

THE COMPARISON OF HEGU ACUPRESSURE AND LEMON AROMATHERAPY ON NAUSEA AND VOMITING AMONG CERVICAL CANCER PATIENTS UNDERGOING CHEMOTHERAPY

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ABSTRACT

Cervical cancer is a potentially fatal disease, making chemotherapy a necessary treatment. However, chemotherapy often causes side effects such as nausea and vomiting, which can reduce patients' motivation to continue treatment and negatively impact their well-being. Consequently, complementary therapies like Hegu acupressure and lemon aromatherapy have been explored to alleviate these symptoms. This study aimed to compare the effectiveness of Hegu acupressure therapy and lemon aromatherapy in reducing nausea and vomiting among cervical cancer patients undergoing chemotherapy. A quasi-experimental, two-group pre-posttest design was employed, using random sampling to recruit 60 respondents. The Index of Nausea, Vomiting, and Retching (INVR) was used as the assessment instrument. Data analyzed using the Wilcoxon signed-rank test and the Mann-Whitney U test. Most participants were in the early elderly age group, unemployed, and stage III cervical cancer. Statistical findings demonstrated that both Hegu acupressure ($p=0.005$) and lemon aromatherapy ($p=0.002$) significantly reduced nausea and vomiting. No significant difference was found between the two interventions ($p=0.421$), indicating comparable therapeutic effects. Thus, therapy can be recommended as complementary non-pharmacological interventions for managing chemotherapy-induced nausea and vomiting in cervical cancer patients. Future research is required to consider additional variables to improve the robustness and generalizability of these findings.

Keywords: *Acupressure; aromatherapy; chemotherapy; lemon; nausea*



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BACKGROUND

Cervical cancer is a leading cause of death worldwide, according to the Global Cancer Observatory (Sung, et al., 2021). In 2020, there were 342,000 deaths and 604,000 new cases globally (Sung et al., 2021). In Indonesia, cervical cancer in Indonesia ranks second among women, following breast cancer (Indonesian Ministry of Health, 2022). To reduce mortality and increase cure rates, chemotherapy is one treatment option (Monk et al., 2023). However, this therapy can cause side effects, including nausea and vomiting (Issac et al., 2024).

Chemotherapy-induced nausea and vomiting (CINV) occur within 1 to 24 hours after the administration of cytotoxic agents. This condition can be influenced by several factors,

such as taste disturbances, bad breath (halitosis), mental confusion, and anxiety (Tianto & Khayati, 2023). Chemotherapy-induced nausea and vomiting significantly impair patients' physical and psychological well-being. When inadequately controlled, these symptoms may lead to insufficient nutritional intake, electrolyte imbalances, reduced motivation to continue chemotherapy, and a decline in overall quality of life (Pahria et al, 2023; Alanazi et al., 2024). Evidence confirms complementary modality utilization within the cancer survivor population subsequent to diagnostic confirmation (Distinarista, Dwidiyanti, & Sofro, 2018).

Chemotherapy-induced nausea and vomiting (CINV) have been effectively managed through the pharmacological use of antiemetic agents, which have proven successful in

prevention. However, their use must be carefully considered due to potential safety concerns, as these agents may cause various adverse effects and affect patient comfort (Filetti et al., 2023). Nurses play an important role in delivering culturally sensitive nursing care, particularly through the implementation of non-pharmacological interventions to alleviate CINV, including music therapy, progressive muscle relaxation, guided imagery, yoga, ginger administration, patient education, counseling and patient visits were carried out using a culturally sensitive approach. These interventions have been demonstrated to reduce the frequency and severity of nausea and vomiting, thereby improving the quality of life for cancer patients (Li et al., 2022; Wang et al., 2025).

Nausea and vomiting in chemotherapy patients can be managed with various treatments, including lemon aromatherapy and acupressure. Research by Ahn, Kim, and Kim (2024) indicates that aromatherapy can reduce nausea and vomiting in cancer patients. Lemon aromatherapy has also been administered to alleviate nausea and vomiting in post-surgical patients (Rambod et al., 2023). Evidence from previous studies suggests that lemon aromatherapy may be effective in reducing nausea and vomiting in pregnant women (Romauli & Niu, 2022; Rafiei et al., 2025). Additional research supports the efficacy of lemon aromatherapy in mitigating nausea and vomiting during pregnancy (Safajou, 2020). A recent systematic review reported significant reductions in the severity and frequency of nausea and vomiting among pregnant women receiving lemon aromatherapy (Fattah et al., 2019; Putri, 2023; Rafiei et al., 2026). Similar findings were reported by Romauli and Niu (2022), who found that lemon aromatherapy effectively reduced emesis symptoms in first-trimester pregnant women. Several studies also indicate that aromatherapy can reduce nausea and vomiting in cervical cancer patients (Zhang et al., 2026). Lemon aromatherapy induces a relaxing effect in those who inhale it. The locus coeruleus releases noradrenaline, serotonin, and endorphins in response to the stimulant effect of lemon aromatherapy, resulting in a sense of relaxation and stability that may alleviate nausea and vomiting (Medforth, 2013).

Non-pharmacological interventions, including acupressure, have demonstrated efficacy in reducing nausea and vomiting, as evidenced by findings from several recent studies. Research by Wang et al. (2024) and Gong et al. (2024) found that acupressure can reduce nausea and vomiting in pregnant women. Other studies have shown that acupressure reduces nausea and vomiting in post-laparoscopic patients (Salamah et al., 2023; Jasem & Dawood, 2024). Additionally, recent research has demonstrated that acupressure is an effective non-pharmacological intervention for mitigating chemotherapy-induced nausea and vomiting in cancer patients (Alhusamiah et al., 2024). Specifically, acupressure applied to the P6 point can prevent and treat nausea and vomiting in cancer patients undergoing chemotherapy (Xiao et al., 2023). This effect attributed to Hegu acupressure, which increases the release of beta-endorphins in the pituitary gland near the chemoreceptor trigger zone. Furthermore, lemon aromatherapy combined with acupressure has been shown to effectively relieve nausea and vomiting in pregnant women, cancer patients, and post-surgical patients.

Previous research has shown that lemon aromatherapy and Hegu acupressure can alleviate nausea and vomiting in various clinical populations, including pregnant women,

patients with lung cancer, individuals experiencing chemotherapy-induced nausea and vomiting (CINV), and patients undergoing gynecologic surgery orcholecystectomy (Miao et al., 2017; Ezzati Arasteh et al., 2019; Küçük & Bülbül, 2021; Ahn et al., 2024; Yu, 2024; Miao & Zhang, 2025). However, their effectiveness in relieving nausea and vomiting in cervical cancer patients undergoing chemotherapy has not been extensively studied.

METHOD

Study design

This research is a quantitative study employing a quasi-experimental two-group pretest-posttest design aimed at comparing the effectiveness of Hegu acupressure and lemon aromatherapy in treating nausea and vomiting among cervical cancer patients undergoing chemotherapy.

Population and sample

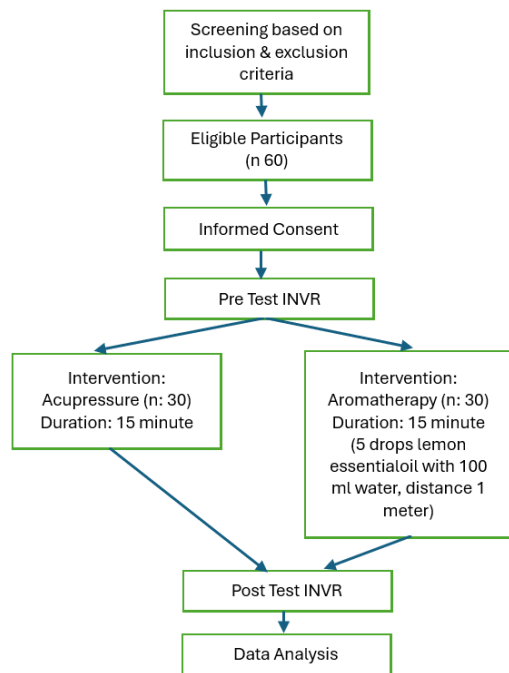
The study was conducted at RSUP Dr. Kariadi and involved a population of 218 cervical cancer patients undergoing chemotherapy from January to June 2023. Random sampling technique was used, with inclusion criteria comprising cervical cancer patients receiving chemotherapy who experienced nausea and vomiting. Exclusion criteria excluded patients allergic to lemon aromatherapy, those in emergency conditions, and patients with decreased consciousness. The sample size was determined using a fixed sample size approach (Jennison & Turnbull, 2025), resulting in 30 participants in the lemon aromatherapy intervention group and 30 participants in the acupressure intervention group.

Instrument

The measuring instrument used was the Index of Nausea, Vomiting, and Retching (INVR) (Rhodes, & McDaniel, 1999). This instrument was administered before and after the lemon aromatherapy intervention and in the Hegu acupressure intervention group. The reliability of the INVR instrument in the anticipatory category, assessed using Cronbach alpha, yielded a value of 0.780 (>0.632). In the acute category, the Cronbach's alpha was 0.774 (>0.632), indicating that the INVR instrument is reliable in both anticipatory and acute categories. Regarding validity, the calculated r value for the INVR instrument, was greater than 0.632. (Rhodes, & McDaniel, 1999), confirming its validity.

Data collection

Data collection for this study was conducted from January to April 2024 in the chemotherapy room. Researchers explained the purpose, procedures, and benefits of the study before administering the intervention. Respondents were given the option to participate or decline by signing an informed consent form. Random sampling, a probability sampling technique, was used to ensure that every member of the population had an equal chance of selection. This was achieved by assigning numbers to all eligible participants and selecting samples randomly using a lottery system. Respondents who agreed to participate in this study were then assessed with a pre-test using the Index of Nausea, Vomiting, and Retching (INVR) instrument. The Hegu acupressure group received a 15-minute intervention, while the aromatherapy group was exposed for 15 minutes to a mixture of 5 drops of lemon essential oil diffused into 100 ml of air at a distance of 1 meter. Immediately following the 15-minute intervention, the researcher immediately conducted a post-test using INVR instrument.



Data analysis

The collected and summarized research data were analyzed using the Wilcoxon test to test the effects of Hegu acupressure and lemon aromatherapy on nausea and vomiting in cervical cancer patients undergoing chemotherapy. The data in this study were categorical with an ordinal scale; therefore, they did not meet the assumption of normal distribution. The analysis was subsequently conducted using the Wilcoxon Signed-Rank Test, a non-parametric statistical test. Meanwhile, the Mann-Whitney test was employed to determine the difference in effects between administering Hegu acupressure and lemon aromatherapy to cervical cancer patients undergoing chemotherapy. The researchers analyzed the data using the SPSS software.

Ethical considerations

This research has undergone ethical review and was approved by the Ethics Committee of Dr. Kariadi Hospital, Semarang, Central Java, Indonesia, under approval number 1531/EC/KEPK-RSDK/2023.

RESULT

Characteristics of Respondent

The respondents in this study were cervical cancer patients undergoing chemotherapy who experienced nausea and vomiting. The characteristics of the respondents are detailed in Table 1 as follows:

Table 1. Characteristics of Respondent n=60

Variable	Hegu Acupressure		Lemon aromatherapy	
	n	%	n	%
Age				
17-25 years	0	0	1	3,3
26-35 years	1	3,3	5	16,7
35-45 years	2	6,7	8	26,7
46-55 years	15	50	11	36,7
56-65 years	9	30	4	13,3

Variable	Hegu Acupressure		Lemon aromatherapy	
	n	%	n	%
>65 years	3	10	1	3,3
Job status				
Working	1	3,3	2	6,7
Not Working	29	96,7	28	93,3
Stadiums				
Stage I	1	3,3	1	3,3
Stage II	13	43,3	10	33,3
Stage III	15	50	17	56,7
Stage IV	1	3,3	2	6,7

Based on Table 1, the characteristics of this study indicate that the majority of respondents who received Hegu acupressure intervention were in the early elderly age group, comprising 50% of the sample. Most respondents, 96.7%, were no longer working. Additionally, the majority of participants were in stage III of their condition and were still undergoing treatment, with 50% receiving chemotherapy.

The characteristics of the respondents who received lemon aromatherapy showed that the majority were in the early elderly age group, accounting for 36.7%. Most respondents were no longer working, comprising 93.3%, and the majority were in stage III of their condition and still undergoing chemotherapy, representing 56.7%.

Table 2. Distribution of Nausea and Vomiting

Variable	Hegu Acupressure		Lemon Aromatherapy	
	n	%	n	%
Pre-Intervention Nausea				
No Nausea	0	0	1	3,3
Mild Nausea	9	30	5	16,7
Moderate Nausea	16	53,3	17	56,7
Severe Nausea	5	16,7	7	23,3
Very Severe Nausea	0	0	0	0
Post-Intervention Nausea				
No Nausea	0	0	1	3,3
Mild Nausea	12	40	8	26,7
Moderate Nausea	18	60	21	70
Severe Nausea	0	0	0	0
Very Severe Nausea	0	0	0	0
Total	30	100	30	100

Based on Table 2, the majority of participants in the Hegu acupressure group experienced moderate nausea both before and after the intervention, with the proportion increasing from 53.3% to 60.0%. Similarly, in the lemon aromatherapy group, most participants remained in the moderate nausea category, with the percentage rising from 56.7% before the intervention to 70.0% afterward. Overall, both intervention groups demonstrated an improvement in nausea severity, as evidenced by the complete absence of participants classified with severe nausea following the interventions, whereas cases of severe nausea were still present prior to treatment.

Table 3. The Effect of Hegu Acupressure and Lemon Aromatherapy on Nausea, Vomiting, and Quality of Life in Patients

Variable	Negative Ranks	Positive Ranks	Ties	p-value
Hegu Acupressure				
Nausea and vomiting	8	0	22	0,005
Lemon Aromatherapy				
Nausea and vomiting	10	0	20	0,002

Table 3 demonstrates that both Hegu acupressure and lemon aromatherapy contributed to reductions in nausea and vomiting. However, the degree of improvement varied between the two intervention groups, indicating differences in treatment outcomes.

Table 4. The differences between Hegu acupressure therapy and lemon aromatherapy on nausea and vomiting

Variable	p-value
Hegu acupressure therapy for nausea and vomiting	0,005
Lemon aromatherapy for nausea and vomiting	0,002
Effectiveness of Hegu point acupressure for nausea and vomiting - lemon aromatherapy	0,421

Based on Table 4, the study results showed administering Hegu acupressure significantly affected nausea and vomiting in cervical cancer patients ($p=0.005$). Similarly, administering lemon aromatherapy also had a significant effect on nausea and vomiting in these patients ($p = 0.002$). However, there was no significant difference in effectiveness between Hegu acupressure and lemon aromatherapy in managing nausea and vomiting among cervical cancer patients ($p = 0.421$).

DISCUSSION

The majority of respondents in the Hegu acupressure group were in the early elderly group, comprising 50%, while in the lemon aromatherapy group, the majority were also in the early elderly age group, accounting for 36.7%. Consistent with the research by Lichter et al. (2022), most respondents were early elderly. Age can significantly influence the female reproductive system, as reproductive function tends to undergo physiological changes and decline with advancing age, particularly among patients with cervical cancer (Neumeyer et al, 2023). Based on this, women are more vulnerable to diseases, including cervical cancer. Although cervical cancer can be prevented if detected early, women often seek medical care only after symptoms appear, indicating that the disease reached an advanced stage. Additionally, average age of respondents fall within the early to late elderly range.

The research findings of Siegel, Giaquinto, and Jemal (2024) show that cancer screening rate remain relatively low, while the incidence of cancer, including cervical cancer, continues to rise. Mortality from cervical cancer among early elderly individuals is a leading cause of death, primarily due to late-stage screening. This phenomenon is likely to influence national policies aimed at increasing cervical cancer screening rates. Such efforts are expected to increase overall human life expectancy.

Based on the research results of Vora et al (2024), patients revealed that after being diagnosed with cervical cancer, they often blamed themselves, kept their illness a secret from

others, felt hopeless, and sometimes required support. This also causes women to be reluctant to visit health facilities, choosing to wait until more serious complaints appear.

The results of this research also showed that the majority of respondents were not working. Employment status may influence women's exposure to health information and access to health education. Unemployed women tend to have reduced access to health-related information. Evidence from previous studies indicates that low health literacy and limited awareness of cervical cancer symptoms are strongly associated with delayed healthcare-seeking behavior. Women with insufficient knowledge are more likely to underestimate symptoms and postpone medical consultation, which may contribute to delayed diagnosis and treatment of cervical cancer. Additionally, many women were diagnosed at stage III (Fang et al., 2025; Li et al., 2025; Pahlia et al., 2026).

The stage of cervical cancer may influence the severity of chemotherapy-induced nausea and vomiting (CINV), as patients with stage III disease typically undergo more aggressive treatment regimens and experience a higher symptom burden. Chemotherapy induces nausea and vomiting in more than 70% of cancer patients, including those with cervical cancer. Previous studies have demonstrated that acupressure, particularly at the Pericardium 6 (P6) point, effectively reduces the severity of nausea and vomiting in post-chemotherapy cervical cancer patients. Similarly, lemon aromatherapy has been shown to significantly alleviate the intensity of nausea and vomiting in patients undergoing chemotherapy. These findings suggest that both interventions may serve as effective non-pharmacological therapies for managing CINV in cervical cancer patients, including those with advanced stages such as stage III (Zorba, 2020; Moghari et al., 2022; Hany et al., 2024; Issac et al., 2024).

Cervical cancer patients undergoing chemotherapy require strong motivation, as this treatment often causes significant side effects. Consequently, most patients do not work during this period, focusing instead on their treatment, since the disease can be cured (Yadav, Srinivasan, & Jain, 2024). Additionally, the side effects of chemotherapy can reduce patients' productivity, often confining them to bed and limiting their ability to perform daily activities, let alone work. Therefore, education on the early detection of cervical cancer is crucial. Promoting healthy behaviors and integrating them into daily life from a productive age, especially among working mothers, can help prevent late diagnoses and low cure rates (Shehta Said Farag et al., 2024).

Cervical cancer is a preventable and detectable disease, with a high cure rate when identified early (Yadav et al., 2024). However, previous research conducted in several countries by Anaman-Torgbor, King, and Correa-Velez (2017); Romli, et al. (2024); Grigore et al. (2017); Buchanan Lunsford et al. (2017); and Ali et al. (2017) have reported that women's early detection of cervical cancer among women remains low. This often due to experience feelings of fear, embarrassment about examinations conducted by health workers, concern about the pain, apprehension regarding the gender of the examining health worker, and, and perceptions of inadequate privacy during the examination. Consequently, women with cervical cancer tend to seek medical care only when they experience troubling signs and symptoms. These symptoms typically indicate that the patient is in the advanced stages of cervical cancer and require immediate treatment.

The results of the study showed a relationship between administering Hegu acupressure and the reduction of nausea and vomiting in cervical cancer patients. Patients with cervical cancer undergoing chemotherapy experience both psychological and physical effects. Among the physical effects felt are nausea and vomiting (Fowler et al., 2023). Based on the experiences of cervical cancer survivors receiving chemotherapy, these physical complaints felt during chemotherapy are considered particularly distressing (Millet et al., 2022). Therefore, this research, which shows that Hegu acupressure is able to reduce nausea and vomiting in cervical cancer patients undergoing chemotherapy, is valuable. Consistent with these findings, Chenbing et al. (2023) reported that application of acupressure effectively reduces nausea and vomiting in cancer patients. Providing Hegu acupressure interventions can help manage nausea and vomiting in patients undergoing chemotherapy (Alhusamiah et al. 2024). Similarly, Wicaksono et al. (2023) found that Hegu acupressure reduces nausea and vomiting in chemotherapy patients (Wicaksono et al. 2023).

Acupressure is a physiotherapy procedure that involves massaging and stimulating specific points on the body to reduce pain. Pain reduction is explained by the gate control theory, which suggests that stimuli or impulses can be modulated or inhibited by defense mechanisms within the central nervous system. This theory explains the mechanism by which gates open at the nerve endings in the spinal cord, regulating the flow of nerve impulses from the peripheral nervous system to the central nervous system. When the control gate is closed, no pain is perceived; when gate is open, a person experiences pain (Wijaya & Yudhawati et al., 2022). This pain can manifest various areas of the body, including heartburn. Hegu acupressure can stimulate the release of endorphins, producing a relaxing effect that helps suppress and reduce nausea experienced by the patient. Hegu is known as the "mother of meridians" because this acupressure point can stimulate all parts of the body. Acupressure can also stimulate the release of substances such as beta-endorphins and adrenocorticotrophic hormone, which can affect the vomiting center in the brain.

The results of the study showed a relationship between the administration of lemon aromatherapy and the reduction of nausea and vomiting in cervical cancer patients. Consistent with the research by Astuti, Soleman, and Ratrinaningsih (2024), lemon aromatherapy can reduce nausea in cancer patients. Similarly, Moghari et al (2022) found that lemon aromatherapy can effectively reduce nausea in cancer patients undergoing chemotherapy. Hastuti et al. (2021) also reported that lemon aromatherapy can decrease the intensity of nausea and vomiting in cancer patients receiving chemotherapy. Comparable findings were reported by Yudha and Nurul Makiyah (2021), who observed that lemon aromatherapy help manage nausea and vomiting in cancer patients undergoing chemotherapy. Additionally, Şancı et al. (2023) confirmed that lemon aromatherapy can reduce nausea and vomiting.

Aromatherapy is a complementary therapy that can be administered by nurses (Wijaya et al., 2022). It involves the use of essential oils derived from roots, flowers, leaves, plant stems, and certain trees. These oils are composed of chemical compounds such as alcohols, ketones, and phenols, which are believed to possess therapeutic properties (Wijaya & Yudhawati, et al., 2022). Inhalation of aromatherapy is an effective and practical method to provide immediate benefits to patients, especially when complaints arise (Damayanti et al., 2022). This technique can enhance

relaxation, increase patient comfort, and reduce nausea and vomiting, particularly in cervical cancer patients undergoing chemotherapy (Trisnaputri, Adhistry, & Purwanto, 2022). Lemon aromatherapy, derived from citrus lemon peel extract, has been tested and confirmed to be safe for patients, including those with vulnerable health conditions. It is widely used and considered safe for users due to the absence of side effects (Muaris, 2018). One key component of lemon aromatherapy is linalool, which helps stabilize the nervous system, promoting calmness and reducing nausea and vomiting in individuals who inhale it (Adela, 2022).

Administering lemon aromatherapy for 15 minutes to cervical cancer patients undergoing chemotherapy —by inhalation through the nose while in a relaxed position—can reduce nausea and vomiting. Similarly, applying Hegu acupressure for 15 minutes to these patients also in a relaxed position, can alleviate nausea and vomiting. The study results showed no significant difference in the effectiveness of Hegu acupressure compared to lemon aromatherapy in reducing nausea and vomiting among cervical cancer patients. This is likely because both therapies have a relaxing effect that helps decrease nausea symptoms. Therefore, there is no difference between Hegu acupressure and lemon aromatherapy for managing nausea in cervical cancer patients.

Aromatherapy is a complementary therapy derived from natural products and extracts that promote healing for the mind, body, and soul. These natural ingredient are processed into essential oils available in various types. Aromatherapy can have several effects, including reducing nausea and vomiting (Agrawal, 2023).

As time goes by, the chosen treatment combines traditional and modern medicine. Existing traditional treatments are supported by research to ensure their safe application to patients. Lemon aromatherapy has been used for a long time, but with technological developments, it is now processed into essential oil, making it practical and easy to apply (Vora et al., 2024).

The technique of inhalation aromatherapy, involving inhaling lemon aroma and exhaling slowly, can increase blood circulation, provide relaxation and comfort, and reduce the feelings of nausea (Aulya et al., 2023). Lemon aromatherapy is an essential oil produced from lemon peel extract (Citrus lemon). This aromatherapy is commonly used and is considered safe for its users (Muaris, 2018). The compounds in lemon aromatherapy also have anti-nausea and antiemetic effects (Adela, 2022).

Hegu acupressure is known as the "mother of meridians" because this acupressure point can stimulate various parts of the body. It stimulate the release of various substances in the body such as beta-endorphins and adrenocorticotrophic hormone, which help regulate the vomiting center in the human brain. Therefore, applying Hegu acupressure therapy to patients experiencing nausea and vomiting can help reduce these symptoms. Additionally, Hegu acupressure stimulates the release of endorphins, which can produce a relaxing effect (Aulya et al. 2023). A limitation of this study is that it did not control for nausea and vomiting occurring at home.

CONCLUSION AND RECOMMENDATION

The results of this study showed that the characteristics of cervical cancer patients undergoing chemotherapy who experienced nausea and vomiting in the group receiving

Hegu acupressure and lemon aromatherapy as follows: the majority were early elderly, unemployed, and in stage III of the disease. Based on the analysis conducted, Hegu acupressure therapy and lemon aromatherapy can be administered to cervical cancer patients who are undergoing chemotherapy to reduce nausea and vomiting. Both therapies were found to be equally effective and did not cause any side effects during the study. Future research should focus on determining the optimal duration of treatment to effectively reduce nausea and vomiting in cervical cancer patients undergoing chemotherapy with Hegu acupressure and lemon aromatherapy.

REFERENCES

- Agrawal, P. (2023). Aromatherapy: An adjuvant treatment in cancer. Bentham Science Publishers. <https://doi.org/10.2174/97898151246991230101>
- Ahn, J. H., Kim, M., & Kim, R. W. (2024). Effects of aromatherapy on nausea and vomiting in patients with cancer: A systematic review and meta-analysis of randomized controlled trials. *Complementary Therapies In Clinical Practice*, 55, 101838. <https://doi.org/10.1016/j.ctcp.2024.101838>
- Alanazi, A., AlRajhi, A. M., Alnakhli, A., Bashir, M. S., & Alnajjar, F. (2024). Assessment of chemotherapy-induced nausea and vomiting in adult patients with hematopoietic stem-cell transplant at a tertiary care hospital. *Journal Of Clinical Oncology*, 42(16_suppl), e24098. https://doi.org/10.1200/JCO.2024.42.16_suppl.e24098
- Alhusamiah, B., Jumana A., Ahmad A. O., Ala'a A., Afaf Y., Jafar A. A., & Ruqayya S. Z. (2024). The effectiveness of p6 and auricular acupressure as a complementary therapy in chemotherapy-induced nausea and vomiting among patients with cancer: Systematic review. *Integrative Cancer Therapies*, 23. <https://doi.org/10.1177/15347354241239110>
- Ali, S., Skirton, H., Clark, M. T., & Donaldson, C. (2017). Integrative review of cervical cancer screening in Western Asian and Middle Eastern Arab countries. *Nursing & Health Sciences*, 19(4), 414-426. <https://doi.org/10.1111/nhs.12374>
- Anaman T., J. A., King, J., & Correa V. I. (2017). Barriers and facilitators of cervical cancer screening practices among African immigrant women living in Brisbane, Australia. *European Journal Of Oncology Nursing*, 31, 22-29. <https://doi.org/10.1016/j.ejon.2017.09.005>
- Buchanan L., Natasha, Kathleen R., Judith L. S., Mona S., & Millicent A. (2017). Environmental and psychosocial barriers to and benefits of cervical cancer screening in Kenya. *The Oncologist* 22(2). <https://doi.org/10.1634/theoncologist.2016-0213>
- Chenbing, X., Xia, H., Xing, Q., Wang, D., Xie, G., Yang, L., Xie, L., & Qian, W. (2023). Effect of ginger and p6 acupressure on chemotherapy-induced nausea and vomiting: A randomized controlled study. *Revista Da Escola De Enfermagem*, 57. <https://doi.org/10.1590/1980-220X-REEUSP-2023-0104EN>
- Jennison, C., & Turnbull, B. W. (2025). *Group sequential and adaptive methods for clinical trials*. Chapman and Hall/CRC.
- Distinarista, H., Dwidiyanti, M., & Sofro, M. A. U. (2018). Pengalaman survivor cancer: Studi fenomenologi. *Jurnal Keperawatan Soedirman*, 12(3), 134-142.
- Damayanti, R., Dewi N., Noorhayati N., & Rissa N. (2022). Management of lemon aromatherapy to reduce emesis gravidarum in first trimester pregnant women. *Jurnal Bimtas: Jurnal Kebidanan Umtas*, 6(2). <https://doi.org/10.35568/bimtas.v6i2.2919>
- Ezzati A., F., Shobeiri, F., Mafakheri, B., Mohamadi, Y., & Parsa, P. (2019). The effect of lemon aromatherapy on nausea and vomiting of pregnancy: A randomized clinical trial. *The Iranian Journal Of Obstetrics, Gynecology And Infertility*, 22(1), 46-52. <https://doi.org/10.22038/ijogi.2019.12852>
- Fang, J., Cheng, Y., Liu, Y., & Yang, Q. (2025). How delays in seeking medical care for cervical cancer patients are affected by their health-seeking behaviour: a qualitative study. *BMC Public Health*, 25, 23783. <https://doi.org/10.1186/s12889-025-23783-0>
- Fattah, A., Hesarinejad, Z., Rajabi, G. N., & Nasibi, M. (2019). The effect of aromatherapy on nausea and vomiting during pregnancy: A systematic review and meta-analysis. *Journal Of Pediatric Perspectives*, 7(3), 9061-9070. <https://sid.ir/paper/337660/en>
- Filetti, M., Lombardi, P., Giusti, R., Falcone, R., Scotte, F., Giannarelli, D., Carcagni, A., Altamura, V., Scambia, G., & Daniele, G. (2023). Efficacy and safety of antiemetic regimens for highly emetogenic chemotherapy-induced nausea and vomiting: A systematic review and network meta-analysis. *Cancer Treatment Reviews*, 115, 102512. <https://doi.org/10.1016/j.ctrv.2023.102512>
- Fitria, A., Ade A. P., & Sari Y. (2021). The effect of lemon aromatherapy on emesis gravidarum in the first trimester. *Jurnal Bidan Cerdas*, 3(3). <https://doi.org/10.33860/jbc.v3i3.445>
- Fowler, J. R., Maani, E. V., Dunton, C. J., Gasalberti, D. P., Jack, B. W., & Miller, J. L. (2023). Cervical cancer (nursing). In StatPearls [Internet]. StatPearls Publishing.
- Friska, D. (2023). The effect of lemon aromatherapy on reducing emesis gravidarum in pregnant women in the first trimester at midwife independent practice in the cempaka health center, Cianjur regency, Indonesia. *Archives of The Medicine and Case Reports*, 4(5). <https://doi.org/10.37275/amcr.v4i5.378>
- Gong, J., Dandan G., Hui W., Feng Z., Wangqin S., Haiou Y., & Juan X. (2024). Effect of acupressure in nausea and vomiting treatment during pregnancy: A meta-analysis. *Explore*, 20(1). <https://doi.org/10.1016/j.explore.2023.06.015>
- Grigore, M., Razvan P., Anda P., Ana M. g., Mioara M., & Dumitru G. (2017). Perception and use of pap smear screening among rural and urban women in Romania. *European Journal of Public Health*, 27(6). <https://doi.org/10.1093/eurpub/ckx112>
- Hany, D. N., Ardiyanti, A., & Arisdiani, D. R. (2024). Pengaruh akupresure Pericardium 6 terhadap mual muntah pada pasien kanker serviks post kemoterapi (The effect of pericardium 6 accupresure on nausea and vomiting among post chemotherapy servical cancer patients). *Vitamin: Jurnal Ilmu Kesehatan Umum*, 2(3), 471-478. <https://doi.org/10.61132/vitamin.v2i3.471>

- Hanny N. A., Euvangelia D. F., Bambang P., & Farida F. (2024). The effect of lemon aromatherapy inhalation on reducing the degree of emesis gravidarum in first trimester pregnant women at TPMB puji astuti Surabaya. *World Journal Of Advanced Research and Reviews*, 21(1). <https://doi.org/10.30574/wjarr.2024.21.1.0227>
- Hastuti, P., Yuli N., Dwi E., Christina Y., & Merina W. (2021). Lemon aromatherapy as an alternative to reduce the intensity of chemotherapy-related nausea and vomiting experienced by the breast cancer patients. *International Journal of Nursing and Midwifery Science*, 5(2). <https://doi.org/10.29082/ijnms/2021/vol5/iss2/350>
- Ismail, S., Salinda, M. T., & Fornolles, D. J. (2023). Nurses' expression of transcultural care to patients with cancer: A phenomenological study of the Philippines context. *Jurnal Keperawatan Soedirman*, 18(3), 164-170. <https://doi.org/10.20884/1.jks/2023.18.3.8222>
- Issac, A., Nayak, S. G., & Halemani, K. (2024). Acupressure on chemotherapy-induced nausea and vomiting among breast cancer patients: A systematic review and meta-analysis. *Asian Pacific Journal of Cancer Prevention*, 25(10), 3421–3428. <https://doi.org/10.31557/APJCP.2024.25.10.3421>
- Jasem, B. A. A., & Dawood, H. A. (2024). Effect of acupressure technique with wristband on postoperative nausea and vomiting in laparoscopic cholecystectomy patient. *Kufa Journal For Nursing Sciences*, 14(01), 191-199. <https://doi.org/10.36321/kjns.vi202401.15904>
- Kementrian Kesehatan RI. (2022). Indonesia Health Profile 2021. Malang.
- Li, K., Cai, Y., Xie, S., Zhou, Y., Dong, J., Zhu, Q., Zhang, J., & Qiu, X. (2022). Evidence summary for nonpharmacological management of chemotherapy-induced nausea and vomiting. *BioMed Research International*, 4741193. <https://doi.org/10.1155/2022/4741193>
- Li, Y., et al. (2025). Determinants of delay in presentation to completion of treatment in cervical cancer. *Scientific Reports*, 15, 41329. <https://doi.org/10.1038/s41598-025-25103-3>
- Miao, J., Liu, X., Wu, C., Kong, H., Xie, W., & Liu, K. (2017). Effects of acupressure on chemotherapy-induced nausea and vomiting-a systematic review with meta-analyses and trial sequential analysis of randomized controlled trials. *International Journal of Nursing Studies*, 70, 27-37. <https://doi.org/10.1016/j.ijnurstu.2017.02.014>
- Miao, Y., & Zhang, R. (2025). Effects of Chinese acupuncture on nausea and vomiting after cholecystectomy: A retrospective study. *World Journal of Gastrointestinal Surgery*, 17(11), 110262. <https://doi.org/10.4240/wjgs.v17.i11.110262>
- Millet, N., Esther L. Moss, Fehmidah M., Eva R., & Hilary J. M. (2022). A qualitative exploration of physical and psychosocial well-being in the short and long term after treatments for cervical cancer. *European Journal Of Cancer Care*, 31(2). <https://doi.org/10.1111/ecc.13560>
- Moghari, M., Rahemi, Z., Sadat, Z., & Ajorpaz, N. M. (2022). Effects of aromatherapy using sour lemon on nausea in patients undergoing chemotherapy. *Iranian Rehabilitation Journal*, 20(2), 209–216. <https://doi.org/10.32598/irj.20.2.1567.1>
- Monk, B. J., Colombo, N., Tewari, K. S., Dubot, C., Caceres, M. V., Hasegawa, K., (2023). First-line pembrolizumab+ chemotherapy versus placebo+ chemotherapy for persistent, recurrent, or metastatic cervical cancer: Final overall survival results of keynote-826. *Journal Of Clinical Oncology*, 41(36), 5505-5511. <https://doi.org/10.1200/JCO.23.00914>
- Neumeyer, S., Tanaka, L. F., Liang, L. A., & Klug, S. J. (2023). Epidemiology of cervical cancer in elderly women: Analysis of incidence, treatment, and survival using German registry data. *Cancer Medicine*, 12(16), 17284-17295. <https://doi.org/10.1002/cam4.6318>
- Pahria, T., Yuliana, A. P., Atout, M., & Agustina, H. R. (2023). Symptom clusters and quality of life among women living with cancer. *Jurnal Keperawatan Soedirman*, 18(3), 129-138. <https://doi.org/10.20884/1.jks.2023.18.3.8530>
- Pahria, T., et al. (2026). Women's experiences toward cervical cancer care at the initiation of care. *BMC Women's Health*. <https://doi.org/10.1186/s12905-026-04493-0>
- Putri, H., Farokah, A., & Khusmitha, Q. N. (2023). Lemon aromatherapy for emesis gravidarum: A systematic review. *International Journal of Nursing and Midwifery Research*, 2(1), 8–16. <https://doi.org/10.35335/ners.v2i1.173>
- Rambod, M., Nilofar P., Zahra K., & Arash F. (2023). The effect of lemon inhalation aromatherapy on pain, nausea, as well as vomiting and neurovascular assessment in patients for lower extremity fracture surgery: A randomized trial. *BMC Complementary Medicine and Therapies*, 23(1). <https://doi.org/10.1186/s12906-023-04047-z>
- Rafiei, M. (2025). The effect of lemon aromatherapy on nausea and vomiting during pregnancy: A systematic review. *Journal of Midwifery & Women's Health*. <https://doi.org/10.1111/jmwh.70135>
- Romauli, S., & Niu, F. (2022). Effect of lemon aromatherapy on decline nausea and vomiting in pregnant women in the first trimester at the Abepura health center in Jayapura city. *International Journal Of Nursing And Midwifery Science*, 6(3). <https://doi.org/10.29082/IJNMS/2022/Vol6/Iss3/420>
- Ruswadi, I., & Evi S. (2022). Gerontic nursing practical knowledge for nurses and nursing students. Penerbit Adab.
- Safajou, F., Soltani, N., Taghizadeh, M., Amouzeschi, Z., & Sandrous, M. (2020). The effect of combined inhalation aromatherapy with lemon and peppermint on nausea and vomiting of pregnancy: A double-blind, randomized clinical trial. *Iranian Journal Of Nursing And Midwifery Research*, 25(5), 401–406. <https://doi.org/10.4103/ijnmr.IJNMR.11.19>
- Salamah, H. M., Elsayed, E., Brakat, A. M., Abualkhair, K. A., Hussein, M. A., Saber, S. M., & Abdelhaleem, I. A. (2023). The effects of acupressure on postoperative nausea and vomiting among patients undergoing laparoscopic surgery: A meta-analysis of randomized controlled trials. *Explore*, 19(3), 300-309. <https://doi.org/10.1016/j.explore.2022.10.015>

- Jasem, B. A. A., & Dawood, H. A. (2024). Effect of acupressure technique with wristband on postoperative nausea and vomiting in laparoscopic cholecystectomy patient. *Kufa Journal For Nursing Sciences*, 14(01), 191-199. <https://doi.org/10.36321/kjns.vi202401.15904>
- Küçük, E., & Bülbül, T. (2021). The effects of acupressure on nausea, vomiting, and vital signs in patients undergoing gynecologic surgery: A randomized controlled trial. *Journal of Peri Anesthesia Nursing*, 36(4), 420-427. <https://doi.org/10.1016/j.jopan.2020.10.017>
- Şancı, Y., Suzan Y., Ali A., & Naciye M. (2023). Effect of peppermint-lemon aromatherapy on nausea-vomiting and quality of life in pediatric patients with leukemia: A randomized controlled trial. *Journal of Pediatric Nursing*, 72. <https://doi.org/10.1016/j.pedn.2023.07.001>.
- Shehta S. F., Doaa, S. S. A. M., Rasha N. M., & Hanan E. H. (2024). Effectiveness of educational intervention program about cervical cancer on working women's knowledge, attitude, and practice at beni-suef university. *Egyptian Journal of Health Care*, 15(1). <https://doi.org/10.21608/ejhc.2024.335701>
- Siegel, R. L., Angela N. Giaquinto, & Ahmedin J. (2024). Cancer statistics, 2024. *Ca: A Cancer Journal For Clinicians*, 74(1). <https://doi.org/10.3322/caac.21820>.
- Romli, R., Hashim, S. M., Abd Rahman, R., Chew, K. T., Mohamad, E. M. W., & Nawati, A. M. (2024). Understanding cervical cancer screening motivations from women and health practitioners' perspectives: A qualitative exploration. *Gynecologic Oncology Reports*, 52, 101349. <https://doi.org/10.1016/j.gore.2024.101349>
- Sung, H., Ferlay, J., Siegel, R. L., Laversanne, M., Soerjomataram, I., Jemal, A., & Bray, F. (2021). Global cancer statistics 2020: globocan estimates of incidence and mortality worldwide for 36 cancers in 185 countries. *Ca: A Cancer Journal For Clinicians*, 71(3), 209-249. <https://doi.org/10.3322/caac.21660>
- Trisnaputri, A. P., Karolin A., & Sigit P. (2022). Combination therapy: Ginger aromatherapy and progressive muscle relaxation in post-chemotherapy cervical cancer patients. *Jurnal Untuk Masyarakat Sehat (Jukmas)* 6(1). <https://doi.org/10.52643/jukmas.v6i1.1977>
- Vora, L. K., Amol D. G., Navnath T. H., Padmashri N., Sabiya K., Vivek P. C., Pankti C. B., Jimil G., & Dharmendra K. K. (2024). Essential oils for clinical aromatherapy: A comprehensive review. *Journal of Ethnopharmacology*, 330(April):118180. <https://doi.org/10.1016/j.jep.2024.118180>
- Wang, X., Guangyi Y., Ke L., Fujing Y., Xiaoyu L., & Shangping W. (2024). Efficacy and safety of acupressure in nausea and vomiting during pregnancy: A systematic review and meta-analysis of randomized controlled trials. *Archives Of Gynecology and Obstetrics*, 309(4). <https://doi.org/10.1007/s00404-023-07313-0>
- Wang, Y., Wang, F., Hu, F., & Long, F. (2025). Effect of non-pharmacological interventions on chemotherapy-induced nausea and vomiting: A systematic review and bayesian network meta-analysis. *Complementary Therapies In Medicine*, 88, 103124. <https://doi.org/10.1016/j.ctim.2024.103124>
- Wicaksono, B., Feriana I. H., Achmad D. F., & Zulvikar S. U. (2023). The effect of digital acupressure on chemotherapy-induced nausea in Indonesian patients with stages III-IV breast cancer. *Journal of Ayurveda And Integrative Medicine*, 14(5). <https://doi.org/10.1016/j.jaim.2023.100794>
- Wijaya, Y. A., Ni L. P. S. Y., Komang A. K. D., & Shofi I. K. (2022). Nursing complementary therapy concept. *Universitas Brawijaya*, 11(13). <https://doi.org/10.13140/RG.2.2.17112.37121>
- Xiao, C., Ming Q., Huiling X., Qianqian X., Dan W., & Weiwei Q. (2023). Effects of pc6 acupressure on acute and delayed nausea and vomiting induced by chemotherapy in patients with malignant neoplasm: A meta-analysis. *Supportive Care In Cancer*, 31(9). <https://doi.org/10.1007/s00520-023-07976-0>
- Yadav, G., Ganga, S., & Ashish J. (2024). Cervical cancer: Novel treatment strategies offer renewed optimism. *Pathology Research and Practice*, 254. <https://doi.org/10.1016/j.prp.2024.155136>
- Yu, H. (2024). Analysis of the nursing effect of five-tone therapy combined with acupoint massage on chemotherapy of lung cancer. *Technology and Health Care*, 32(6), 4837-4856. <https://doi.org/10.3233/THC-231890>
- Yudha, M.B., & Sri N.N.M. (2021). Effectiveness of aromatherapy against nausea and vomiting in patients cancer undergoing chemotherapy: Literature review. *Jurnal Aisyah: Jurnal Ilmu Kesehatan*, 6(4). <https://doi.org/10.30604/jika.v6i4.700>
- Zhang, X., Wang, Y., He, J., Li, H., & Wang, Y. (2026). Systematic review and meta-analysis of aromatherapy in alleviating post-chemotherapy nausea and vomiting among cancer patients. *Biological Research For Nursing*, 28(1), 16-29. <https://doi.org/10.1177/10998004251356515>
- Zorba, P., & Özdemir, L. (2020). Massage and inhalation aromatherapy on chemotherapy-induced nausea and vomiting: A pilot study. *Journal of Nursing Care in Cancer*, 41(5), 359-366. <https://doi.org/10.1097/NCC.0000000000000496>