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Experimental study to assess the effectiveness of moxibustion on nausea and vomiting in pregnancy

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ABSTRACT

***Background**: Nausea and vomiting are common symptoms in pregnancy caused by hormonal changes. Although physiological, if not properly managed, these symptoms can lead to nutritional disturbances, dehydration, electrolyte imbalances, and hyperemesis gravidarum. Proper management is essential to alleviate nausea and vomiting and prevent pregnancy complications. Non-pharmacological methods are preferred to manage nausea and vomiting in pregnancy due to their lack of side effects.*
***Objectives**: This study aims to assess the impact of moxibustion on the P6 (Neiguan) and ST36 (Zusanli) acupoints on the incidence of nausea and vomiting during pregnancy. Moxibustion is known for its effectiveness in stimulating Qi at specific points that may be difficult to access through acupressure alone, thus improving the body's energy balancing process. The intervention is intended to improve pregnancy health outcomes.*
***Methods**: This study uses a quasi-experimental design with a pretest-posttest one-group framework to evaluate the effectiveness of moxibustion on nausea and vomiting during the first trimester of pregnancy. The participants consisted of 30 pregnant women selected using quota sampling based on inclusion criteria at selected independent midwifery practices. The instrument used was the Pregnancy Unique Quantification of Emesis (PUQE) to assess the intensity of nausea and vomiting in the respondents.*
***Results**: The results show a significant difference in the incidence of nausea and vomiting in the first trimester before and after moxibustion treatment ($p < 0.05$).*
***Conclusions**: Therefore, it can be concluded that moxibustion is beneficial in reducing nausea and vomiting symptoms during the early stages of pregnancy.*

KEYWORD*: nausea in pregnancy; vomiting; moxibustion*

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INTRODUCTION

Complications during pregnancy and childbirth are globally the leading causes of death among women aged 15 to 19 years. Teenage mothers aged 10-19 years have a higher risk of eclampsia, postpartum endometritis, and systemic infections compared to women aged 20-24 years. Additionally, babies born to teenage mothers have an increased risk of low birth weight, preterm birth, and various congenital defects (1) Every year, approximately 5.6 million abortions are performed on teenage girls, with 3.9 million of these classified as unsafe abortions, contributing to higher maternal mortality, morbidity, and other health consequences (2) Therefore, it is crucial to reduce harmful risk factors that affect fetal growth and development before conception.

Nausea and vomiting in pregnancy are common symptoms that affect up to 70% of pregnant women. Hyperemesis gravidarum is a serious condition that can occur if nausea and vomiting are not managed appropriately. Hyperemesis can affect 0.3-10.8% of pregnant women, potentially causing various adverse effects on the mother, fetus, and offspring (3). If left untreated, this condition can have detrimental effects on both the mother and the fetus. Management of nausea and vomiting during pregnancy depends on the mother's condition. The treatments may include pharmacological and non-pharmacological interventions. Pharmacological therapy involves the use of anti-nausea medications, antihistamines, and corticosteroids, while non-pharmacological therapies are implemented through various methods. The advantage of non-pharmacological therapies is that they minimize the effects on the fetus (4).

The use of high doses or long-term pyridoxine (vitamin B6) can cause peripheral neuropathy, characterized by symptoms such as tingling, numbness, and sensory disturbances. This risk is important to consider when using pharmacological therapies during pregnancy, especially when weighing the benefits and potential long-term side effects. Administering several complementary therapies is far more beneficial than prescribing medications, as some drugs have been shown to increase the risk of birth defects. Several complementary therapies have proven to be effective and safe non pharmacological interventions for reducing symptoms of nausea and vomiting during pregnancy (5, 6) According to some studies, the use of antihistamines such as promethazine to manage nausea and vomiting has been shown to be effective but may also cause negative side effects, such as drowsiness, dry mouth, and extrapyramidal symptoms due to interactions with the neurotransmitter system (7). In contrast, complementary therapies such as acupressure, acupuncture, and moxibustion have shown significant results in reducing nausea and vomiting symptoms without causing pharmacological side effects, as well as improving health (8).

Moxibustion therapy is a treatment and healthcare method originating from China.

This therapy involves stimulating acupuncture meridians and points with heat to regulate the immune system and enhance immunity (9). Moxibustion is a form of heat therapy using dried mugwort, which is burned at acupoints and meridians of the body. Moxa is believed to stimulate the flow of Qi and Blood, which is thought to enhance healing and restore balance within the body. Moxibustion therapy in early pregnancy is useful for treating nausea and vomiting (10, 11).

Several studies have shown that moxibustion can help with nausea and vomiting during pregnancy, however many of these studies have problems with their research design, small sample sizes, and not being able to control outside factors that could affect the results. Also, previous studies have mostly looked at stimulating just one acupuncture point. They haven't looked at the possible synergistic effects of combining P6 (Neiguan) and ST36 (Zusanli), which are thought to work on different physiological mechanisms that cause gastrointestinal discomfort.

There is also a theoretical limitation, lacks studies that compare moxibustion to other non-pharmacological interventions, especially in the setting of Indonesian maternal health care, which is affected by cultural differences and different levels of access to services. So, the goal of this study is to employ a pretest-posttest one-group experimental design to find out how well moxibustion therapy administered to the P6 and ST36 acupuncture points works to lower the number and intensity of nausea and vomiting during the first trimester of pregnancy.

MATERIALS AND METHODS

This prospective investigation endured eight months and directly helped women who were pregnant in their first trimester. This study was experimental and had one group that took a test before and after. Before the moxibustion therapy, a pretest was given. After the intervention was over, a posttest was done. The study took place at the chosen Independent Midwife Practice in Padang City, West Sumatra, Indonesia. The study's population was made up of all pregnant women in their first trimester who went to the Independent Midwife Practice in Padang City. Using quota sampling, thirty people were chosen to answer the survey. This study's inclusion criteria are: willing to be a respondent and follow the research procedures; fewer than 16 weeks pregnant; and having nausea and vomiting.

The exclusion criteria included women who had taken anti-nausea medications in the past week, had a history of gastritis, had pregnancy complications (hypertension, kidney disorders, anemia), or had injuries or wounds at the acupressure points P6 and ST36. Data were collected through the intervention of moxibustion therapy, following the standard operating procedure (SOP) using a material called moxa. Moxa is made from dried leaves of the plant Artemisia vulgaris, which are ground into powder or

shaped into sticks. Moxibustion was applied to the P6 and ST36 acupoints, with a duration of 5 minutes per day for two consecutive days. Moxibustion was performed using a stick-on moxa device, with one application per day. A second intervention was given 24 hours after the first intervention. Evaluation was carried out on the second day with a posttest.

The data collection instrument in this study was a questionnaire. The research instrument used was the Pregnancy Unique-Quantification of Emesis (PUQE) questionnaire to assess the severity of nausea and vomiting of respondents.10 PUQE score criteria are: the data collection instrument used in this study was the Pregnancy Unique Quantification of Emesis (PUQE) to assess the severity of nausea and vomiting in the respondents. The PUQE score criteria were mild nausea and vomiting (score ≤6), moderate nausea and vomiting (score 7-12), and severe nausea and vomiting (score ≥13) (12).

The data collected in this study were analyzed with numerical data using the mean, median, and standard deviation values. Normality test was conducted to determine whether the data was normally distributed or not. Analysis was performed with a dependent Paired T-test if normally distributed. If the data is not normally distributed, then the Wilcoxon analysis test is performed. The approach employed to evaluate the hypothesis involves comparing the mean data before and after treatment to ascertain the efficacy of moxibustion therapy in alleviating nausea and vomiting symptoms during pregnancy.

In this study, data were analyzed using mean values, median, and standard deviation to describe the characteristics of the data. We got a normality test to see how the data was spread out. We employed a paired t-test if the data were normally distributed; otherwise, we used the Wilcoxon signed-rank test. The goal of this analysis was to find out how well moxibustion therapy worked to ease nausea and vomiting in the first several months of pregnancy. The Faculty of Medicine's Research Ethics Committee at Andalas University provided ethical approval before the research occurred. As part of the application procedure, people had to send in a thorough research plan, informed consent forms, and intervention protocols for approval. The study obtained approved to ethical clearance letter number 479/UN.16.2/KEP-FK/2024, which means it met the ethical requirements for human subject research set by the government and the institution. All of the participants who took part were given written information on the study's goals, methods, benefits, and any hazards. Each respondent was given their written approval.

RESULTS AND DISCUSSION

RESULTS

Data collection was carried out from June 18, 2024, to October 28, 2024, at the Halimatun Sa'diah Independent Midwife Practice and Kurao Clinic. These locations

were selected due to their experience and standardized maternal care service quality.

Respondent selection was based on the inclusion and exclusion criteria. The first intervention was administered to 35 respondents, with 5 respondents not continuing to the second intervention due to physical limitations. The first and second interventions were separated by a 1-day interval. Data collection was performed door-to-door at the respondents' addresses. The respondent characteristics were as follows:

Table 1. Respondent characteristics

Characteristic	f	%
Age		
≤ 35 years	26	86.7
>35 years	4	13.3
Education Level		
Low	4	13.3
High	15	50
Medium	11	36.7
Work Status		
Not working	22	73.3
Working	8	26.7
	30	100

Based on **Table 1** characteristics respondents based on age, the highest frequency is less than 35 years. The table above shows that most respondents were over 35 years old, had a high level of education, and were not employed. Data were collected before and after the moxibustion therapy intervention. The data were described using the mean, median, and standard deviation.

The **Table 2** shows an increase in the mean score from 2.50 to 2.93, with a lower standard deviation in the posttest. This indicates that moxibustion therapy not only improved the respondents' scores but also resulted in a more homogeneous data distribution.

Table 2. Statistical test results before and after treatment

Result	Pretest	Posttest
Mean	2.5	2.9333
Median	3	3
Deviation Standard	0.57235	0.25371

Table 3. Nausea and vomiting categories before and after treatment

Categories	Pretest	Posttest
Severe	3.3	0
Moderate	43.3	6.7
Mild	53.3	93.3

Based on **Table 3** data shows a significant decrease in severe and moderate nausea and vomiting categories and a high increase in the mild category. This reflects the success of moxibustion therapy in reducing the severity of nausea and vomiting. A normality test was performed to determine if the data followed a normal distribution. The data from the pretest and posttest were analyzed using the Kolmogorov-Smirnov method. The evaluation of normality was carried out by comparing the findings with a significance level of 5% or 0.05. Since the p-value was < 0.05 for both groups, the data were not normally distributed. Therefore, the non-parametric Wilcoxon Signed Rank Test was used for further analysis.

Table 4. Wilcoxon signed rank test

		N	Mean Rank	Sum of Ranks
Posttest result-Pretest result	Negative Ranks	0[a]	0	0
	Positive Ranks	13[b]	7	91
	Ties	13[b]		
	Total	30		

a.Posttest result<pretest result
b.Posttest result>pretest result
c.Posttest result=pretest result

The Wilcoxon statistical test was used to evaluate the pretest and posttest data, considering the non-normal distribution of the data. This assessment aimed to determine whether the difference between the pretest and posttest results was statistically significant.

From **Table 4**, 13 respondents showed improvement, while 17 remained stable. No respondents showed a decline after the intervention.

Table 5. Statistical significance

	Posttest-Pretest
Z	-3.606[b]
Asymp. Sig. (2-tailed)	0.000

a.Wilcoxon Signed Ranks Test
b.Based on negative ranks.

The p-value of 0.000 (< 0.05) indicates that there is a significant difference between the pretest and posttest results. Therefore, it can be concluded that moxibustion therapy is statistically effective in reducing nausea and vomiting symptoms during pregnancy.

DISCUSSION

The results of this study indicate that moxibustion therapy significantly reduces the intensity of nausea and vomiting during pregnancy. Administering moxibustion twice over two days at the combination points P6 and ST36 proved effective in alleviating symptoms of nausea and vomiting. A study by Hu et al. found that moxibustion is effective in reducing pregnancy-related nausea and vomiting, particularly when applied at precise acupuncture points. Moxibustion utilizes heat from burning moxa (Artemisia vulgaris) to stimulate blood circulation, warm the meridians, and regulate the balance of Qi in the body, which is believed to play an essential role in relieving gastrointestinal complaints (10).

Based on **Table 1**, the majority of respondents were unemployed (73.3%), under 35 years old (86.7%), and highly educated (50%). These demographic traits point to a population that might profit from easily accessible, non-pharmacological treatments like moxibustion. This is consistent with earlier studies showing that work status and educational attainment may affect people's willingness to seek medical attention and their receptivity to conventional therapies.

Other pharmacological studies have demonstrated that active compounds in moxa, such as flavonoids, cineole, and borneol, possess anti-inflammatory properties and exert calming effects on the nervous system (13). The use of moxibustion may eliminate the need for antihistamines, which often cause drowsiness or extrapyramidal symptoms. This mechanism is seen as one of the therapeutic advantages of moxibustion, offering benefits without side effects (7).

Based on **Table 3**, there was a significant reduction in the percentage of respondents experiencing severe (from 3.3% to 0%) and moderate (from 43.3% to 6.7%) nausea and vomiting. Conversely, there was a marked increase in the proportion of respondents reporting only mild symptoms, from 53.3% to 93.3%. This reflects the success of moxibustion therapy in reducing the severity of symptoms.

These findings are consistent with previous studies that stimulation at acupuncture points such as P6 (Neiguan) and ST36 (Zusanli) can help relieve symptoms of nausea. Earlier research on moxibustion at P6 and ST36 has shown positive outcomes, particularly in treating nausea, improving digestion, and boosting vitality. Moxibustion can serve as a safe and effective non-pharmacological alternative for gastrointestinal discomfort in pregnant women (10,14).

Hu et al. (2024) demonstrated that moxibustion significantly reduces both the frequency and severity of nausea and vomiting during pregnancy without causing serious side effects (10). Lu et al. (2021) also reported similar effectiveness in the context of hyperemesis gravidarum a severe form of nausea more intense than typical morning sickness (15). A study by Raihanah et al. (2020) found that applying moxibustion at the P6 point was more effective than at ST36 in reducing both the frequency and duration of nausea and vomiting episodes (14). Compared to acupressure and acupuncture, moxibustion has the advantages of comfort and ease of home application. Tara et al. (2020) reported that while acupressure was also effective in reducing nausea intensity, patients responded more favorably to the warmth of moxibustion than to pressure stimuli (16).

The P6 point is located approximately 2 to 3 finger widths above the wrist crease, between the two main tendons of the forearm. It is associated with the pericardium meridian and is traditionally used to treat gastric disturbances such as nausea, vomiting, reflux, and emotional disorders like anxiety. Physiologically, stimulation at P6 is believed to affect the autonomic nervous system by decreasing sympathetic activity and enhancing parasympathetic activity, which leads to improved gastrointestinal motility and a reduction in nausea sensation (17). Functional magnetic resonance imaging (fMRI) studies have also shown that stimulation of this point influences brain regions involved in nausea control, such as the insula, cerebellum, and amygdala (18).

The ST36 point, located laterally below the kneecap, is known as a vital point for boosting energy and regulating stomach function. ST36 has a tonic effect on Qi, improves blood circulation, and enhances immune function. From a neurophysiological perspective, stimulation of ST36 has been shown to trigger the release of natural neurotransmitters such as beta-endorphins, serotonin, and enkephalins, which help reduce discomfort including nausea (19). The combination of P6 and ST36 is thought to produce a stronger therapeutic effect due to their complementary mechanisms. P6 addresses the neurological and psycho-emotional aspects of nausea, such as anxiety, stress, and vagal nerve imbalance. While ST36 supports digestive function and boosts bodily energy, aiding recovery and reducing symptom severity.

Other studies suggest that the combination of these two points may have a synergistic effect in modulating signals between the brain and the stomach, improving blood flow, and enhancing bowel motility (15, 20). The present study demonstrates that the combination of P6 and ST36 targets not only the symptoms but also the physiological roots of nausea and vomiting, which involve complex interactions among the central nervous system, hormonal regulation, and the gastrointestinal tract.

Compared to acupressure and acupuncture, moxibustion has distinct advantages in terms of comfort, accessibility, and minimal side effects. Moxibustion is non-invasive, can be applied at home, and provides a warming sensation that contributes to emotional comfort in pregnant women. The warmth from moxibustion is often preferred over the pressure applied during acupressure, particularly regarding patient satisfaction and feelings of relaxation (21).

Moxibustion also offers a solution to the limitations of pharmacotherapy, as many antiemetic drugs such as antihistamines or dopamine antagonists may cause sedation, extrapyramidal symptoms, or even pose risks to the fetus if used long term (22). In this context, moxibustion emerges as a safe option that can be integrated into complementary prenatal care protocols. Educating pregnant women about the methods, timing, and duration of moxibustion therapy could serve as a promotive-preventive community-based intervention program.

CONCLUSION AND RECOMMENDATION

This study demonstrates that moxibustion therapy at acupuncture points P6 (Neiguan) and ST36 (Zusanli) is effective in reducing nausea and vomiting during the first trimester of pregnancy. The P6 point exerts a stronger effect in alleviating nausea and vomiting by regulating gastric Qi and calming the parasympathetic nervous system, while the ST36 point plays a role in improving digestive function, enhancing energy, and supporting overall gastrointestinal health. The synergy between these two points strengthens the therapeutic effect, making

moxibustion a viable and safe alternative to pharmacological interventions. This therapy appears to be most effective in pregnant women who are unemployed and over the age of 35, possibly due to lower stress levels and greater attention to health. Further research is needed to explore the effectiveness of moxibustion in more severe cases, such as hyperemesis gravidarum, and to determine the optimal frequency and duration of treatment.

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