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Effect of PC6 Nei Guan and ST36 Zu San Li Acupressure on Nausea and Vomiting Frequency in Pregnancy

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Abstract

Nausea and vomiting of pregnancy (NVP) are common complaints caused by increased levels of hCG and estrogen hormones, which may lead to dehydration, nutritional disturbances, stress, and decreased quality of life. Acupressure at the PC6 and ST36 points is a non-pharmacological therapy that has the potential to reduce these symptoms. This study aimed to analyze the effect of PC6 and ST36 acupressure on the frequency of nausea and vomiting among first- and second-trimester pregnant women. This study employed a pre-experimental design with a one-group pretest-posttest approach. The population consisted of 30 pregnant women at Sukorame Public Health Center, Kediri City, and 28 samples were obtained using a consecutive sampling technique. The frequency of nausea and vomiting was measured using the Pregnancy-Unique Quantification of Emesis and Nausea (PUQE) instrument and analyzed using the Wilcoxon Signed Rank Test. The results showed a significant decrease in nausea and vomiting scores after the intervention, with an Asymp. Sig. (2-tailed) value of (0.000) < α (0.05). After the intervention, most respondents were in the mild category, totaling 19 respondents (67.9%). It can be concluded that acupressure at the PC6 and ST36 points was effective in reducing nausea and vomiting during pregnancy.

Keywords: Acupressure; Nausea; Vomiting; PC6; ST36; PUQE.

1. INTRODUCTION

Pregnancy is a physiological condition that begins with fertilization and implantation of the zygote in the uterine wall, followed by embryonic and fetal development until childbirth. During pregnancy, women experience substantial anatomical, hormonal, metabolic, and psychological adaptations. Although these changes are part of normal maternal adaptation, they may cause several discomforts, particularly during the first and second trimesters.

Nausea and vomiting of pregnancy (NVP) is one of the most frequent complaints during early pregnancy. Symptoms commonly begin at 6–8 weeks of gestation, peak around 9–12 weeks, and usually improve by 16–20 weeks. NVP has been associated with hormonal and neuroendocrine changes, including human chorionic gonadotropin, estrogen, progesterone, gastrointestinal dysmotility, and emerging evidence on growth differentiation factor 15 (GDF15). Most cases are mild to moderate; however, some women develop hyperemesis gravidarum (HG), the severe end of the NVP spectrum, characterized by persistent vomiting, dehydration, electrolyte imbalance, weight loss, nutritional disturbance, and impaired daily functioning (Choi et al., 2025; Fejzo et al., 2024; Hada et al., 2021; Liu et al., 2022).

The global burden of NVP remains high. Recent literature reports that NVP affects approximately 70–85% of pregnant women, while HG occurs in a smaller proportion of pregnancies, with reported prevalence varying according to diagnostic criteria, population characteristics, and health service settings (Choi et al., 2025; De Bonis et al., 2025; Liu et al., 2022). NVP and HG can reduce food and fluid intake, disturb maternal nutritional status, increase the risk of dehydration and electrolyte imbalance, and reduce quality of life through fatigue, psychological distress, anxiety, and disruption of social and occupational activities (Choi et al., 2025; De Bonis et al., 2025). In East Java, nausea and vomiting during pregnancy were recorded among women aged 10–54 years who had previously been pregnant and delivered. Local administrative data showed that the working area of Sukorame Public Health Center had 263 pregnant women in 2025 and 194 pregnant women in 2026 (National Population and Family Planning Board, 2026). In Kediri City, Sukorame Public Health Center recorded

the highest number of maternal cases compared with several other public health centers, with 152 cases in 2023 and 92 cases in 2024. Hyperemesis gravidarum cases increased from one case in 2023 to two cases in 2024, while Campurejo, Ngletih, and Pesantren I Public Health Centers recorded no similar cases during the same period (Kediri City Health Office, 2024).

Management of NVP and HG includes pharmacological and non-pharmacological approaches. Pharmacological treatment commonly involves antihistamines, pyridoxine, doxylamine, metoclopramide, ondansetron, and corticosteroids for refractory cases. Although these drugs may reduce symptoms, their use may be limited by maternal side effects such as sedation and gastrointestinal symptoms, as well as concerns regarding fetal safety during early pregnancy (Nelson-Piercy et al., 2024). These concerns have encouraged the use of non-pharmacological therapies, especially for mild to moderate symptoms or as adjunctive management.

Several non-pharmacological interventions have been investigated for NVP, including ginger, aromatherapy, acupuncture, acupressure, auricular acupressure, dietary modification, hydration, relaxation techniques, and psychosocial support. A systematic review of integrative and complementary practices reported that aromatherapy, herbal medicine, and acupuncture-related interventions were among the most frequently studied approaches for reducing gestational nausea and vomiting (Nassif et al., 2022). An overview of systematic reviews also found that acupuncture-related techniques, including acupressure, may help alleviate NVP symptoms, although methodological limitations and heterogeneous protocols indicate the need for further well-designed studies (Yao et al., 2025). A network meta-analysis further suggested that several pharmacological and non-pharmacological interventions, including vitamin B6, ginger, acupuncture, and P6 acupressure, may reduce NVP symptoms, but the certainty of evidence remains limited by heterogeneity and incomplete safety reporting (Frivaldszky et al., 2026).

Acupressure is a non-invasive, non-pharmacological therapy derived from traditional East Asian medicine. It applies manual pressure to specific acupoints to stimulate physiological responses, modulate autonomic activity, improve gastrointestinal function, and reduce nausea-related signals. In traditional theory, acupressure is believed to regulate the flow of *qi* and restore bodily balance. From a biomedical perspective, stimulation of acupoints may influence neural pathways, vagal activity, gastric motility, and central emetic regulation (Wang et al., 2024; Yao et al., 2025).

The PC6 (*Nei Guan*) point is one of the most widely studied antiemetic acupoints. Yılmaz et al. (2023) reported that PC6 acupressure using wristbands could reduce nausea and vomiting during pregnancy. The ST36 (*Zu San Li*) point is also frequently used because it is associated with gastrointestinal regulation, gastric tone, and digestive function. A quasi-experimental study comparing PC6 and ST36 acupressure found that both points were effective in reducing nausea and vomiting among first-trimester pregnant women (Tirtawati et al., 2025). Furthermore, a systematic review and meta-analysis of acupuncture for NVP reported that PC6, ST36, and CV12 were among the most commonly used acupoints. Acupuncture may be as effective as standard pharmacological therapy and may have a favorable safety profile, although larger and more robust trials are still required (Jin et al., 2024).

Current evidence supports PC6 and ST36 as accessible, low-risk, and clinically relevant acupoints for managing nausea and vomiting during pregnancy. However, studies combining PC6 and ST36 acupressure within a single intervention protocol remain limited, particularly in primary health care settings in Indonesia. Therefore, this study was conducted to analyze the effect of PC6 (*Nei Guan*) and ST36 (*Zu San Li*) acupressure massage on the frequency of nausea and vomiting among first- and second-trimester pregnant women in the working area of Sukorame Public Health Center, Kediri City.

2. METHOD

This study used a quantitative pre-experimental design with a one-group pretest–posttest approach. The study was conducted in the working area of Sukorame Public Health Center, Mojoroto District, Kediri City, from December 15, 2025, to January 21, 2026. The population consisted of first- and second-trimester pregnant women who attended antenatal care and experienced mild to moderate nausea and vomiting. A total of 28 respondents were selected from 30 eligible pregnant women using consecutive sampling. The inclusion criteria were pregnant women at ≤27 weeks of gestation, having a PUQE score of 4–12, and willing to complete the intervention. Women with severe nausea and vomiting, current antiemetic use, skin lesions or infection at the acupressure points, or inability to complete the intervention were excluded.

The intervention consisted of acupressure massage at the PC6 (*Nei Guan*) and ST36 (*Zu San Li*) points, performed once in one day according to the study procedure and accompanied by a therapist. Nausea and vomiting were measured before the intervention and 24 hours after the intervention using the Indonesian version of the Pregnancy-Unique Quantification of Emesis and Nausea (PUQE) questionnaire. The instrument had been tested for validity and reliability, with all items declared valid and a Cronbach's alpha value of 0.645. Data were analyzed using univariate analysis to describe respondent characteristics and PUQE score distribution, while bivariate analysis was performed using the Wilcoxon Signed Rank Test with a significance level of 0.05. This study received ethical approval under number DP.04.03/F.XIII.31/0046/2026, and all respondents provided informed consent before participation.

3. RESULT AND DISCUSSION

RESULT

Univariate analysis

General data

The characteristics of the respondents included maternal age, gestational age, antiemetic drug consumption, the presence of open wounds in the wrist and lower limb areas, and the frequency of nausea and vomiting based on the PUQE score.

Table 1. Characteristics of pregnant women in the first and second trimesters in the working area of Sukorame Public Health Center, Kediri City

Respondent Characteristics	Frequency (n)	Percentage (%)
Age (years)		
<20 years	0	0
20–35 years	26	93
>35 years	2	7
Gestational age: first trimester		
5 weeks	1	4
8 weeks	4	14
10 weeks	1	4
11 weeks	1	4
12 weeks	3	11
13 weeks	1	4
Gestational age: second trimester		
14 weeks	1	4
15 weeks	1	4
16 weeks	2	7

Respondent Characteristics	Frequency (n)	Percentage (%)
17 weeks	2	7
18 weeks	1	4
19 weeks	1	4
20 weeks	6	21
24 weeks	2	7
25 weeks	1	4
Antiemetic drug consumption	0	0
Open wounds in the wrist and lower limb areas	0	0

Table 1 shows the characteristics of 28 respondents. Based on maternal age, almost all respondents were in the 20–35-year age group, totaling 26 respondents (93%). A small proportion of respondents were aged >35 years, totaling 2 respondents (7%), and no respondents were aged <20 years (0%). Based on gestational age, most respondents were in the second trimester (≥14 weeks), totaling 17 pregnant women (61%), while 11 pregnant women (39%) were in the first trimester (<14 weeks). All respondents (100%) did not consume antiemetic drugs and had no open wounds in the acupressure pressure areas, indicating that the intervention could be performed safely.

Specific data

The frequency of nausea and vomiting among first- and second-trimester pregnant women before PC6 (*Nei Guan*) and ST36 (*Zu San Li*) acupressure massage is presented in Table 2.

Table 2. Frequency distribution of nausea and vomiting before PC6 (*Nei Guan*) and ST36 (*Zu San Li*) acupressure massage

Nausea and Vomiting Category	Frequency (n)	Percentage (%)
Mild (4–6)	19	67.9
Moderate (7–12)	9	32.1
Severe (≥13)	0	0
Total	**28**	**100**

Before the intervention, most respondents were in the mild nausea and vomiting category, totaling 19 respondents (67.9%), while 9 respondents (32.1%) were in the moderate category. No respondents were in the severe category.

Table 3. Frequency distribution of nausea and vomiting after PC6 (*Nei Guan*) and ST36 (*Zu San Li*) acupressure massage

Nausea and Vomiting Category	Frequency (n)	Percentage (%)
No vomiting	12	42.9
Mild (4–6)	12	42.9
Moderate (7–12)	4	14.3
Severe (≥13)	0	0
Total	**28**	**100**

After the intervention, the distribution of nausea and vomiting frequency changed. Nearly half of the respondents were in the no vomiting category and mild category, with 12 respondents (42.9%) in each category. A small proportion of respondents remained in the moderate category, totaling 4 respondents (14.3%), and no respondents experienced severe nausea and vomiting. These findings indicate a decreasing trend in nausea and vomiting frequency after the intervention.

Bivariate analysis

The bivariate analysis compared the frequency of nausea and vomiting among first- and second-trimester pregnant women before and after PC6 (*Nei Guan*) and ST36 (*Zu San Li*) acupressure massage.

Table 4. Frequency distribution of nausea and vomiting before and after PC6 (*Nei Guan*) and ST36 (*Zu San Li*) acupressure massage

No.	Nausea and vomiting category	Before intervention		After intervention		p-value
		n	%	n	%	
1	No vomiting	0	0	12	42.9	0.000
2	Mild (4–6)	19	67.9	12	42.9	
3	Moderate (7–12)	9	32.1	4	14.3	
4	Severe (>13)	0	0	0	0	
	Total	**28**	**100**	**28**	**100**	

Table 4 shows that before the intervention, most respondents experienced mild nausea and vomiting, totaling 19 respondents (67.9%), while 9 respondents (32.1%) experienced moderate nausea and vomiting. After the intervention, 12 respondents (42.9%) were in the no vomiting category and 12 respondents (42.9%) were in the mild category, while only 4 respondents (14.3%) remained in the moderate category. The Wilcoxon Signed Rank Test showed a p-value of 0.000, indicating a significant difference in nausea and vomiting frequency before and after PC6 (*Nei Guan*) and ST36 (*Zu San Li*) acupressure massage.

DISCUSSION

Frequency of Nausea and Vomiting Before PC6 (*Nei Guan*) and ST36 (*Zu San Li*) Acupressure Massage

Before the intervention, most respondents experienced mild nausea and vomiting, totaling 19 respondents (67.9%), while 9 respondents (32.1%) were in the moderate category, and none were in the severe category. These findings indicate that all respondents experienced nausea and vomiting, although most symptoms remained within the mild category. The absence of severe cases suggests that the symptoms experienced by the respondents were still within the physiological spectrum of pregnancy and had not progressed to a pathological condition such as hyperemesis gravidarum.

Nausea and vomiting of pregnancy (NVP) is a common complaint during early pregnancy and may range from mild discomfort to severe vomiting requiring clinical management. Liu et al. (2022) reported that NVP commonly begins at 6–8 weeks of gestation and usually improves by 16–20 weeks, whereas hyperemesis gravidarum represents the severe end of the clinical spectrum. The distribution observed in the present study was consistent with this pattern because most respondents experienced mild to moderate symptoms. De Bonis et al. (2025) similarly reported that NVP frequently occurs during early pregnancy and may persist

into the second trimester in some women, depending on individual susceptibility and clinical characteristics.

The etiology of NVP is multifactorial. Hormonal changes remain among the most widely discussed mechanisms, including increased levels of human chorionic gonadotropin, estrogen, and progesterone, as well as emerging evidence regarding growth differentiation factor 15 (GDF15; Fejzo et al., 2024; Liu et al., 2022). Wahyuni et al. (2023) described NVP as a condition associated with multiple biological, psychological, and social factors. Progesterone may reduce gastrointestinal motility and delay gastric emptying, whereas estrogen may increase maternal sensitivity to odors and food-related stimuli. These mechanisms may explain why respondents in the present study continued to experience nausea and vomiting during the first and second trimesters.

The Spearman correlation analysis showed a nonsignificant, very weak negative correlation between gestational age and pretest nausea and vomiting scores, $r_s = -.102$, $p = .606$. The negative direction indicates a tendency for nausea and vomiting scores to decrease as gestational age increases. However, this association was not statistically significant. This finding is clinically plausible because NVP generally decreases with increasing gestational age, although substantial individual variation remains. Consequently, some pregnant women may continue to experience symptoms into the second trimester.

Although the symptoms observed in this study were classified as physiological, mild to moderate nausea and vomiting may still cause discomfort and interfere with maternal daily activities. Early management is necessary to prevent symptom progression, maintain adequate food and fluid intake, and improve maternal comfort. Nonpharmacological interventions such as acupressure are relevant because they are simple, noninvasive, and applicable as supportive care in midwifery practice.

Frequency of Nausea and Vomiting After PC6 (*Nei Guan*) and ST36 (*Zu San Li*) Acupressure Massage

After the intervention, the distribution of nausea and vomiting shifted toward lower levels of severity. Twelve respondents (42.9%) were in the no-vomiting category, 12 respondents (42.9%) were in the mild category, and only 4 respondents (14.3%) remained in the moderate category. No respondent experienced severe nausea and vomiting after the intervention. This shift indicates a reduction in the frequency and severity of nausea and vomiting following PC6 (*Nei Guan*) and ST36 (*Zu San Li*) acupressure massage.

These findings support the use of acupressure as a nonpharmacological approach for managing emesis gravidarum. Acupressure is a manual stimulation technique applied to specific acupoints to produce physiological responses. Yao et al. (2025) explained that acupoint massage may influence neural regulation, autonomic activity, circulation, and gastrointestinal function. A systematic review and meta-analysis of randomized controlled trials also indicated that acupressure was effective and generally safe for reducing nausea and vomiting during pregnancy (Wang et al., 2024). These findings support the reduction in nausea and vomiting observed in the present study.

Physiologically, acupressure may reduce nausea and vomiting through peripheral nerve stimulation, modulation of autonomic nervous system activity, and regulation of the emetic pathway. Stimulation of acupoints may promote relaxation, reduce stress responses, and influence neurotransmitters involved in nausea regulation. In traditional East Asian medicine, a sensation known as *De Qi* may occur during acupoint stimulation and may be described as soreness, numbness, warmth, heaviness, or a radiating sensation around the stimulated point. Yao et al. (2025) stated that this sensation reflects sensory pathway activation and may be associated with the therapeutic response to acupoint stimulation.

The PC6 (*Nei Guan*) point is widely used as an antiemetic acupoint because it is associated with nausea regulation and vagal modulation. Stimulation of PC6 may reduce nausea-related impulses transmitted to the vomiting center. The ST36 (*Zu San Li*) point is commonly associated with gastrointestinal regulation, including gastric motility and digestive function. Combining PC6 and ST36 may produce complementary effects because PC6 acts more directly on nausea and vomiting pathways, whereas ST36 supports gastrointestinal function. Jin et al. (2024) found that PC6 and ST36 were among the acupoints most frequently used in acupuncture studies for NVP and were associated with symptom reduction.

The findings of the present study are consistent with those of Tirtawati et al. (2025), who reported that acupressure at PC6 and ST36 significantly reduced nausea and vomiting among first-trimester pregnant women, $p < .001$. Ultraluana and Al Farizi (2024) also reported that acupressure therapy reduced symptoms of nausea and vomiting during pregnancy compared with placebo or control conditions. These findings support the observed decline in symptom severity following the intervention.

Effect of PC6 (*Nei Guan*) and ST36 (*Zu San Li*) Acupressure Massage on the Frequency of Nausea and Vomiting

Before the intervention, 19 respondents (67.9%) experienced mild nausea and vomiting, while 9 respondents (32.1%) experienced moderate nausea and vomiting. After the intervention, 12 respondents (42.9%) reported no vomiting, 12 respondents (42.9%) experienced mild symptoms, and only 4 respondents (14.3%) remained in the moderate category. These results demonstrate a clinical shift from higher symptom categories to lower symptom categories following acupressure massage.

The Shapiro–Wilk normality test showed that the pretest and posttest data were not normally distributed, with significance values of .001 and < .001, respectively. Consequently, bivariate analysis was conducted using the Wilcoxon signed-rank test. The analysis showed a statistically significant difference in nausea and vomiting scores before and after PC6 and ST36 acupressure massage, $p < .001$. Thus, the null hypothesis was rejected, indicating that nausea and vomiting scores differed significantly between the preintervention and postintervention measurements.

The significant reduction in nausea and vomiting supports the potential effect of acupressure massage on symptom improvement among first- and second-trimester pregnant women. This finding is consistent with evidence from previous acupressure studies and reviews. Yılmaz et al. (2023) reported that PC6 acupressure wristbands reduced nausea and vomiting scores among pregnant women. Nafiah et al. (2022) also found that P6 acupressure alleviated nausea and vomiting among women with hyperemesis gravidarum. These findings support the relevance of PC6 stimulation as an antiemetic intervention during pregnancy.

The combined use of PC6 and ST36 may strengthen the therapeutic response because both points target different but related physiological mechanisms. PC6 is associated with antiemetic regulation, whereas ST36 is associated with gastrointestinal function. Tirtawati et al. (2025) reported that both PC6 and ST36 acupressure reduced nausea and vomiting scores among first-trimester pregnant women. Jin et al. (2024) similarly found that acupuncture involving PC6 and ST36 reduced NVP symptoms and could be considered a nonpharmacological management option, although further high-quality trials remain necessary.

The results of the present study indicate that PC6 (*Nei Guan*) and ST36 (*Zu San Li*) acupressure massage contributed to a reduction in the frequency of nausea and vomiting among first- and second-trimester pregnant women in the working area of Sukorame Public Health Center. In midwifery care, this intervention may be considered a supportive nonpharmacological option because it is relatively safe, simple, inexpensive, and feasible in primary health care settings. However, because the study employed a one-group pretest–

posttest design without a control group, causal conclusions should be interpreted cautiously. Future studies using randomized controlled designs, larger sample sizes, longer follow-up periods, and adequate control of potential confounding variables are required to confirm the effectiveness of combined PC6 and ST36 acupressure.

4. CONCLUSION

This study concluded that PC6 (*Nei Guan*) and ST36 (*Zu San Li*) acupressure massage significantly reduced the frequency of nausea and vomiting among first- and second-trimester pregnant women in the working area of Sukorame Public Health Center. Before the intervention, most respondents experienced mild nausea and vomiting, whereas after the intervention nearly half of the respondents were in the no-vomiting category and nearly half remained in the mild category. These findings indicate that PC6 and ST36 acupressure may be used as a safe, simple, and feasible non-pharmacological intervention in antenatal care. Further studies with larger samples, control groups, and consideration of potential confounding factors are recommended to strengthen the evidence for its clinical application.

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