

Effectiveness of Acupressure at PC6 versus ST36 Points on Nausea and Vomiting in First-Trimester Pregnant Women: A Quasi-Experimental Study

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ABSTRACT

The high incidence of nausea and vomiting during pregnancy, which affects 60-80% of primigravidas and 40-60% of multigravidas in Indonesia, can lead to complications such as dehydration and malnutrition if not managed effectively. This can have a negative impact on maternal health and fetal development. While pharmacological treatments are available, non-pharmacological interventions such as acupressure are gaining attention as a safe and effective alternative. This study aimed to determine and compare the effectiveness of acupressure at PC6 and ST36 points in reducing nausea and vomiting among first-trimester pregnant women. A comparative quasi-experimental design was used with a total sample of 50 pregnant women, divided into two groups: one receiving acupressure at PC6 and the other at ST36. The severity of nausea and vomiting was measured using the Pregnancy-Unique Quantification of Emesis and Nausea (PUQE) questionnaire before and after the intervention. The results showed a significant decrease in nausea and vomiting scores in both groups ($p < 0.001$). The mean score reduction was 6.64 in the PC6 group and 6.32 in the ST36 group. Statistical analysis indicated no significant difference between the two groups, suggesting comparable efficacy ($p = 0.214$). These findings suggest that acupressure at both PC6 and ST36 points is an effective non-pharmacological method for managing nausea and vomiting in early pregnancy. Thus, ST36 can be considered a viable alternative point for treatment

Key Messages:

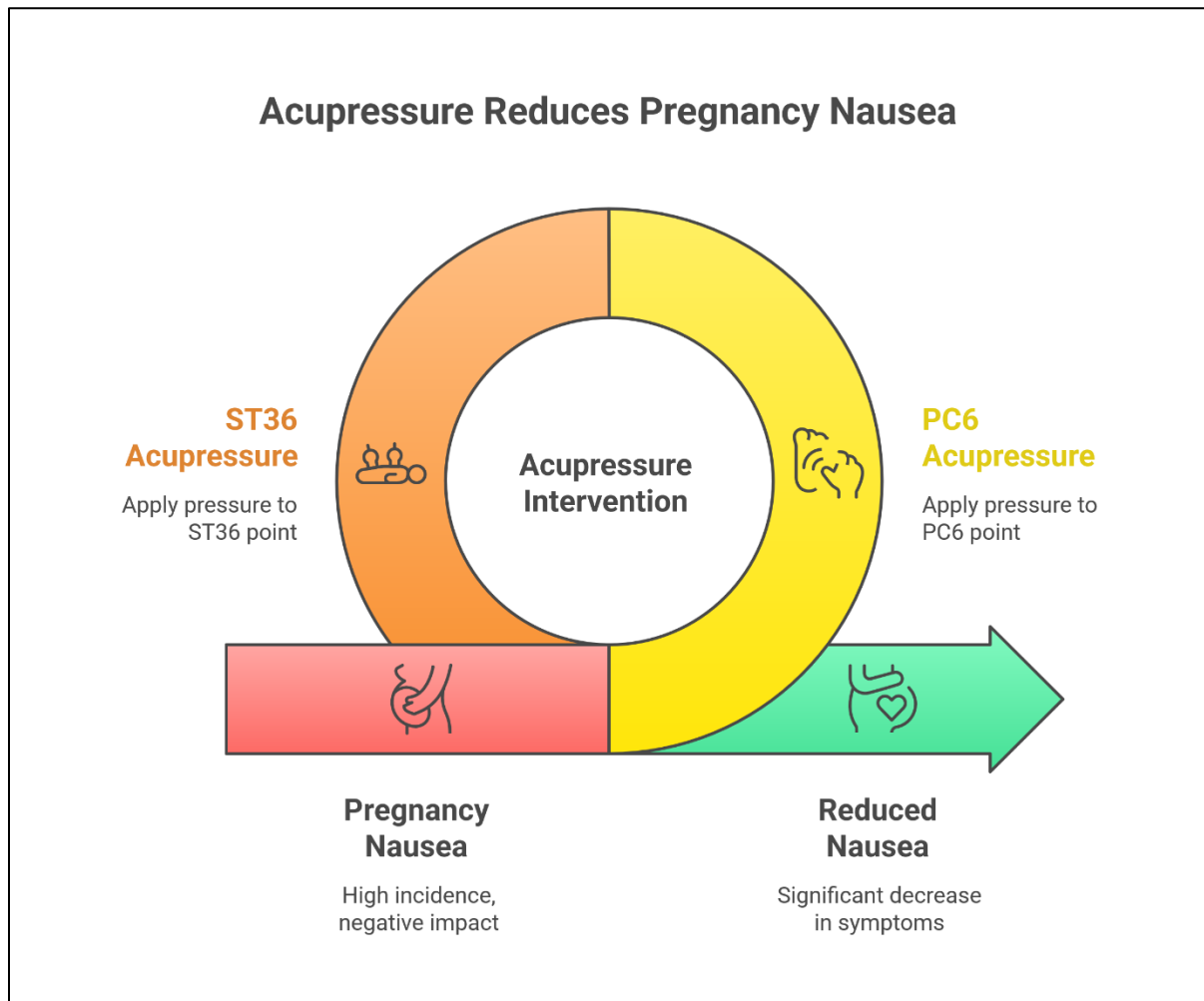
- This study demonstrates that acupressure applied to either the PC6 or ST36 point significantly reduces the severity of nausea and vomiting in first-trimester pregnant women. The findings indicate comparable efficacy between the two intervention sites, supporting the use of ST36 as a viable alternative for the non-pharmacological management of emesis gravidarum.

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GRAPHICAL ABSTRACT



INTRODUCTION

Nausea and vomiting of pregnancy (NVP) is a ubiquitous condition affecting approximately 60–80% of pregnant women globally and remains a significant health issue in Indonesia (1,2). While generally considered a normal part of pregnancy, persistent nausea and vomiting can negatively affect a woman's daily activities and, if severe, can lead to more serious conditions like hyperemesis gravidarum, dehydration, and malnutrition, thereby impacting fetal development (3). The incidence of emesis gravidarum is significant, affecting a large percentage of pregnancies globally and in Indonesia (4,5).

The etiology of nausea and vomiting in pregnancy is multifactorial, with hormonal changes, particularly increased levels of human chorionic gonadotropin (hCG), estrogen, and progesterone, playing a significant role (6). Psychological factors such as stress and anxiety can also exacerbate these symptoms by influencing the release of hormones like serotonin, which affects the digestive system (7). Complications arising from untreated nausea and vomiting can be severe, including fluid and electrolyte imbalances (8), and may contribute to adverse fetal outcomes like low birth weight and premature birth (9). Given these potential consequences, effective management strategies are crucial for the well-being of both mother and child.

Management of emesis gravidarum includes both pharmacological and non-pharmacological approaches (10). While antiemetic medications are often prescribed, there is a growing interest in non-pharmacological therapies due to concerns about potential side effects (11). Among these, acupressure, a technique derived from traditional Chinese medicine, has emerged as a promising, safe, and cost-effective intervention. Stimulation of these points is believed to modulate neurochemical signals involved in the

emetic reflex, potentially via the release of beta-endorphins or serotonin regulation.

The Pericardium 6 (PC6) and Stomach 36 (ST36) points are particularly noted for their effectiveness in alleviating nausea and vomiting (12,13). Despite this, direct comparative studies between these two points in the context of pregnancy are limited. It is crucial to determine if ST36 offers comparable efficacy to PC6, providing an alternative site for intervention. This study, therefore, aimed to evaluate and compare the effectiveness of acupressure applied to the PC6 versus ST36 points in reducing nausea and vomiting in first-trimester pregnant women at the Sidemen Health Center.

METHODS

This study employed a comparative quasi-experimental design (two-arm intervention study) to assess the impact of acupressure on nausea and vomiting in pregnant women. The research was conducted at the Puskesmas Sidemen, where a preliminary study in January 2024 found that a significant percentage of first-trimester pregnant women experienced these symptoms. The study population consisted of all first-trimester pregnant women who visited the health center and met the inclusion criteria. The total sample of 50 participants was divided into two groups of 25 using a purposive assignment based on the order of visits.

The selection of participants was based on specific inclusion and exclusion criteria. Pregnant women in their first trimester who were experiencing nausea and vomiting 2-3 times a day and were not suffering from any gastrointestinal diseases like appendicitis or gastritis were included. Women who were taking other anti-nausea medications or herbal therapies, or had a history of hyperemesis gravidarum, were excluded from the study. This purposive sampling technique ensured that the observed effects were attributable to the intervention.

Data on the frequency and severity of nausea and vomiting were collected using the structured Pregnancy-Unique Quantification of Emesis and Nausea (PUQE) questionnaire. This instrument measures the duration of nausea and the frequency of vomiting and retching over a 24-hour period, with scores ranging from 3 to 15, categorized as mild (3-6), moderate (7-12), and severe (13-15) (14). The questionnaire was administered to each participant before the intervention (pretest) and after the completion of the therapy (posttest) to measure the change in scores.

The intervention consisted of applying pressure to either the PC6 point, located three fingerbreadths below the wrist on the inner forearm, or the ST36 point, located four fingerbreadths below the kneecap on the outside of the shin bone. The pressure was applied for 40 minutes, twice a day, for three consecutive days to both groups. Data collection was facilitated by trained enumerators who were briefed on the research protocol.

Data Analysis Data analysis was performed using SPSS Statistics software. Univariate analysis was conducted to describe the demographic characteristics of the respondents, presented as frequencies and percentages. Bivariate analysis was utilized to evaluate the effectiveness of the interventions. Prior to hypothesis testing, data normality was assessed using the Shapiro-Wilk test, and homogeneity of variances was verified using Levene's test. To determine the significant changes in nausea and vomiting scores within each group (pre-test vs. post-test), a paired sample t-test was employed. Subsequently, to compare the effectiveness of the two interventions (comparing the mean difference between the PC6 group and the ST36 group), an Independent Sample t-test was conducted. Statistical significance was defined as $p < 0.05$. Ethical clearance for the study was obtained prior to its commencement, and informed consent was secured from all participants

RESULTS

The majority of participants in both the PC6 and ST36 groups were between 20-35 years of age (68.0% and 96.0%, respectively). Most respondents in both groups were multigravida (72.0% in the PC6 group and 80.0% in the ST36 group). A high level of education was prevalent in both groups, with 84.0% in the PC6 group and 88.0% in the ST36 group having completed high school or higher education. The majority of participants in both groups were employed (76.0% and 84.0%, respectively) (Table 1).

Table 1. Univariate Analysis of Respondent Characteristics

Characteristic	Acupressure PC6 (n=25) n (%)	Acupressure ST36 (n=25) n (%)
Age		
< 20 years	0 (0.0)	0 (0.0)
20-35 years	17 (68.0)	24 (96.0)
>35 years	8 (32.0)	1 (4.0)
Parity		
Primigravida	7 (28.0)	5 (20.0)
Multigravida	18 (72.0)	20 (80.0)
Education		
Low	4 (16.0)	3 (12.0)
High	21 (84.0)	22 (88.0)
Occupation		
Not working	6 (24.0)	4 (16.0)
Working	19 (76.0)	21 (84.0)

Table 2. Bivariate Analysis of Nausea and Vomiting Scores Before and After Intervention

Group	Pre-test Mean (SD)	Post-test Mean (SD)	Mean Difference (Delta)	Within-Group P-value *	Between-Group P-value **
Acupressure PC6 (n=25)	10.28 (0.98)	3.64 (0.76)	6.64 (1.29)	< 0.001	0.214
Acupressure ST36 (n=25)	10.24 (0.97)	3.92 (0.81)	6.32 (1.28)	< 0.001	

*Paired T-test **Independent T-test (comparing Mean Difference)

Based on Table 2, the bivariate analysis demonstrates that both acupressure interventions significantly reduced nausea and vomiting scores. Specifically, the within-group analysis using the Paired T-test revealed a highly significant decrease in scores from pre-test to post-test for both the PC6 group (Mean difference: 6.64) and the ST36 group (Mean difference: 6.32), with p-values < 0.001. However, the independent t-test comparing the mean differences between the two groups showed no statistically significant difference (p = 0.214), suggesting that acupressure at points PC6 and ST36 is equally effective in alleviating these symptoms.

DISCUSSION

This study demonstrates that acupressure applied to both the PC6 and ST36 points is an effective method for reducing nausea and vomiting in first-trimester pregnant women. The significant decrease in PUQE scores in both intervention groups provides strong evidence for the efficacy of this non-pharmacological therapy. The findings are consistent with previous research that has highlighted the benefits of acupressure in managing pregnancy-related nausea. For instance, studies by Tanjung, W. W., et al. (2020) (15) and Holisoh S, et al. (2023) (16) also found that acupressure at the PC6 point significantly reduced the intensity of nausea and vomiting in pregnant women. This study contributes to the existing literature by demonstrating the effectiveness of the ST36 point and providing a direct comparison with the other.

The mechanism by which acupressure alleviates nausea and vomiting is thought to be through the stimulation of specific neurohormonal pathways (17). Stimulating the PC6 point can affect the body's endocrine system, regulate the levels of beta-endorphin in the cerebrospinal fluid and the transmission of endogenous opioids and 5-hydroxytryptamine in the serum, inhibit gastric acid secretion, regulate gastrointestinal function, and thus stop nausea and vomiting (18). Similarly, stimulating the ST36 point, which is located on the stomach meridian, is thought to regulate the digestive system and harmonize the flow of energy, thereby reducing gastric distress (19). The application of a 30-minute acupressure protocol at the Zusanli (ST 36) and Taibai (SP 3) acupoints resulted in a statistically significant reduction in nausea

severity among patients with dyspepsia. This effect was evident both within the intervention group ($t=7.91$, $p<0.001$) and when comparing the intervention group to a control group ($z=-2.884$, $p=0.01$) (20).

While the traditional perspective emphasizes the harmonization of energy flow, modern biomedical studies offer a physiological explanation for the efficacy of the ST36 point. Stimulation of ST36 is hypothesized to modulate vagal tone, which plays a critical role in the regulation of the gastrointestinal tract (21). Previous studies suggest that acupressure or electroacupuncture at this point enhances gastric motility and accelerates gastric emptying via the cholinergic pathway (22,23). By improving gastric myoelectrical activity, stimulation at ST36 helps counteract the gastric dysrhythmias often associated with nausea and vomiting.

A key finding of this study is the comparison between the two intervention points. Although the PC6 group showed a slightly higher mean score reduction compared to the ST36 group (6.64 vs. 6.32), statistical analysis revealed no significant difference between the two interventions ($p > 0.05$). This indicates that the ST36 point has comparable efficacy to the well-established PC6 point in managing emesis gravidarum. These results suggest that ST36 serves as a viable alternative for pregnant women, particularly in cases where the PC6 point might be inaccessible due to local skin issues or injury or simply based on patient preference.

The authors acknowledge several limitations of this study. First, the use of a quasi-experimental design without a placebo or pseudo-acupressure control group limits the ability to definitively rule out a placebo effect or natural regression of symptoms over time. Second, the lack of a double-blind procedure may have introduced potential bias in participants' subjective reporting of symptom relief. Third, the relatively small sample size ($n = 50$) and recruitment of participants from a single health center may limit the generalizability of the results to a broader population. Finally, the intervention period was limited to three days; therefore, the long-term sustainability of the therapeutic effects remains to be investigated in future Randomized Controlled Trials (RCTs) with larger and more diverse cohorts.

CONCLUSION

This study demonstrates that acupressure applied to either the PC6 or ST36 point results in a statistically significant reduction in the severity of nausea and vomiting among first-trimester pregnant women. The findings provide support regarding the use of this non-pharmacological, safe, and cost-effective intervention as a valuable complementary therapy in prenatal care. Notably, both intervention points showed comparable efficacy, suggesting that ST36 is a viable alternative to the commonly used PC6 point. The integration of acupressure into standard midwifery practice is recommended to improve the management of emesis gravidarum.

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CONFLICTS OF INTEREST

The authors declare no conflict of interest.

REFERENCES

1. Vadakekut ES, Mahdy H. Hyperemesis Gravidarum. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2025 [cited 2025 Sept 15]. Available from: <http://www.ncbi.nlm.nih.gov/books/NBK532917/>

2. Putri WT. Case Study On Primigravida In The First Trimester With Emesis Gravidarum In The Tongguh Community Health Center Area Bangkalan Regency. *Fetus J Midwifery*. 2024 Sept 25;1(1):101–12.
3. Nijsten K, Jansen LAW, Limpens J, Finken MJJ, Koot MH, Grooten IJ, et al. Long-term health outcomes of children born to mothers with hyperemesis gravidarum: a systematic review and meta-analysis. *Am J Obstet Gynecol*. 2022 Sept 1;227(3):414-429.e17.
4. Bella SCS, Idris SBMS, Selomo PAM. Prevalence of Hyperemesis Gravidarum Based on Age, Parity, and Severity. *J Indones Sos Sains*. 2025 Aug 7;6(8):2514–9.
5. Citrawati NK, Arwidiana I dewa P. Characteristic Description of Emesis Gravidarum Case to Pregnant Woman in 1st Trimester. *Indones J Glob Health Res*. 2023 May 2;5(2):217–22.
6. Bustos M, Venkataramanan R, Caritis S. Nausea and Vomiting of Pregnancy-What's New? *Auton Neurosci Basic Clin*. 2017 Jan;202:62–72.
7. Rorrong JF, Wantania JJE, Lumentut AM. Hubungan Psikologis Ibu Hamil dengan Kejadian Hiperemesis Gravidarum. *E-Clin*. 2021;9(1):218–23.
8. Shah R, Malhamé I, Fayek M, Merolli A, Mehta N. Wernicke's encephalopathy: An uncommon complication from hyperemesis gravidarum. *Obstet Med*. 2020 Dec;13(4):198–200.
9. Petry CJ, Ong KK, Beardsall K, Hughes IA, Acerini CL, Dunger DB. Vomiting in pregnancy is associated with a higher risk of low birth weight: a cohort study. *BMC Pregnancy Childbirth*. 2018 May 4;18(1):133.
10. Gereade A, Stavros S, Moustakli E, Potiris A, Orgianelis I, Zikopoulos A, et al. Hyperemesis in Pregnancy: Complications and Treatment. *Med Sci*. 2025 Aug 14;13(3):132.
11. Wills L, Hsiao HF, Thomas A, Kay-Smith C, Henry A, Grzeskowiak LE. Assessing the burden of severe nausea and vomiting of pregnancy or hyperemesis gravidarum and the associated use and experiences of medication treatments: An Australian consumer survey. *PLOS ONE*. 2025 Sept 3;20(9):e0329687.
12. Mohd Nafiah NA, Chieng WK, Zainuddin AA, Chew KT, Kalok A, Abu MA, et al. Effect of Acupressure at P6 on Nausea and Vomiting in Women with Hyperemesis Gravidarum: A Randomized Controlled Trial. *Int J Environ Res Public Health*. 2022 Sept 1;19(17):10886.
13. Christiani N, Bitara INW. Effectiveness of Point ST36 (Zusanli) Acupressure on Emesis Gravidarum First Trimester in the Tenganan Health Center. *Proc Int Conf Health Sci Pract Educ*. 2025 Jan 2;463–71.
14. Koren G, Piwko C, Ahn E, Boskovic R, Maltepe C, Einarson A, et al. Validation studies of the Pregnancy Unique-Quantification of Emesis (PUQE) scores. *J Obstet Gynaecol*. 2005 Apr 1;25(3):241–4.
15. Tanjung WW, Wari Y, Antoni A. Pengaruh Akupresur pada Titik Perikardium 6 terhadap Intensitas Mual Muntah pada Ibu Hamil Trimester I. *J Educ Dev*. 2020 Nov 1;8(4):265–265.
16. Holisoh S, Hernawati Y, Kartika I. Pengaruh Akupresure Titik Pericardium (Pc 6) Pada Mual Muntah Ibu Hamil Di PMB Bidan E Kabupaten Bandung. *J Sehat Masada*. 2023 July 21;17(2):73–9.
17. Chernyak GV, Sessler DI. Perioperative Acupuncture and Related Techniques. *Anesthesiology*. 2005 May;102(5):1031–78.
18. Yang J, Jiang Y, Chen Y, Sun M, Chen J, Zheng Q, et al. Acupressure the PC6 point for alleviating postoperative nausea and vomiting. *Medicine (Baltimore)*. 2019 Aug 16;98(33):e16857.
19. Abbate S, Maciocia G, editors. *Advanced Techniques in Oriental Medicine* [Internet]. Stuttgart: Georg Thieme Verlag; 2006 [cited 2025 Sept 15]. Available from: <http://www.thieme-connect.de/DOI/DOI?10.1055/b-002-52045>
20. Oktaviani R, Mardiyono M, Achiriyati D. Acupressure On Zusanli (St36) And Taibai (Sp3) in Reducing Nausea for Patients with Dyspepsia at Banyumas Hospital. *Nurse Media J Nurs*. 2014 July 7;4(2):745–53.
21. Zhang Y, Tang YW, Zhou J, Wei YR, Peng YT, Yan Z, et al. Electroacupuncture at ST36 ameliorates gastric dysmotility in rats with diabetic gastroparesis via the nucleus tractus solitarius-vagal axis. *World J Gastroenterol*. 2025 June 7;31(21):107395.

22. Tang YW, Zhang Y, Zhou J, Peng YT, Zi Y, Wei YR, et al. Electroacupuncture with different current intensities can improve gastrointestinal motility in diabetic gastroparesis via vagal and sympathetic pathways. *World J Diabetes*. 2025 Aug 15;16(8):107779.
23. Li S, Ye F, Zhang S, Liu Y, Chen JDZ. Effect and Mechanism of Vagal Nerve Stimulation on Gastric Motility: A Preliminary Rodent Study. *Neuromodulation Technol Neural Interface*. 2025 July 1;28(5):767-74.