



Non-Pharmacologic Intervention for Nausea and Vomiting of Pregnancy: Systematic Review

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ABSTRACT

Nausea and vomiting of pregnancy affect almost 75% of pregnant women. In most cases, nausea, which is ended with or without vomiting, is a mild condition. However, the rest could become hyperemesis gravidarum, in which both mother and fetus are in danger. Non-pharmacological therapy is needed as an alternative or complementary treatment when pharmacological therapy causes side effects in some cases of nausea and vomiting. This systematic review aims to identify non-pharmacological therapies to help women deal with nausea and vomiting of pregnancy. Three electronic databases were used to conduct systematic research, namely Pubmed, CINAHL Ebsco, and Proquest between 2004 and 2019. Those studies included in the review were only a randomized controlled trial design. Of the 898 articles, 16 articles met the inclusion criteria and were analyzed. This systematic review provides evidence of non-pharmacological methods that can be used as an alternative to conquer nausea and vomiting of pregnancy, namely ginger, acupressure, acupuncture, and aromatherapy. Further research can examine which method is most effective in dealing with nausea and vomiting of pregnancy.

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ABSTRAK

Mual dan muntah pada kehamilan mempengaruhi hampir 75% wanita hamil. Dalam kebanyakan kasus, mual yang disertai atau tanpa muntah adalah kondisi ringan, namun beberapa kasus dapat berlanjut menjadi hyperemesis gravidarum, yang berakibat buruk bagi ibu dan janin. Mempertimbangkan efek samping terapi farmakologis bagi ibu dan janin, dan tidak cukup mengatasi mual dan muntah dalam kehamilan pada sebagian kasus, sehingga diperlukan terapi non farmakologi sebagai pilihan lain atau terapi tambahan. Sistematis review ini bertujuan untuk mengidentifikasi terapi non farmakologi untuk membantu mengatasi mual dan muntah saat kehamilan. Pencarian sistematis dilakukan pada tiga database, yaitu Pubmed, CINAHL Ebsco dan Proquest dengan rentang waktu antara 2004 dan 2019. Hanya desain penelitian randomised controlled trial yang dimasukkan dalam review. Dari 898 artikel, sebanyak 16 artikel memenuhi kriteria inklusi, kemudian dianalisis. Sistematis review ini menunjukkan bukti yang relevan tentang metode non-farmakologi yang dapat digunakan mengatasi mual dan muntah saat kehamilan, yaitu jahe, akupresur, akupuntur dan aromaterapi. Penelitian lebih lanjut dapat dilakukan untuk mengetahui metode mana yang paling efektif untuk mengatasi mual dan muntah pada kehamilan.

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INTRODUCTION

Pregnancy is a process of growth and development of the intrauterine fetus, starting from conception and ending until labor onset (Durham & Chapman, 2014; Pillitteri, 2010). Pregnancy produces physiological and psychological adaptations in women, involving every body system (Durham & Chapman, 2014). Various changes occur in pregnant women, including nausea and vomiting.

Nausea and vomiting (*emesis gravidarum*) in pregnant women usually occurs in the morning (morning sickness) but can also occur at any time and night (Herrell, 2014; O'Donnell et al., 2016). Nausea and vomiting of pregnancy affect almost 75% of pregnant women. The exact cause is unknown, but hormonal changes are the determining factor (Gabbe et al., 2017). In most cases, nausea with or without vomiting is mild, can be controlled conservatively, and has no adverse fetal sequelae (Herrell, 2014). However, some cases may progress to hyperemesis gravidarum, resulting in fluid and electrolyte imbalances, and sometimes requiring hospitalization (Niebyl, 2010). About 1% of women experience hyperemesis gravidarum, which can have adverse effects on both mother and fetus (Golberg et al., 2007; Herrell, 2014). Thus, appropriate treatment is needed to overcome nausea and vomiting, if it has interfered with the pregnancy process.

As a treatment to relieve symptoms of nausea and vomiting, pharmacotherapy such as antiemetics can be used. However, this therapy is not sufficient to cure pregnant women's mild, moderate, or severe nausea and vomiting. In addition, pharmacological use can cause many physiological changes for the mother, including plasma volume, intestinal motility, glomerular filtration, and impact on the fetus. Many drugs can affect the fetus directly by simple diffusion across the placenta (Skorpen et al., 2016; Viljoen et al., 2014). Other interventions besides pharmacology are needed to treat nausea and vomiting in pregnant women, which have minimal side effects for both mother and fetus. Due to concerns about drugs in early pregnancy, non-pharmacological therapy can be an alternative in helping to deal with nausea and vomiting in pregnant women because they are considered 'natural' and safe or have a lower risk than drugs (Matthews, Dowswell, Haas, Doyle, & O'Mathuna, 2014).

This systematic review aims to identify non-pharmacological interventions to manage nausea and vomiting of pregnancy.

METHOD

To minimize the potential for publication bias, researchers conducted a systematic search by browsing electronic databases, namely Pubmed, CINAHL Ebsco, and Proquest. Researchers conducted a follow-up search on the three databases between 2004 and 2019. The combination of keywords used was "intervention" OR "therapy" OR "treatment" AND "emesis gravidarum" OR "hyperemesis gravidarum" OR "nausea" OR "vomiting" AND "pregnancy" OR "pregnant women" AND "controlled trial" NOT "review". Article search results were found in the Proquest database with 298 articles, Pubmed with 539 articles, and CINAHL Ebsco with 61 articles.

The inclusion criteria used were articles with RCT research, peer-reviewed articles, English. After a review based on irrelevant and duplicate articles (105), 42 articles were obtained that matched the title. Furthermore, the

researchers conducted an analysis based on the inclusion criteria and obtained 16 relevant articles. The selection criteria for articles in this systematic follow the PRISMA guidelines (Liberati et al., 2009; Moher, 2015) (Figure 1).

A comprehensive search conducted on three databases, namely Proquest, CINAHL Ebsco, and Pubmed, found 898 potentially relevant articles for identification. One hundred five articles were excluded after going through duplication screening. Of the remaining 793 articles, 751 were excluded after being screened by title and abstract. Furthermore, of the remaining 42 articles, 26 articles were excluded because they were non-RCT studies (n=5), review articles (n=2), researchers could not access the full text of the articles (n=3) and were pharmacological interventions (n=16).

The sixteen studies included in this review demonstrated minimal risk of bias, as all studies used blinded RCT designs to avoid selection bias during sample selection or intervention allocation.

The instruments used in the research in this review to assess the degree of nausea and vomiting are Pregnancy-Unique Quantification of Emesis and Nausea (PUQE) (n=3), Visual analogue scale (VAS) (n=3), Index of Nausea, Vomiting and Retching (INVR) (n=4), Rhodes index of nausea and vomiting scale (n=3), Semi-structured interview (n=1) (Neri et al., 2005), subjective reports, namely the results of patients and the results of clinical examinations from doctors (n=1) (Habek et al., 2004), primary outcome measure: median length of stay in days (IQR), number of women staying >4 days (n=1) (Heazell et al., 2006).

RESULTS AND DISCUSSION

Study Characteristics

The studies were conducted in several countries, namely Iran (n=7), Thailand (n=3), Malaysia (n=1), Australia (n=1), Croatia (n=1), Italy (n=1), English (n=1), Korean (n=1). The number of study participants included in this review was 1600 participants. The age range of respondents varied from 18 years to 40 years, with a mean gestational age of <20 weeks and only one study used 5-30 weeks of gestation (Shin et al., 2007). Of the total studies, most of which involved pregnant women with complaints of nausea and vomiting in general, only four studies involved pregnant women with hyperemesis gravidarum (Adlan et al., 2017; Habek et al., 2004; Neri et al., 2005; Shin et al., 2007). The characteristics of the research are detailed in table 1.

Intervention Description

The interventions included in this review can be grouped into four interventions and the most commonly found intervention is ginger. Seven studies discuss ginger intervention (Ensiyeh & Sakineh, 2009; Ozgoli et al., 2009; Pongroj paw et al., 2007; Saberi et al., 2014; Sharifzadeh et al., 2017; Smith et al., 2004), two studies on aromatherapy interventions (Joulaeerad et al., 2018; Kia et al., 2014), two studies on acupuncture (Habek et al., 2004; Neri et al., 2005), and five studies on acupressure (Adlan et al., 2017; Heazell et al., 2006; Jamigorn & Phupong, 2007; Puangsricharn & Mahasukhon, 2008; Shin et al., 2007). The various studies in this review reveal mixed results as described below.

Ginger

Three studies have shown that ginger has the same effectiveness as vitamin B6. Research by Sharifzadeh et al. (2017) showed that ginger and vitamin B6 were more effective than placebo ($P=0.039$ and $P=0.007$), but there was no significant difference between the total Rhodes scores in the ginger and vitamin B6 groups ($P=0.128$) (Sharifzadeh et al., 2017). This result is in line with the research of Smith et al. (2004) that ginger has the same effectiveness as vitamin B6 in reducing nausea, vomiting, and retching in pregnant women ($p<0.001$) (Smith et al., 2004). A study by Ensiyeh & Sakineh (2009) also compared ginger with vitamin B, with slightly different results, that ginger was more effective than vitamin B6 for reducing the severity of nausea but equally effective for reducing the number of vomiting episodes in early pregnancy (Ensiyeh & Sakineh, 2009).

Research on the effectiveness of ginger using a placebo conducted by Saberi et al. (2014) found that there was a significant mean difference in the decrease in Rhodes index scores on vomiting, nausea, and vomiting in the three intervention and control groups ($p < 0.001$) (Saberi et al., 2014). A similar study was conducted by Ozgoli et al. (2009) that the intensity of nausea was lighter in the intervention group than in the control group ($p<0.05$) (Ozgoli et al., 2009). Thus, ginger is effective in dealing with nausea and vomiting of pregnancy.

Another study was also conducted by Mohammadbeigi et al., (2011) to assess the effectiveness of ginger and

metoclopramide compared to placebo. The results showed that there was a decrease in Rhodes index scores in the three groups with different intensity changes in the ginger group ($p=0.004$) and the metoclopramide group (0.025) compared to placebo. However, there was no significant decrease between the metoclopramide and ginger groups ($p=0.509$) (Mohammadbeigi et al., 2011). The study did not aim to see the difference between metoclopramide and ginger, so it cannot be said that ginger is less effective than metoclopramide. However, ginger can be used as an alternative to metoclopramide. This study is in line with Pongrojpraw et al. (2007) research that ginger has the same effectiveness as dimenhydrinate in treating nausea and vomiting and has fewer side effects (Pongrojpraw et al., 2007).

Based on the review results, ginger has the same effectiveness as metoclopramide, dimenhydrinate, and vitamin B6. Various studies have shown evidence that ginger has an antiemetic effect that can be used as an alternative option in managing nausea and vomiting of pregnant women. In addition, ginger is also inexpensive and has minimal side effects (Giacosa et al., 2015; Lete & Allue, 2016; Viljoen et al., 2014). This review did not find any side effects of ginger that are bad for pregnant women. Ginger is safe to use to manage nausea and vomiting in pregnant women up to a dose of 1000 mg/day (Ozgoli et al., 2009). Thus, ginger can be used as an alternative non-pharmacological option to help overcome complaints of nausea or vomiting in pregnancy, mild to moderate degrees, with gestational age <20 weeks.

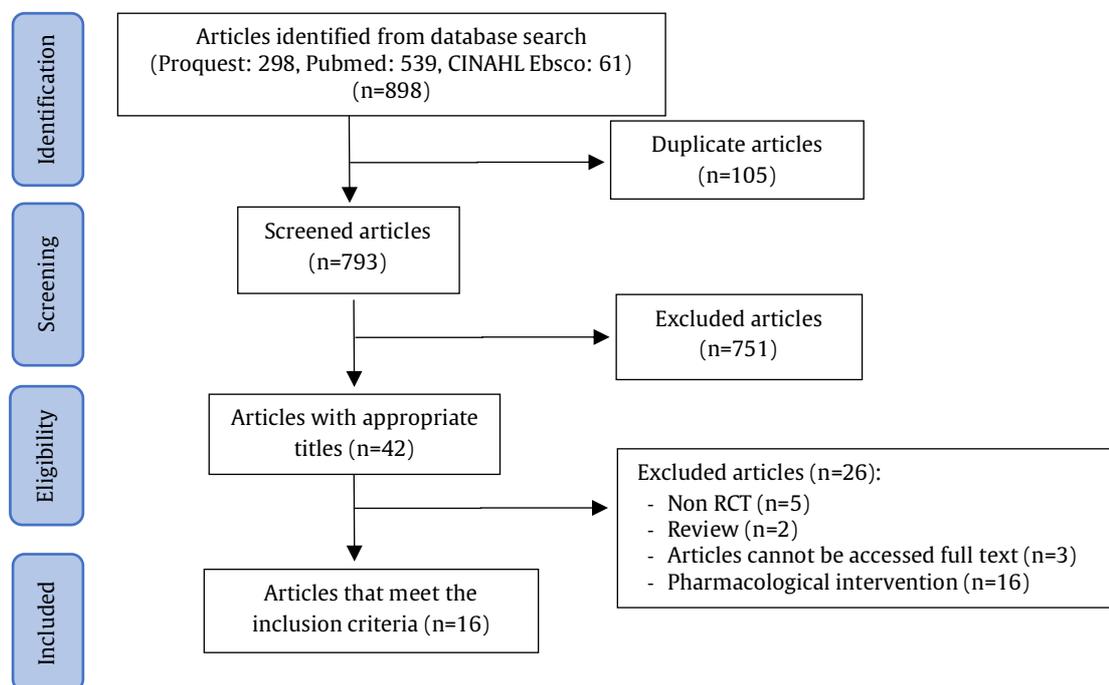


Figure 1: Article selection process

Tabel 1.
Non-pharmacological therapy for nausea and vomiting of pregnancy

No	Author dan Country	Design	Sample	Inclusion criteria	Intervention	Control	Result
1	(Smith et al., 2004) Australia	RCT	291	Pregnant woman with nausea and vomiting, gestational age 8-16 weeks.	350 mg ginger capsules three times a day, for three weeks.	Vitamin B6 capsules 25 mg.	Ginger has the same effectiveness as vitamin B6 in reducing nausea, vomiting and retching in pregnant women ($p < 0.001$).
2	(Habek et al., 2004) Kroasia	RCT	36	Primigravida woman with hyperemesis gravidarum.	- Group 1: Bilateral manual acupuncture at point Pc 6. - Group 2: bilateral acupressure at point Pc 6. - The intervention was carried out 30 minutes/day, for seven days.	Group 1: Superficial intracutaneous acupuncture placebo Group 2: Placebo acupressure	Acupuncture ($p < 0.0001$) and acupressure ($p < 0.01$) were effective as non-pharmacological methods in treating hyperemesis gravidarum.
3	(Neri et al., 2005) Italia	RCT	88	Pregnant women with gestational age <12 weeks, singleton pregnancy, have a diagnosis of hyperemesis gravidarum with criteria for nausea and vomiting accompanied by dehydration and weight loss >5%.	The needle was inserted at the point C6 Neiguan, conception vessel 12 (CV12 Zhongwan), stomach 36 (ST36 Zusanli), followed by the use of seaband for 6-8 hours/day at the PC6 point.	20 mg/500 mL normal saline and B12 complex 30 mg/day at home.	Both treatments can reduce episodes of nausea and vomiting in pregnant women. The effects of acupuncture appear to be more progressive, which increases at the end of treatment. In contrast, the pharmacological approach has a rapid effect on the responders and remains stable later.
4	(Heazell et al., 2006) Inggris	RCT	80	Pregnant women with complaints of nausea and vomiting at the first hospitalization, gestational age between 5-14 weeks, do not have digestive system problems, do not know about acupressure.	Wristband (sea-band) is placed at P6 point, 8 hours per day (9:00-17:00).	Placebo beads were placed on the back of the arm.	There were no differences between the length of stay, amount of medication, or fluids needed between the acupressure and placebo groups, although acupressure reduced the number of patients staying four nights in the hospital. Acupressure is well tolerated and is not associated with increased perinatal morbidity or mortality.
5	(Pongrojapaw et al., 2007) Thailand	RCT	170	Pregnant women with gestational age <16 weeks experience nausea and vomiting.	Capsules containing 0.5 g of powdered ginger, as much as two capsules a day, for 1 week	The capsule contains 50 mg of dimenhydrinate.	The mean score of vomiting after days 3 to 7 of treatment in the two groups was not significantly different ($p > 0.05$). Ginger is as effective as dimenhydrinate in treating nausea and vomiting and has fewer side effects.
6	(Jamigorn & Phupong, 2007) Thailand	RCT	66	Pregnant women with singleton pregnancies, the degree of nausea/vomiting from mild to moderate, gestational age 6-12 weeks, aged 20-35 years.	Wristband (sea-band) which puts pressure on the Nei-guan point 24 hours/day, for five days.	Vitamin B6 50 mg.	There was a significant reduction in nausea, vomiting, and retching between acupressure ($p < 0.001$) and vitamin B6 ($p < 0.001$). Using the sea-band 24 hours per day for five days can reduce nausea and vomiting.

7	(Shin et al., 2007) Korea	RCT	66	Pregnant women aged 20-40 years diagnosed with hyperemesis gravidarum, gestational age 5-30 weeks, receiving only conventional IV fluid therapy, had no other pregnancy complications.	Thumb pressure on the Nei-guan point for 7 seconds with 2 second breaks, 3 times a day, for four days. Each session lasts 10 minutes.	Placebo: thumb pressure on the wrist around the radial pulse. Control: IV fluid therapy	The Nei-guan acupressure group (P6) had a significantly lower degree of nausea and vomiting than the placebo and control groups (F= 12.28; p<0.001). The level of ketonuria in the Nei-guan acupressure group (P6) was significantly lower than the placebo and control groups (F= 73.35; P≤0.001). Nei-guan (P6) acupressure intervention can reduce the degree of nausea/vomiting and the level of ketonuria in pregnant women with hyperemesis gravidarum.
8	(Puangsricharern & Mahasukhon, 2008) Bangkok, Thailand	RCT	91	Pregnant women with symptoms of nausea and vomiting, gestational age 14 weeks, perform routine physical examinations and ultrasound in the absence of multiple or molar pregnancies.	Magnetic pellets (round magnetic balls) with a diameter of 1 mm were pressed for 30 seconds 4 times per day, for six days.	Standard treatment with anti-emetic drugs.	There was no significant difference in the value of the Rhodes index between the intervention group and the control group. Auricular acupressure may not relieve nausea and vomiting in early pregnancy but further clinical research is needed to confirm its effectiveness.
9	(Ensiyeh & Sakineh, 2009) Iran	RCT	70	Pregnant women who visited the clinic for the first time, gestational age 17 weeks, experienced nausea with or without vomiting.	1 g ginger extract/day as much as 2 capsules (500 mg/capsule) for four days.	40 mg vitamin B6/day.	Ginger is more effective than vitamin B6 in reducing the severity of nausea, but is equally effective in reducing the number of vomiting episodes in early pregnancy.
10	(Ozgoali et al., 2009) Iran	RCT	70	Pregnant women with mild to moderate nausea, with or without vomiting; gestational age <20 weeks; have no medical or surgical history; had no history of smoking or drug use.	Capsules contain 250 mg of ginger powder, 4 capsules per day, for four days.	Placebo capsule (250 mg lactose).	The intensity of nausea was lighter in the intervention than in the control group (p<0.05). 1000 mg of ginger per day is safe for repeated use to manage nausea or vomiting of pregnancy.
11	(Mohammadbeigi et al., 2011) Iran	RCT	102	Pregnant women with singleton pregnancies and inefficient in controlling nausea and vomiting.	200 mg ginger extract, 3 times per day	- Metoclopramide: 10 mg of metoclopramide. - Placebo: 200 mg of medicinal flour.	Rhodes index scores decreased in the three groups with different intensity changes in the ginger group (p=0.004) and metoclopramide group (0.025) compared to placebo. It was not significant between the ginger group and the metoclopramide group (p=0.509).
12	(Saberi et al., 2014) Kashan, Iran	RCT	120	Pregnant women who experience mild to moderate nausea and vomiting, <16 weeks of gestation, singleton pregnancy, can read and write, have a digestive disease, have not taken anti-vomiting drugs in the last three weeks, domiciled in Kashan.	Capsules contain 250 mg of ginger powder, three capsules per day for four days.	Plasebo capsule (250 mg lactose).	There was a significant mean difference in the reduction in Rhodes index scores on vomiting, nausea and retching in the three groups (p<0.001). Ginger is a non-pharmacological intervention that can be used to reduce NVP with mild to moderate degrees with gestational age <16 weeks.

13	(Kia et al., 2014) Iran	RCT	100	Pregnant women with mild to moderate nausea, with or without vomiting; gestational age 6-16 weeks; singleton pregnancy without threat of abortion or other diseases that have symptoms of nausea and vomiting; Have not used anti-emetic drugs in the last 24 hours.	Ten ccs of lemon oil for four days	Placebo (10 ccs of almond oil combined with the color of the carrots).	The decrease in the mean score for nausea and vomiting in the five intervals was significant in both groups, but the reduction in the intervention group was more significant than in the control group.
14	(Sharifzadeh et al., 2017) Iran	RCT	77	Women with a gestational age of 6-16 weeks; aged 20-35 years; have a mild to moderate degree of nausea or vomiting, without requiring hospitalization; single pregnancy with healthy fetus; do not have digestive system disorders; literacy; do not have allergies or hypersensitivity to herbal medicines.	Ginger capsules 500 mg, 2 capsules per day, for four days.	Vitamin B6 capsule(40 mg). Placebo capsule.	Ginger and vitamin B6 were more effective than placebo (P=0.039 and P=0.007), but there was no significant difference between the ginger and vitamin B6 groups (P=0.128). Ginger was more effective than placebo in treating mild to moderate NPV and was comparable to vitamin B6.
15	(Adlan et al., 2017) Malaysia	RCT	120	Pregnant women with singleton pregnancies, 5-14 weeks' gestation with moderate to severe hyperemesis gravidarum, requiring hospitalization.	Respondents wear <i>Normal wristband</i> acupressure wristband (Neiguan point) within 12 hours per day for three days.		Using an acupressure wristband at the Neiguan point, 12 hours per day for three days in patients treated with hyperemesis gravidarum, reduced nausea, vomiting and retching, ketonuria, and significantly shortened hospital stays.
16	(Joulaeerad et al., 2018) Iran	RCT	65	18-35 years old, domiciled in Iran, can read and write, mild to moderate level of nausea and vomiting with a score of 3-12 based on the PUQE questionnaire, 6-20 weeks gestation, has an ultrasound record of the number and health of the fetus, planned pregnancy, lack of olfactory problems according to individual, single pregnancy and no pregnancy complications, no previous medical history, no smoking and alcohol consumption, not sensitive to herbal medicine, not using medical or herbal anti-emetics in the last 24 hours, no mental health problems during the past 24 hours last six months.	10% peppermint essential oil in 1 bottle of dark yellow oil equal volume, for four days.	Plasebo: 10% almond	The severity of nausea and vomiting in both groups decreased significantly (p<0.001). However, there was no significant difference between the severity of nausea and vomiting in the intervention group and the control group. Inhaled aromatherapy with peppermint oil is safe to use to manage mild to moderate nausea or vomiting. Aromatherapy is easy to access and apply anytime and anywhere because it does not require specific equipment.

Acupressure

Research by Jamigorn & Phupong (2007) showed that there was a significant reduction in nausea, vomiting or retching between vitamin B6 ($p < 0.001$) and acupressure ($p < 0.001$) (Jamigorn & Phupong, 2007). Wearing a wristband (sea-band) for 24 hours per day, for five days can reduce nausea and vomiting. Only one patient complained about the resulting effect of using the sea-band. The results of research by Habek et al. (2004) also showed the effectiveness of acupressure as a non-pharmacological method in treating hyperemesis gravidarum ($p < 0.01$) (Habek et al., 2004). Both studies show that acupressure can be used non-pharmacological to reduce nausea and vomiting in pregnant women, mild to moderate degrees or hyperemesis gravidarum.

Prolonged nausea and vomiting can produce ketonuria, so the study of Shin et al., (2007) added ketonuria as one of the variables measured. The results showed that the Nei-guan acupressure group (P6) had a significantly lower degree of nausea and vomiting than the placebo and control groups ($F = 12.28$; $p < 0.001$) (Shin et al., 2007). In addition, the level of ketonuria in the Nei-guan acupressure group (P6) was also significantly lower than the placebo and control groups ($F = 73.35$; $P < 0.001$). A similar study was conducted by Adlan et al., (2017), that the use of acupressure wristband at the Nei-guan point, within 12 hours per day for 3 days in patients treated with hyperemesis gravidarum, can reduce nausea, vomiting and retching, ketonuria, and significantly shorter hospital stay (Adlan et al., 2017). The results also showed that respondents in both groups felt the same satisfaction. Both studies showed that Nei-guan (P6) acupressure intervention could reduce the degree of nausea/vomiting and reduce the level of ketonuria in pregnant women with hyperemesis gravidarum, with gestational age 30 weeks.

Two other studies showed different results from the four previous studies. The study of Heazell et al. (2006) showed no difference between the length of stay, amount of medication, or fluids required between the acupressure and placebo groups. However, acupressure reduced the number of patients staying four nights in the hospital (Heazell et al., 2006). However, acupressure was well tolerated and was not associated with increased perinatal morbidity or mortality. This study is in line with the research of Puangsrucharern & Mahasukhon (2008), which showed the same results, that there was no significant difference in the value of the Rhodes index between the intervention group and the control group. Auricular acupressure may not relieve nausea and vomiting in early pregnancy, but more clinical research is needed to confirm its effectiveness (Puangsrucharern & Mahasukhon, 2008). Although the results of two studies showed that acupressure did not significantly affect nausea and vomiting of pregnancy, acupressure was well tolerated, as it was not associated with increased perinatal morbidity or mortality.

Acupressure duration in this review ranging from 2 minutes to 12 hours a day, with the duration of application of the intervention ranged from three to seven days. The acupressure technique used in the review consists of several types, namely acupressure with a wristband (sea-band) and finger pressure at P6 or Pc6 points, acupressure at auricular points using magnetic pellets. Consistency in the application of each technique is necessary for effective results. In addition to consistency, the relationship between the provider and the patient can also affect the results.

Previous review studies have shown that acupressure is a non-invasive method and can be used as an adjunct therapy in treating individuals with various symptoms, one of which

is to manage nausea and vomiting in pregnant women (Lee & Frazier, 2011). This review adds to the evidence that acupressure techniques can be considered non-pharmacological therapy to manage nausea and vomiting of pregnancy.

Acupuncture

The results of the literature search found two studies on acupuncture interventions. The study of Neri et al., (2005) who conducted a study on 88 pregnant women with hyperemesis gravidarum showed that treatment in the intervention and control groups could reduce episodes of nausea and vomiting in pregnant women (Neri et al., 2005). The effects of acupuncture appear to be more progressive, which increases at the end of treatment. In contrast, the pharmacological approach has a rapid effect on the responders and remains stable later. This study is in line with the research of Habek et al. (2004), that acupuncture intervention carried out at the PC6 point, which was carried out 30 minutes/day, for seven days, was adequate for overcoming complaints of nausea and vomiting in pregnant women with hyperemesis gravidarum (Habek et al., 2004). Both studies showed the effectiveness of acupuncture, so it can be considered an alternative option outside of pharmacological methods to manage nausea and vomiting of pregnancy.

Aromatherapy

There were two studies on aromatherapy intervention that used a placebo as a comparison of the intervention. Research by Kia et al., (2014) showed that the decrease in the mean score for nausea and vomiting in the five intervals was significant in both groups. However, the reduction in the intervention group was more significant than in the control group (Kia et al., 2014). There was a significant difference in satisfaction with the care provided with 50% and 34% in each group (intervention and control group).

The results of different studies were shown by the study of Joulaeerad et al., (2018), that there was a significant decrease in the severity of nausea and vomiting in the two groups ($p < 0.001$), but there was no significant difference between the severity of nausea and vomiting in the intervention group and the intervention group. control (Joulaeerad et al., 2018). However, aromatherapy can be used as an alternative to treat mild to moderate nausea and vomiting. In addition, aromatherapy is easy to access and apply anytime and anywhere because it does not require specific equipment. Thus, aromatherapy can be considered an option or additional therapy to treat nausea and vomiting of pregnancy.

LIMITATION OF THE STUDY

This systematic review does not explicitly address the side effects of each intervention. In addition, this review only identifies interventions or non-pharmacological methods that can be used as options or adjunct therapy to treat nausea and vomiting of pregnancy.

CONCLUSIONS AND RECOMMENDATIONS

Nausea and vomiting of pregnancy are physiological but can affect the condition of a pregnant woman's body. Based

on the review results, several non-pharmacological methods were found that can be used as options or additional therapy to help overcome nausea and vomiting of pregnancy, including ginger, acupressure, acupuncture, and aromatherapy. The review results found that several studies did not show a significant difference between the intervention and the comparison, that both can reduce nausea and vomiting of pregnancy. However, more significant reductions were seen in the intervention group in each study. Thus, the four interventions can be considered options or adjunct therapy to help with nausea and vomiting of pregnancy.

Further research can be conducted to determine the most effective non-pharmacological intervention or method to treat nausea and vomiting of pregnancy.

Conflict of Interest Statement

The author declared no conflicts of interest in the connection concerning this article's research and publication.

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