



Administration of Lemon Water Towards Emesis Gravidarum

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ARTICLE INFO	ABSTRACT
<p><i>Article history:</i></p> <p>Received 19 October 2022 Accepted 10 January 2023 Published 20 January 2023</p> <hr/> <p><i>Keyword:</i></p> <p>Emesis Lemons Nausea vomiting</p>	<p>Hyperemesis gravidarum is a condition that is most often experienced by a pregnant woman which results in a mother having to get hospital care and treatment. Hyperemesis gravidarum generally occurs in the sixth to tenth week of pregnancy and occurs in about 60-80% of mothers with first pregnancies. Hyperemesis gravidarum not only threatens the life of pregnant women, but also has side effects on the fetus such as abortion, low birth weight and stunted fetal growth. To determine the effect of giving lemon steeping water to reduce emesis gravidarum. This type of research is Quasy Experiment with One Group Pretest Posttest. The sample is all pregnant women who experience emesis as many as 15 people with a period of 6 months. Data analysis using the T-Test Dependent statistical test. Statistical tests showed the frequency of nausea and vomiting before the intervention was given, namely 10.93 and after the intervention was given, namely 3.33 with an average decrease of 7.60. The statistical test results obtained a p-value = 0.00 ($p < 0.05$) so that it can be concluded that giving lemon steeped water is effective in reducing nausea and vomiting in pregnant women. The frequency of nausea and vomiting before the intervention was given was 10.93 and after the intervention was given it was 3.33 with an average decrease of 7.60. The statistical test results obtained a p value < 0.005 so it can be concluded that giving lemon infusion is effective in reducing nausea and vomiting in pregnant women.</p>

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<p><i>Kata kunci:</i></p> <p>Mual muntah Lemon Emesis</p> <p><i>*) corresponding author</i></p> <p>Meli Doloksaribu, S.Tr.Keb, M.Keb</p> <p>Pendidikan Profesi Bidan Fakultas Ilmu Kesehatan Institut Kesehatan Sumatera Utara Jl. Jamin Ginting Kel. Lau Cih Kec. Medan Tuntungan Sumatera Utara - Indonesia 20136</p> <p><i>Email:</i> melidoloksaribu88@gmail.com</p> <p>DOI: 10.30604/jika.v8iS1.1687</p> <p>Copyright 2023 @author(s)</p>	<p>ABSTRAK</p> <p>Hiperemesis gravidarum merupakan kondisi yang paling sering dialami oleh seorang ibu hamil yang mengakibatkan seorang ibu harus mendapatkan penanganan dan perawatan rumah sakit. Hiperemesis gravidarum pada umumnya terjadi pada minggu keenam sampai dengan minggu ke sepuluh kehamilan dan terjadi pada sekitar 60-80% ibu dengan kehamilan pertama. Hyperemesis gravidarum tidak hanya mengancam kehidupan ibu hamil, namun juga memberikan efek samping pada janin seperti abortus, berat badan lahir rendah, dan pertumbuhan janin terhambat. Untuk mengetahui pengaruh pemberian air seduhan lemon terhadap penurunan emesis gravidarum. Jenis penelitian Quasy Eksperimen dengan One Group Pretest Posttest. Sampel adalah seluruh ibu hamil yang mengalami emesis sebanyak 15 orang dengan waktu 6 bulan. Analisis data menggunakan uji statistik T-Test Dependent. Uji statistik menunjukkan frekuensi mual muntah sebelum diberikan intervensi yaitu 10,93 dan setelah diberikan intervensi yaitu 3,33 dengan penurunan rata-rata 7,60. Hasil uji statistik didapatkan nilai p-value=0,00 ($p < 0,05$) sehingga dapat disimpulkan bahwa pemberian air seduhan lemon efektif dalam penurunan mual dan muntah pada ibu hamil. Frekuensi mual dan muntah responden sebelum diberikan intervensi yaitu 10,93 dan setelah diberikan intervensi yaitu 3,33 dengan penurunan rata-rata 7,60. Hasil uji statistik didapatkan nilai $p < 0,005$ sehingga dapat disimpulkan bahwa pemberian seduhan lemon efektif dalam penurunan mual muntah pada ibu hamil</p>
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INTRODUCTION

The World Health Organization (WHO) stated that the global maternal mortality rate is 810 deaths per 100,000 live births per day, and data on maternal mortality in ASEAN shows that Indonesia ranks second highest. The 2018 Indonesia Health Profile shows the results of data from the 2017 Indonesian Demographic Health Survey (IDHS) The Maternal Mortality Rate (MMR) generally decreased during the 1991-2015 period from 390 to 305 per 100,000 live births. Even though there was a reduction in the maternal mortality rate, it failed to achieve the MDGs target which had to be achieved, namely 102 per 100,000 live births in 2015. (Badan Pusat Statistik, 2017).

In general, the incidence of hyperemesis reaches 4:1000 pregnancies. Hyperemesis emesis occurs in almost all parts of the world. WHO reports that the incidence of hyperemesis gravidarum in Sweden reaches 0.3%, California reaches 0.5%, Canada reaches 0.8%, China reaches 10.8%, Norway reaches 0.9%, Pakistan reaches 2.2% and Turkey reaches 1.9%. (Purwandari, 2019).

According to data from the Ministry of Health, in Indonesia the incidence of hyperemesis gravidarum reaches 1-3% of all pregnancies. The incidence of nausea and vomiting in Indonesia ranges from 50-70% in the first trimester. (SDKI, 2017)

Pregnancy is a physiological thing that starts from conception to the birth of the fetus which involves physical and emotional changes from the mother and social changes in the family, pregnant women will adapt to physiological changes including changes in the digestive system. (Nurhikmah, 2017).

The event of pregnancy is considered as a maturation crisis or a transitional period in a woman's life cycle. This event causes a woman to experience major changes in her life. During the period of pregnancy a woman's body undergoes many changes or adaptations in relation to the needs of the growing fetus. Various adaptations during pregnancy are physiological and psychological adaptations. (Nurhikmah, 2017).

Physiological adaptations include regulation of the endocrine system through hormonal mechanisms, causing various adaptations in the body of pregnant women in response to fetal life. Psychological adaptation that occurs in the first trimester of pregnant women is often considered as an adjustment period. The adjustments made by the mother are facing the fact that she is pregnant, some mothers feel sad and ambivalent about their pregnancy and the feeling of discomfort is caused by nausea and vomiting and changes in appetite. (Hutahaean, 2017).

Changes in the digestive tract system in pregnant women occur in the first months of pregnancy, where the mother feels unwell (nausea) caused by an increase in the hormones estrogen and progesterone, it is not uncommon to experience symptoms of vomiting (emesis) which often occurs in the morning (morning sickness). (Felina & Ariani, 2021).

Most pregnant women can adapt to emesis gravidarum, but there are a small number of pregnant women who cannot cope with ongoing nausea and vomiting so that it interferes with daily life or what is known as hyperemesis gravidam (Mujayati et al., 2022).

"Morning Sickness" is a complaint of nausea (nausea) and vomiting (emesis gravidarum) is a natural symptom and is often found in the first trimester of pregnancy. It is called morning sickness because it usually occurs in the morning, but does not always occur in the morning. The average

pregnant woman starts experiencing morning sickness in the 4th or 6th week. However, if the nausea and vomiting gets worse, it can cause a pregnancy disorder called hyperemia gravidarum. (Ali, 2022).

Nausea and vomiting is caused by the hormone progesterone, which is the hormone that predominates during pregnancy. Progesterone relaxes the work of the digestive tract which makes elimination of the body slower, eventually leading to slow gastric emptying, giving rise to excess stomach acid. Nausea and vomiting during pregnancy is usually caused by changes in the endocrine system that occur during pregnancy, mainly caused by increased fluctuations in HCG (Hormone Chorionic Gonadotropin) levels, especially because the most common period of gestational nausea and vomiting is the first 12-16 weeks of age which at that time HCG reaches its highest level. In addition, social, psychological and cultural factors also influence the occurrence of this condition. (Butu et al., 2019).

Symptoms of nausea, vomiting in the morning or morning sickness are commonly experienced by pregnant women under 6 months of age. Most women who experience symptoms of nausea and vomiting go away between the 16th and 22nd week of pregnancy. A small percentage of women 0.3-2% will develop a more serious condition called hyperemesis gravidarum which requires medical referral. Midwives can advise pregnant women to drink milk before going to bed and consume dry biscuits with a drink before waking up in the morning, avoid spicy or strong-smelling foods, and eat small portions to maintain blood sugar levels. In addition, devices that emit electrical stimulation initiate the wrist to trigger sensory and neurological impulses that control vomiting, acupuncture, herbal and homeopathic medicines can also minimize discomfort from the condition. (Melly Damayanti, 2022).

Hyperemesis gravidarum is a condition that is most often experienced by a pregnant woman which results in a mother having to get hospital care and treatment. This condition is very common in the first trimester of pregnancy. Nausea and vomiting most often occur in the morning, but can also occur at night or throughout the day. Hyperemesis gravidarum generally occurs in the sixth to tenth week of pregnancy and occurs in about 60-80% of mothers with first pregnancies. (London et al., 2017).

Hyperemesis gravidarum can cause dehydration and electrolyte imbalance in the body. Lack of fluids to drink and loss of fluids due to vomiting causes dehydration, so that extracellular fluid and plasma are reduced, several body systems will be affected if hyperemesis gravidarum expands or if it is not treated properly it will increase maternal morbidity and mortality. (Maharani et al., 2017).

Hyperemesis gravidarum can cause a decrease in appetite so that the balance of electrolytes such as potassium, calcium and sodium becomes disturbed and causes changes in the body's metabolism. Hyperemesis gravidarum not only threatens the life of pregnant women, but also has side effects on the fetus such as abortion, low birth weight and stunted fetal growth. (Hertje Salome Umboh et al., 2017).

Some of the predisposing factors that cause hyperemesis gravidarum are pregnancies in mothers who are too young, first pregnancies, pregnancies with molahididasa and multiple pregnancies due to increased HCG levels. Physiological factors for the occurrence of hyperemesis gravidarum are the entry of chorionic villi into the maternal circulation and changes in the metabolic system during pregnancy. Pregnancy conditions with hyperthyroidism and diabetes can also increase the risk of hyperemesis

gravidarum. In addition, psychological factors also have a role as a cause of hyperemesis such as household rifts, job loss, fear of pregnancy and childbirth, and fear of facing the role of parent. (Fitria et al., 2022).

Psychologically, nausea and vomiting during pregnancy affects more than 80% of pregnant women and has a significant effect on their quality of life. Some pregnant women think this condition is normal in pregnancy, but there are also many pregnant women who feel uncomfortable and really interfere with their activities and life. Some pregnant women make efforts to handle it pharmacologically by consuming drugs such as Vitamin B6 which turns out to have side effects such as headaches, diarrhea, and drowsiness. In addition to pharmacological treatment, hyperemesis gravidarum can also be treated non-pharmacologically or with complementary therapies, including using herbal plants such as ginger, lemon, peppermint leaves and so on. (Rampersaud & Valim, 2017)

The cause of nausea and vomiting in pregnant women is still not known with certainty, but there are various things that are predisposing factors, such as psychological factors and hormonal changes. Pregnant women with a hysterical personality type and excessive dependence on their mother tend to experience nausea and vomiting. Other influential factors are the hormones progesterone and HCG which cause an increase in gastric motility and stomach acid, causing a reaction of nausea and vomiting. (Wijayanti et al., 2017).

Cases of emesis gravidarum experienced by pregnant women in Indonesia are 50-90%. However, in cases like this it does not cause death in pregnant women because it only lacks nutrition and fluids. Continuous emesis gravidarum can result in hyperemesis gravidarum. This will cause fluid and electrolyte disturbances, body fluids will decrease so that the blood becomes thick and blood circulation to the tissues will be hampered and can affect the health of the mother and the development of the fetus she contains. (Natalist BR Simbolon, 2022).

Handling of emesis gravidarum is divided into pharmacology and non-pharmacology. Pharmacological treatment consists of administering vitamins and mild sedatives. Non-pharmacological treatment to treat emesis gravidarum, for example by giving hot tea and giving ginger. The results of using ginger, mint leaves and lemon depend on the pregnant woman. If you don't like steeping ginger, then you can drink mint leaves as a substitute. Mint leaves are also known to be a safe and effective remedy for treating nausea and vomiting in pregnant women. Mint leaves can be eaten like mints, drink mint tea or use peppermint oil. Additionally, lemon essential oil is one of the most widely used herbal oils in pregnancy and is considered a safe remedy in pregnancy. (Mujayati et al., 2022).

Another complementary therapy that can reduce nausea and vomiting in first trimester pregnant women is using lemon. Lemon contains several minerals that are important for the body. Lemon contains pyridoxine as a receptor antagonist. Lemon can help maintain stamina and health

during pregnancy and helps high nutritional intake for the growth of the fetus in the womb. (Felina & Ariani, 2021).

Handling emesis gravidarum can be done in several ways. The availability of medicines as a treatment effort can also be obtained easily. However, these drugs have the potential to provide teratogenic effects during the fetal growth period in early pregnancy. Therefore, many pregnant women start looking for other alternative treatments, one of which is through alternative or traditional medicine. The literature states that herbal plants that can reduce nausea and vomiting are bay leaves, ginger, chamomile, raspberry leaves, peppermint, and lime juice. (Harahap et al., 2020).

Fruits that contain acid in them such as lime can stimulate the production of saliva or saliva which is certainly useful for breaking down food substances in the digestive system. Flavonoids contained in lime can also trigger peristalsis in the stomach so that the stomach can easily digest food. (Gaitán et al., 2021).

Lime has Flavonoids which increase the production of bile, acids and digestive juices. Where the content of flavonoids will neutralize acidic digestive juices, removing toxins in the body. (MacGibbon et al., 2017).

Lemon (Citrus Limon) is well-known as an ingredient to be squeezed and its juice taken as a drink. In traditional medicine, lemon juice can be added to tea to reduce fever, stomach acid, and can also treat nausea and vomiting during pregnancy. The results showed that 40% of women had used lemon to relieve nausea and vomiting, and 26.5% and consuming lemon juice was an effective way to control symptoms of nausea and vomiting. (Mutiah, 2020).

Based on the description above, it can be seen that the purpose of this study was to determine the effect of giving lemon steeping water to reducing emesis gravidarum. The benefits of this study are that it is hoped that the research results can strengthen study material on non-pharmacological treatment of hyperemesis gravidarum in pregnant women.

METHOD

This type of research is quantitative research with quasi-experimental design. Researchers used the One Group Pretest Posttest design, which was to determine the effectiveness of giving lemon infusion to reduce hyperemesis gravidarum. This research was conducted at the Tuntungan Health Center. The population and sample in this study were pregnant women. The sampling technique is the total sampling technique. The instrument used is the PUQE instrument. Research analysis using the Dependent T-Test.

RESULTS AND DISCUSSION

Result

Table 1. Effect of Lemon Stew on Nausea and Vomiting

Intervention	Mean	SD	Difference		P-Value
			Mean	SD	
Before	10,93	1,43	7,60	1,40	0,00
After	3,33	0,61			

Discussion

Based on the results of the study, it was found that the average nausea and vomiting before the intervention was given was 10.93 and then the intervention was given lemon steeping for 7 days and then a reassessment was carried out to obtain a nausea vomiting value of 3.33 with a mean value of 7.60. These data show that giving lemon infusion is effective in reducing nausea and vomiting in pregnant women.

Emesis gravidarum is an increase in the hormones Estrogen, Progesterone and Human Chorionic Gonadotropine (HCG). Poor eating patterns before or in the early weeks of pregnancy, lack of sleep or lack of rest and stress are also factors that cause emesis gravidarum. (London et al., 2017).

hCG levels reach their peak in the first trimester of pregnancy. Until now, the hCG hormone is suspected to be one of the causes of emesis gravidarum. Changes in the rhythmic activity of the stomach (gastric dysrhythmias), either faster or slower, also contribute to the occurrence of nausea and vomiting in pregnancy. Current mechanisms that cause gastric dysrhythmias include increased levels of estrogen and progesterone, impaired thyroid function, changes in vagal and sympathetic tone, and vasopressin secretion in response to changes in intravascular volume that usually occur in early pregnancy. Progesterone reduces the contractility of smooth muscle, and can alter gastric emptying and cause increased nausea and vomiting. In addition, placental prostaglandin E (PGE) also affects gastric smooth muscle. (Mutiah, 2020).

If emesis gravidarum is not treated properly, it will get worse and become hyperemesis gravidarum which can cause decreased body fluids and blood to become thick, thereby slowing blood circulation which affects the intake of oxygen and nutrients to the fetus. (Rofi' ah et al., 2019).

The results of this study were supported by research conducted by (Butu et al., 2019) concerning the effectiveness of giving lemon and grapefruit juice infusion on the frequency of nausea and vomiting in first trimester pregnant women, found that the results of an analysis of lemon infusion and grapefruit juice in first trimester mothers I in the working area of the Adan-Adan Public Health Center, Kediri Regency using the Independent T-Test statistic test, the average frequency of nausea and vomiting of respondents after being given lemon infusion was 1.62. While the average frequency of nausea and vomiting in respondents who were given grapefruit juice was 2.00. So it can be concluded that giving lemon infusion is more effective than giving grapefruit juice.

Flavonoids are anti-oxidants as free radical scavengers, antiviral, anti-microbial, anti-inflammatory, anti-ulcer and anti-allergenic. Daily intake of flavonoids 70-170 mg/day. Citrus fruits and orange juice are food sources rich in phenolics. Fresh fruit and hand-pressed juices contain flavanones and flavones. In citrus fruit, there is a naringin content that affects bitterness. The highest levels of flavonoids in Grapefruit are found in white grapefruit varieties compared to pink and red. (Cholifah & Nuriyanah, 2019).

According to research by (Trovik & Vikanes, 2018) regarding the comparison of the effectiveness of giving lemon drink therapy with cardamom drinks for morning sickness in first trimester pregnant women, found that the results of statistical tests showed that the average level of morning sickness for pregnant women after being given lemon infusion was 7.5. This value is lower than the average value of morning sickness after being given a cardamom

drink of 9.93. With a p-value of 0.005, it can be concluded that there are two significant differences in the effectiveness of lemon infusion therapy with cardamom drink against morning sickness in pregnant women.

Research (Trovik & Vikanes, 2018) on the effectiveness of giving a lemon decoction in reducing the frequency of nausea and vomiting in pregnant women in the first trimester, found that the results showed that the average frequency of nausea and vomiting before being given a lemon decoction was 13 times and after being given a lemon decoction it decreased to 3.18 times. These results indicate that lemon infusion is effective in reducing nausea and vomiting in pregnant women (p-value = 0.000).

The results of this study are also in accordance with the theory (Purwandari, 2019) that nausea and vomiting is one of the earliest, most common and most stressful symptoms associated with pregnancy. Nausea and vomiting is often overlooked as a normal consequence of early pregnancy without acknowledging the devastating impact it can have on women and their families. For some women, symptoms may last throughout the day, or may not occur at all upon waking in the morning. Nausea and vomiting during pregnancy is usually caused by changes in the endocrine system that occur during pregnancy, mainly caused by high levels of HCG, because the most common period of nausea or vomiting occurs in the first 12-16 weeks of age where the peak of the increase in the hormone hCG.

According to (Rofi' ah et al., 2019) initial therapy for emesis should be conservatively accompanied by dietary changes, emotional support, and alternative therapies such as herbs. Traditional potions can be used by drinking lemon infusion. In India, lemon is made as a drink to treat nausea in pregnant women.

According to (Jannah et al., 2021) one of the pharmacological functions of lemon is antiemetic (anti-vomiting), intestinal peristalsis. About 6 compounds in lemon have been shown to have potent antiemetic properties. The action of these compounds is more towards the stomach wall than the central nervous system.

According to theory (Felina & Ariani, 2021) lemon is usually safe as an herbal medicine. Lemon does not have acute ketotoxicity at doses normally consumed for food or medicine. In large doses lemon can cause gastric irritation and loss of the protective gastric mucosa. At normal doses lemon does not affect blood clotting parameters or blood coagulation.

Treatment of nausea and vomiting depends on the severity of the symptoms you are feeling. Treatment for nausea and vomiting can use pharmacological and non-pharmacological therapy. Pharmacological therapy can be carried out by administering antiemetics, antihistamines, anticholinergics and corticosteroids. Meanwhile, non-pharmacological therapy can be carried out by adjusting the emotional support diet, acupuncture, lifestyle changes, rest, sleep and by providing herbal/natural remedies such as ginger and pepper-mint. (Kustriyanti & Putri, 2019).

One alternative non-pharmacological treatment of nausea and vomiting in pregnant women is to use aromatherapy. Several types of essential oils that can be used as aromatherapy include peppermint, spearmint, lemon and ginger. (Butu et al., 2019).

Lemon contains Limo-nene which will inhibit the action of prostaglandins so that it can reduce pain and function to control cyclooxygenase I and II, prevent prostaglandin activity and reduce pain including nausea and vomiting (Cheraghi and Valadi). Lemon (Citrus Limon) is well-known as an ingredient to be squeezed and its juice taken as a drink.

In traditional medicine, lemon juice can be added to tea to reduce fever, stomach acid, and can also treat nausea and vomiting during pregnancy. The results showed that 40% of women had used lemon to relieve nausea and vomiting, and 26.5% and consuming lemon juice was an effective way to control symptoms of nausea and vomiting. (Kia et al., 2014).

This study is in accordance with Vutyavanich's statement that lemon is an effective treatment for relieving nausea and vomiting in pregnancy. Types of diseases that can be treated with lemon include: headaches, dizziness, increased appetite and vomiting (McParlin et al., 2018).

Lemon fruit is known as a source of vitamin C, but actually this fruit also contains other essential nutrients, including carbohydrates (sugars and dietary fiber), potassium, folate, calcium, thiamin, niacin, vitamin B6, phosphorus, magnesium, copper, riboflavin, pantothenic acid, and phytochemical compounds. (Sandven et al., 2019).

Lemon peel also contains dlimonene and vitamin C. Dlimonene is a flavonoid contained in lemon peel, according to data from the Code of Federal Regulations generally recognized as safe (GRAS) which states that d-Limonene has low toxicity so it is safe for consumption. (Mcparlin et al., 2017).

According to the researchers' assumptions, the content contained in lemons is limonene which can prevent prostaglandin activity and reduce pain including nausea, vomiting and lemon also contains flavonoid which can overcome nausea and vomiting in pregnant women. However, the flavonoid in lemons contains the highest content in the juice of the orange juice which contains little flavonoids, therefore grapefruit reduces nausea and vomiting faster in pregnant women than lemons. Lemon decoction is effective in reducing nausea and vomiting in first trimester pregnant women. Where nausea and vomiting are caused by changes in the endocrine system that occur during pregnancy, mainly caused by changes in the endocrine system that occur during pregnancy, mainly caused by high fluctuations in HCG levels, especially during the period of gestational nausea and vomiting, which is most common in the first 12-16 weeks. Lemon can work to inhibit serotonin receptors and cause antiemetic effects on the gastrointestinal system and central nervous system. Lemon also contains essential oils which function as anti-inflammatories so that they can inhibit the inflammatory process caused by H.pylori infection. Therefore, the frequency of nausea and vomiting caused by H.pylori infection can be reduced. So it can be concluded that lemon infusion is effective in reducing nausea and vomiting in pregnant women.

LIMITATION OF THE STUDY

Research must be able to control effectively the use of pharmacological drugs to treat nausea and vomiting in pregnant women and collaborate with pharmaceuticals to facilitate the manufacturing process and produce good quality lemon juice.

CONCLUSIONS AND SUGGESTIONS

Based on the results of research regarding the effect of giving lemon steeped water on reducing emesis gravidarum, the following conclusions can be drawn; The frequency of nausea and vomiting before the intervention was given was

10.93 and after the intervention was given it was 3.33 with an average decrease of 7.60. The statistical test results obtained a p value <0.005 so it can be concluded that giving lemon infusion is effective in reducing nausea and vomiting in pregnant women.

ETHICAL CONSIDERATIONS

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REFERENCES

- Badan Pusat Statistik. (2017). Survei Demografi Dan Kesehatan : Kesehatan Reproduksi Remaja 2017. In Badan Kependudukan dan Keluarga Berencana. *Survei Demografi Dan Kesehatan*, 271. <http://www.dhsprogram.com>.
- Butu, Y. O., Rottie, J., & Bataha, Y. (2019). Faktor – Faktor Yang Berhubungan Dengan Kejadian Hyperemesis Gravidarum Pada Ibu Hamil Trimester I. *Jurnal Keperawatan*, 2(2). <https://doi.org/10.35790/jkp.v7i2.24476>
- Cholifah, S., & Nuriyanah, T. E. (2019). Aromaterapi Lemon Menurunkan Mual Muntah pada Ibu Hamil Trimester I. *Jurnal Kebidanan Midwiferia*, 4(1), 36. <https://doi.org/10.21070/mid.v4i1.1844>
- Felina, M., & Ariani, L. (2021). Efektifitas Pemberian Seduhan Jahe dengan Jus Jeruk terhadap Mual Muntah pada Ibu Hamil Trimester I. *Prosiding Seminar Kesehatan Perintis E*, 4(2), 2622–2256.
- Fitria, N., Pratiwi, C. S., & Darmayanti, M. S. (2022). *Hyperemesis gravidarum in premarital pregnancy: scoping review*. 3(3), 89–99. <https://doi.org/10.31101/ijhst.v3i3.1981>
- Gaitán, E. S., Red, D. De, Servicios, I. De, & Huetar, D. S. (2021). *Cuerpo Editorial Management of hyperemesis gravidarum according to clinical severity*. 6(7). <https://revistamedicasinergia.com/index.php/rms/article/view/693/1259>
- Harahap, H. P., Oktafirnanda, Y., & Manggabarani, S. (2020). Efektivitas serbuk jahe, aromaterapi lemon, teh daun mint terhadap emesis gravidarum trimester 1. *Jurnal Riset Kebidanan Indonesia*, 4(2), 84–90. <https://doi.org/10.32536/jrki.v4i2.91>
- Hertje Salome Umboh, Mamuaya, T., & S.N.Lumy, F. (2017). Faktor-Faktor Yang Berhubungan Dengan Kejadian Hiperemesis. *Jurnal Ilmiah Bidan*, 2(2), 24–33.
- Hutahaean, S. (2017). *Perawatan Antenatal*. <https://www.ptonline.com/articles/how-to-get-better-mfi-results>
- Jannah, M., Rahmawati, A., & Lestari, D. (2021). Efektivitas Pemberian Aromaterapi Lemon untuk Menurunkan

- Frekuensi Mual & Muntah pada Ibu Hamil Trimester I: Literatur Review The Effectiveness of Giving Lemon Aromatherapy to Reduce the Frequency of Nausea & Vomiting in First Trimester Pregnant Women: *PROMOTIF: Jurnal Kesehatan Masyarakat*, 11(02), 191–195.
- Kia, P. Y., 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>
- Kustriyanti, D., & Putri, A. A. (2019). Ginger and Lemon Aromatherapy To Relieve Nausea and Vomiting in Pregnancy. *Jurnal Keperawatan Soedirman*, 14(1), 15. <https://doi.org/10.20884/1.jks.2019.14.1.868>
- London, V., Grube, S., Sherer, D. M., & Abulafia, O. (2017). Hyperemesis gravidarum: A review of recent literature. *Pharmacology*, 100(3–4), 161–171. <https://doi.org/10.1159/000477853>
- MacGibbon, K. W., Fejzo, M. S., & Mullin, P. M. (2017). Women's Health & Gynecology Mortality Secondary to Hyperemesis Gravidarum: A Case Report. *Women's Health & Gynecology*, 1(2), 1–7.
- Maharani, Susilo, J., & Sari, S. K. S. (2017). Power To Dissolve Ca Oxalate By Lemon Juice (Citrus Lemon) On Variation Of Concentration And Immersion Times. *Seminar Nasional Pendidikan, Sains Dan Teknologi*, 15–19.
- Mcparlin, C., Donnell, O. A., Sc, R., Beyer, F., Moloney, E., Bryant, A., & Bradley, J. (2017). *Muirhead CR , Nelson-Piercy C , Newbury-Birch D , Norman J , Shaw C , Simpson E , Swallow B , Yates L , Vale L . Treatments for Hyperemesis Gravidarum and Nausea and Vomiting in Pregnancy: A Systematic Review . Journal of* 316(April), 1392–1401.
- McParlin, C., O' Donnell, A., Robson, S. C., Beyer, F., Moloney, E., Bryant, A., Bradley, J., Muirhead, C. R., Nelson-Piercy, C., Newbury-Birch, D., Norman, J., Shaw, C., Simpson, E., Swallow, B., Yates, L., & Vale, L. (2018). Treatments for hyperemesis gravidarum and nausea and vomiting in pregnancy: A systematic review. *JAMA - Journal of the American Medical Association*, 316(13), 1392–1401. <https://doi.org/10.1001/jama.2016.14337>
- Melly Damayanti. (2022). Penyuluhan dan Pemanfaatan Jeruk Nipis Madu (JEMU) untuk Mengatasi Emesis Gravidarum. *Jurnal Pengabdian UntukMu NegeRI*, 6(2), 57–64. <https://doi.org/10.37859/jpumri.v6i2.3336>
- Mujayati, N., Ariyani, N. W., Ariyani, N. W., Mauliku, J., & Mauliku, J. (2022). Efektivitas Aromaterapi Lemon Pada Penurunan Derajat Emesis Gravidarum Di Praktek Mandiri Bidan. *Jurnal Ilmiah Kebidanan (The Journal Of Midwifery)*, 10(1), 73–79. <https://doi.org/10.33992/jik.v10i1.1635>
- Mutiah, C. (2020). Perbandingan Efektifitas Pemberian Jeruk Bali (Citrus Grandis) Dan Jeruk Lemon (Citrus Limon) Terhadap Intensitas Mual Dan Muntah Pada Ibu Hamil Di Puskesmas Langsa Kota Tahun 2019. *Journal of Chemical Information and Modeling*, 53(9), 1689–1699. <https://orcid.org/0000-0002-5359-627X>
- Natalist BR Simbolon, M. (2022). Hubungan Antara Gastritis, Stres, Dan Dukungan Suami Dengan Sindrom Hiperemesis Gravidarum Di Pmb M Tahun 2022 Kabupaten Sukabumi Tahun 2022. *SIBATIK JOURNAL: Jurnal Ilmiah Bidang Sosial, Ekonomi, Budaya, Teknologi, Dan Pendidikan*, 1(6), 779–786. <https://doi.org/10.54443/sibatik.v1i6.92>
- Nurhikmah. (2017). *Hubungan Paritas Dan Usia Ibu Dengan Kejadian Hiperemesis Gravidarum Tingkat II Dan III Di Rumah Sakit Bhayangkara Makassar*. 01(02), 1–14.
- Purwandari, A. et al. (2019). Lemon Suangi (Citrus limon) Aromatherapy to Reduce Vomitting on Early First Trimester Pregnancy at Teling Public Health Center Wanea District Manado City. *Parity*, 3(1), 6. <https://ejournal.poltekkes-manado.ac.id/index.php/PMHP2nd/article/view/933>. Diakses 2 Agustus 2021
- Rampersaud, G. C., & Valim, M. F. (2017). 100% citrus juice: Nutritional contribution, dietary benefits, and association with anthropometric measures. In *Critical Reviews in Food Science and Nutrition* (Vol. 57, Issue 1). <https://doi.org/10.1080/10408398.2013.862611>
- Rofi' ah, S., Widatiningsih, S., & Sukini, T. (2019). Efektivitas Aromaterapi Lemon untuk Mengatasi Emesis Gravidarum. *Jurnal Kebidanan*, 9(1), 9–16. <https://doi.org/10.31983/jkb.v9i1.3814>
- Sandven, I., Abdelnoor, M., Nesheim, B., & Melby, K. K. (2019). Helicobacter pylori infection and hyperemesis gravidarum: A systematic review and meta-analysis of case-control. *Acta Obstetricia et Gynecologica Scandinavica*, 88(11), 1190–1200. <https://doi.org/10.3109/00016340903284927>
- SDKI. (2017). *Survei Demografi dan Kesehatan Indonesia*.
- Trovik, J., & Vikanes, Å. (2018). Hyperemesis Gravidarum is associated with substantial economic burden in addition to severe physical and psychological suffering. *Israel Journal of Health Policy Research*, 5(1), 1–5. <https://doi.org/10.1186/s13584-016-0099-y>
- Wijayanti, H., Melasari, I., Gravidarum, E., & Hamil, I. (2017). *Literature Review : Aromaterapi Lemon Efektif*. 52–58.