Aromatherapy	N	Median (Minimum-Maximum)	P
------------------------	---	--------------------------	---

Pre	20	13 (9-16)	0,000
Post	20	10 (6-12)	

Based on the table above, the results showed that there are differences before and after being given the aromatherapy method in treating nausea and vomiting in the first trimester, with a value of p 0.000 ($p < 0.05$). This can be seen from the median value, which decreased from 13 to 10.

Table 3. Results of the Wilcoxon test analysis on the Effectiveness of Acupressure in Overcoming Nausea Vomiting in First Trimester Pregnant Women

Method of Acupressure	N	Median (Minimum-Maximum)	P
Pre	36	7.5 (4-11)	0,001
Post	36	7 (3-9)	

Based on the table above, the results showed that there are differences before and after being given the acupressure method in treating nausea and vomiting in the first trimester, with a value of p 0.001 ($p < 0.05$). This can be seen from the median value, namely from 7.5 decreased to 7.

Table 4. Results of the Kruskal-Wallis test analysis on Comparison of the Effectiveness of Acupuncture, Aromatherapy and Acupressure in Overcoming Nausea Vomiting in First Trimester Pregnant Women

Method	N	Median (Minimum-Maximum)	P
Acupuncture	30	2 (1-5)	0,000
Aromatherapy	20	10 (6-12)	
Acupressure	36	7 (3-9)	

Based on the table above, the results showed that there are differences between the 3 treatment groups, namely with a value of p 0.000 ($p < 0.05$) in overcoming nausea and vomiting in Trimester I pregnant women. This can be seen from the median value of the two groups; the acupuncture group with a value median 2, the aromatherapy group with a median value of 10, and the acupressure group with a median value of 7.

To find out which groups have differences, an analysis of Post Hoc must be carried out. The test used for Kurkal-Wallis is the Mann-Whitney test. The results obtained are as follows:

1. Acupuncture group with aromatherapy, $p=0.000$
2. Aromatherapy group with acupressure, $p=0.000$
3. Acupuncture group with acupressure, $p=0.000$

Thus, it can be concluded that the groups that have differences in dealing with nausea and vomiting are:

1. Acupuncture group with aromatherapy
2. Aromatherapy group with acupressure
- Acupuncture group with acupressure

Discussion

The Effectiveness of Acupuncture in Overcoming Nausea and Vomiting in First Trimester Pregnant Women

The purpose of using acupuncture as an additional treatment for patients with grade II hyperemesis gravidarum is due to the multifactorial etiology of hyperemesis gravidarum. There is no single therapy for treating nausea and vomiting during pregnancy that is clearly being the most effective, so it is expected that the addition of acupuncture can provide better results in reducing and eliminating the conditions of nausea and vomiting. In this study, patients with grade II hyperemesis gravidarum got standard treatment, in which the use of acupuncture was added to the relevant group. Acupuncture is done 3 times for 1 week. Acupuncture is performed once a day for 15 minutes, this is done with the consideration of the brief intervention and monitoring time, which is expected to reduce the loss of cases to follow up (Magfirah et al., 2020).

The Effectiveness of Aromatherapy in Overcoming Nausea Vomiting in First Trimester Pregnant Women

The use of lemon aromatherapy to reduce the frequency/intensity of nausea and vomiting shows that there is an effect of lemon aromatherapy on reducing the frequency of nausea and vomiting in pregnant women. A questionnaire was used in this study to determine the frequency of nausea and vomiting experienced by pregnant women. The effect of lemon aromatherapy on reducing the intensity of nausea and vomiting when inhaling aromatherapy makes the volatile molecules carry the aromatic elements contained in the oil content to the top of the

nose. There are nose hairs in it, which function as receptors, delivering electrochemical signals to the central nervous system. This message will activate a person's emotional and memory centers, which will then deliver signals back throughout the body through the circulatory system. The signals delivered throughout the body will be converted into one action by releasing neurochemical substances in the form of feelings of pleasure, relaxation, calm, or excitement. Therefore, besides overcoming nausea and vomiting, it turns out that lemon aromatherapy can also reduce menstrual pain (Suwanti, Wahyuningsih, and Liliana, 2018). Lemon aromatherapy has been shown to have a beneficial effect on emesis gravidarum. According to Kia's research (2013) the average score of emesis gravidarum decreased for four days using inhaled lemon aromatherapy. This is also in accordance with the research conducted by Erick et al. (2012) by observing the use of nonpharmacological treatments in women to eliminate emesis gravidarum. Based on the results of this study, it showed that 40% of women used the lemon aromatherapy to relieve nausea and vomiting, and more than half of those who had used it said it was effective. Lemon essential (citrus lemon) is one of the most widely used herbal oils in pregnancy and is considered as a safe treatment in pregnancy. According to a study, 40% of women have used lemon aromatherapy to relieve nausea and vomiting, and 26.5% of them have reported it as an effective way to control nausea and vomiting symptoms. A drop or two of lemon essential oil in an oil burner or diffuser in the bedroom helps to calm and relieve nausea and vomiting. Due to the increasing demand in using herbal medicine in pregnancy, lemons are readily available in all seasons and the use of lemons is safe in pregnancy. Lemon contains limonene, citral, linalyl, linalool, and terpineol which can stabilize the central nervous system, cause feelings of pleasure, increase appetite, improve blood circulation, and act as a sedative (Yavari Kia et al., 2014) (Rofi'ah et al., n.d.).

The Effectiveness of Acupressure in Overcoming Nausea Vomiting in First Trimester Pregnant Women

Based on the table above, the results showed that there were differences before and after being given the acupressure method in treating nausea and vomiting in the first trimester, with a value of $p = 0.001$ ($p < 0.05$). This can be seen from the median value, decreasing from 7.5 decreased to 7. Pregnant women who experience nausea and vomiting and are unable to adapt to the feeling of nausea and vomiting will undergo discomfort which results in a decrease in appetite so that there are changes in the electrolyte balance of potassium, calcium and sodium which cause changes in body metabolism which can impact on their health. The acupressure point for treating nausea and vomiting is the PC 6 point. The PC 6 point (Nei guan) is located 2 "cun" from the wrist line parallel to the middle finger. This point is to reduce nausea and vomiting, massage for 3 days, do it counter clock wisely (sedation) for 50 times during the nausea. This point can expedite Qi and blood flow throughout the body, and restore the reversed meridian pathway, so that after being given therapy at that point, nausea and vomiting will reduce (Setyowati, 2018) (Magfirah et al., 2020).

Conclusion

Acupressure, acupuncture and lemon aromatherapy are effective in reducing emesis gravidarum. Being compared to acupressure and aromatherapy, acupuncture is the most effective complementary in dealing with emesis gravidarum.

Acknowledgement

Thank you to all independent practice midwives in the city of Bandung who have assisted in this research process.

Funding

This research was funded by the Rajawali Health Institute as an internal research grant.

References

- Committee on Practice Bulletins-Obstetrics. (2018). ACOG Practice Bulletin No. 189: Nausea And Vomiting Of Pregnancy. *Obstetrics and Gynecology*, 131(1), e15-e30. <https://doi.org/10.1097/AOG.0000000000002456>
- Hada, A., Minatani, M., Wakamatsu, M., Koren, G., & Kitamura, T. (2021). The Pregnancy-Unique Quantification of Emesis and Nausea (PUQE-24): Configural, Measurement, and Structural Invariance between Nulliparas and Multiparas and across Two Measurement Time Points. *Healthcare*, 9(1553), 1-7.
- Irianti, B., Halida, E. M., Duhita, F., Prabandari, F., Yulita, N., & Yulianti, N. (2014). *Asuhan Kehamilan Berbasis Bukti*. Sagung Seto.
- Karim, F., Dilley, J., & Cheung, E. (2019a). A review of acupuncture in obstetrics and gynaecology. *The Obstetrician & Gynaecologist*, 21(3), 209-214. <https://doi.org/10.1111/tog.12574>
- Karim, F., Dilley, J., & Cheung, E. (2019b). A review of acupuncture in obstetrics and gynaecology. *The Obstetrician & Gynaecologist*, 21(3), 209-214. <https://doi.org/10.1111/tog.12574>
- Kesehatan, J. I., Kunci, K., Saridewi, W., Safitri, E. Y., Studi, P., Stikes, K., Achmad, J., & Cimahi, Y. (n.d.). *Pengaruh Aromaterapi Lemon terhadap Emesis Gravidarum di Praktik Mandiri Bidan Wanti Mardiwati Kota Cimahi*.
- Maesaroh, S., & Putri, M. (2019). Inhalasi Aromaterapi Lemon Menurunkan Frekuensi Muntah pada Ibu Hamil Inhalation of Lemon Aromatherapy Reduces the Frequency of Vomiting in Pregnant Women. *Jurnal Kesehatan Metro Sai Wawai*, 12(1), 30-35.

- 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>
- Maternity, D., Ariska, P., & Yulia Sari, D. (2017). *Inhalasi Lemon Mengurangi Mual Muntah Pada ibu Hamil INHALASI LEMON MENGURANGI MUAL MUNTAH PADA IBU HAMIL TRIMESTER SATU: Vol. II* (Issue 3).
- Rofi'ah, S., Widatiningsih, S., Sukini, T., Kebidanan, P., Poltekkes, M., & Semarang, K. (n.d.). *Efektivitas Aromaterapi Lemon untuk Mengatasi Emesis Gravidarum*.
- Safajou, F., Soltani, N., Taghizadeh, M., Amouzeschi, Z., & Sandrous, M. (2020). 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
- Setyowati, H. (2018). *Akupresure untuk kesehatan wanita*. Unimma Press.
- Tiara D. (2013). *Mual dan Muntah Kehamilan*. EGC.\
- Widyastuti, D. E., Rumiati, E., & Widyastutik, D. (2019). TERAPI KOMPLEMENTER AKUPRESUR UNTUK MENGATASI EMESIS GRAVIDARUM PADA IBU HAMIL TRIMESTER I TAHUN 2018. *Jurnal Kebidanan Indonesia*, 10(1), 96. <https://doi.org/10.36419/jkebin.v10i1.248>
- Yavari kia, P., Safajou, F., Shahnazi, M., & Nazemiyeh, H. (2014). The Effect of Lemon Inhalation Aromatherapy on Nausea and Vomiting of Pregnancy: A Double-Blinded, Randomized, Controlled Clinical Trial. *Iranian Red Crescent Medical Journal*, 16(3). <https://doi.org/10.5812/ircmj.14360>
- Zhang, H., Wu, S., Feng, J., & Liu, Z. (2020). Risk Factors of Prolonged Nausea and Vomiting During Pregnancy. *Risk Management and Healthcare Policy*, 13, 2645-2654. <https://doi.org/10.2147/RMHP.S273791>