Randomised Controlled Trial

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Effect of aromatherapy with rose essential oil on the nausea and vomiting in chemotherapy patients: a randomized controlled trial

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Background: The present study aims to determine the effect of aromatherapy with rose essential oil on the rate of nausea and vomiting in chemotherapy patients.

Materials and methods: This randomized controlled trial included 66 cancer patients who were randomly divided: the rose essential oil aromatherapy group ($n = 33$) and the control group ($n = 33$). The sampling period ranged from November 2022 to March 2023. The state of nausea and vomiting was assessed using the Visual Analog Scale.

Results: The average scores of nausea and vomiting of both the second and third cycle in three time periods after chemotherapy (first, second, and third six hours) were significantly lower in the intervention group than the control group ($P < 0.001$). Also, in the second cycle of chemotherapy, unlike the third cycle of chemotherapy, there was a significant interaction between group and time ($\eta p2 = 0.100$, $P = 0.001$, F (84.70, 1.37) = 6.91). In other words, the amount of difference between the mean scores of nausea and vomiting of the two control and intervention groups depended on the variable levels of time and vice versa.

Conclusion: The results indicate the reducing effect of aromatherapy with rose essential oil on the severity of nausea and vomiting after chemotherapy in cancer patients. Therefore, it is recommended to be used in chemotherapy to reduce the severity of nausea and vomiting according to the patient's condition.

Keywords: aromatherapy, cancer patients, chemotherapy, essential oils, nausea

Introduction

The management of nausea and vomiting is crucial in supporting the treatment of patients undergoing chemotherapy, as it can impact treatment outcomes by potentially reducing the effectiveness of the therapy. The intensity and duration of these symptoms vary between individuals and may also be influenced by the specific chemotherapy drugs administered[1]. The experience of nausea and vomiting after chemotherapy significantly affects the quality of life for patients, who widely acknowledge these side effects as common during cancer treatment. These symptoms are particularly prevalent both before and after chemotherapy, affecting ~10–30% of patients undergoing such treatment[2].

Despite significant progress in drug therapy aimed at controlling and minimizing nausea and vomiting in chemotherapy patients, this remains a persistent issue. However, the regular and continuous use of antinausea and vomiting medications may lead to adverse effects like drowsiness, fatigue, reduced cognitive abilities, headaches, and dry mouth[3,4].

HIGHLIGHTS

- The average scores of nausea and vomiting of both the second and third cycle in three time periods after chemotherapy (first, second, and third six hours) were significantly lower in the intervention group than the control group ($P < 0.001$).
- Also, in the second cycle of chemotherapy, unlike the third cycle of chemotherapy, there was a significant interaction between group and time ($\eta p2 = 0.100$, $P = 0.001$, F (84.70, 1.37) = 6.91).
- In other words, the amount of difference between the mean scores of nausea and vomiting of the two control and intervention groups depended on the variable levels of time and vice versa.
- The results indicate the reducing effect of aromatherapy with rose essential oil on the severity of nausea and vomiting after chemotherapy in cancer patients.
- Therefore, it is recommended to be used in chemotherapy to reduce the severity of nausea and vomiting according to the patient's condition.

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Presently, there is a growing interest in complementary medicine, particularly the use of medicinal plants, as a means to address the complications and symptoms associated with diverse diseases. This approach offers cancer patients the opportunity to manage their health challenges with medications that often have fewer side effects and are more cost-effective[5].

Aromatherapy, a time-honored method in complementary medicine with a history spanning thousands of years, involves using extracts derived from various parts of plants, such as flowers, leaves, and stems, for diverse treatments. Volatile essential oils are utilized in aromatherapy through inhalation, oral administration, and topical application[6,7]. The effectiveness of aromatherapy manifests in multiple ways, with inhalation being the swiftest method of absorption. Inhaling essential oils in aromatherapy can positively impact mental, physical, and emotional well-being[8,9]. Moreover, there is a wide range of oils and essential oils available for use in aromatherapy[10].

Rose with scientific name of *Rosa demascena* Mill can serve as a complementary remedy and aid in alleviating nausea and vomiting through aromatherapy[11]. This plant contains a diverse range of compounds, including terpenes, tannins, glycosides, flavonoids, anthocyanins, carboxylic acid, vitamin C, kaempferol, and geraniol[12]. When the essential oil is inhaled, its aromatic volatile particles travel to the nostrils. Within the nose, the hairs and villi act as receptors, transmitting electrochemical signals to the emotional and memory centers. This stimulation then spreads throughout the body via the bloodstream, resulting in the production of the scent's reaction[13]. A German research study demonstrated the effectiveness of rose scent in reducing complications associated with motion sickness, with nausea being one of the significant risks[14]. Similarly, a separate study conducted in Turkey investigated the effects of aromatherapy using ginger, lavender, rose, and placebo on postoperative nausea and vomiting. The findings revealed that aromatherapy could serve as an alternative or complementary approach to managing postoperative nausea and vomiting[15].

In modern nursing care, complementary medicine is becoming increasingly popular among nurses when attending to patients. The appeal lies in its economic affordability, minimal side effects compared to conventional drugs, and the fact that it does not require specialized equipment[10]. Notably, studies have demonstrated the beneficial impact of rose essential oil on nausea and vomiting in various scenarios like motion sickness, gastric reflux, and postoperative nausea and vomiting. However, there is a notable gap in research concerning its effect on nausea and vomiting in patients undergoing chemotherapy. Hence, this study aims to explore the potential of aromatherapy with rose essential oil as a means to alleviate chemotherapy-induced nausea and vomiting, calling for further investigation in this area.

Methods

Study design

A randomized controlled trial was carried out in North of Iran, aiming to explore the impact of aromatherapy using rose essential oil on the frequency of nausea and vomiting among patients undergoing chemotherapy in line with CONSORT criteria[16] (Fig. 1).

Ethics consideration

This study was registered in the Iranian Registery of clinical Trials and received ethical approval from the Ethics Committee of

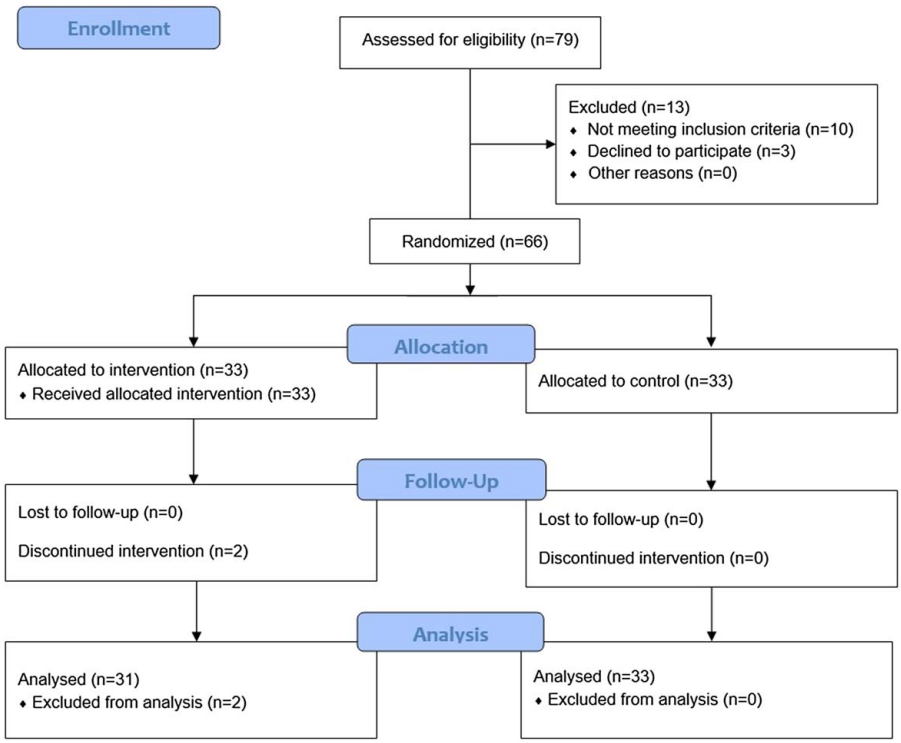

Figure 1. Flow diagram of participants.

Guilan University of Medical Sciences. All participants provided informed consent after being thoroughly briefed on the objectives of the study. They were explicitly informed that they had the right to withdraw from the study at any point if they wished to do so.

Participants

The study's participants consist of individuals who are currently undergoing chemotherapy. The sampling period ranged from November 2022 to March 2023. The research comprised 66 cancer patients who were randomly allocated into two groups: the control group and the intervention group. After screening and selecting patients who met the study's criteria, they were assigned to either the intervention group or the control group using block randomization. The block randomization method utilized blocks of size 4 and 6 in equal proportions (ratio 1:1) to allocate 33 participants to each group. The study's inclusion criteria were as follows: participants had to be 18 years or older, have undergone at least one cycle of chemotherapy, based on the results of paraclinical tests in the patient's file and doctor's examination, be free of hepatitis, brain malignancies, brain metastases, and other metastases, not have allergies to herbal medicines and aromatic essences, possess a normal sense of smell, be able to communicate in Farsi, and be receiving chemotherapy drugs known for their high potential to cause nausea and vomiting. Participants were excluded from the study if they demonstrated noncooperation with the research team or expressed a desire to withdraw from the study during the research period. Additionally, individuals experiencing any allergic reactions due to aromatherapy, sudden fluctuations in hemodynamic status, or those who passed away during the study were also excluded.

Sample size

To compare the average scores of nausea and vomiting in patients undergoing chemotherapy between the aromatherapy group using rose essence and the control group, the sample size was determined using the following formula:

$$n = \frac{2\left(z_{1-\alpha/2} + z_{1-\beta}\right)^2}{d^2} + \frac{z_{1-\alpha/2}^2}{4}$$

The sample size was determined with a consideration of a type I error of 0.05 and a type II error (power) of 0.8. The researcher anticipated a practical difference with an effect size value of $d = 0.8$ (large). Using the formula, it was calculated that 26 participants were needed in each group. Accounting for a potential 20% loss, the final sample size for each group was set at 33 people, resulting in a total sample size of 66 individuals. However, two patients chose to withdraw from the study during the third cycle of chemotherapy due to their unwillingness to continue with aromatherapy. As a result, 64 patients remained in the study. The data collection process is illustrated in Figure 1, which presents the flow diagram of the participants.

Intervention

Before the intervention, all patients provided written consent after receiving detailed explanations regarding the study's purpose and methodology. Demographic information was collected through patient interviews and documented accordingly. The level of nausea and vomiting in both the control and aromatherapy groups was assessed using the visual analog scale (VAS) 1 h before chemotherapy. In case there were any uncertainties or ambiguities in the questionnaire, the researcher offered additional explanations to ensure accurate answers. To ascertain that the participants were not sensitive to rose essential oil, a skin, and respiratory test was conducted on all patients in the intervention group. A drop of rose essential oil, with a concentration of 40%, was applied to the inner surface of the patient's wrist, and a dressing was applied. After 2 min of skin contact, the wrist area was observed for any reactions. Additionally, a sample of the oil was placed on gauze near the patient's nose to check for any signs of headaches. Only individuals who did not exhibit allergy-based symptoms (such as redness, hives, itching, etc.) and did not experience headaches were included in the study.

In the intervention group, the assessment of nausea and vomiting occurred once every hour before chemotherapy. During the chemotherapy session, 5 min before its commencement, three drops of rose essential oil (40% concentration) were applied to a sterile gauze measuring 5×5. The gauze was then attached to the patient's collar using a safety pin, ensuring that it was positioned 20 cm away from the patient's nose. The reason for choosing this method was the constant presence of the essential oil with the patient so that there is no restriction on activity and movement. The patients were instructed to breathe normally for 3 min before each chemotherapy cycle, repeating this process for every session. The data collection for this study was conducted over two cycles of chemotherapy, with a 21-day interval between them. As the patients spent a brief time at the clinic after chemotherapy and then returned home, they were educated on attaching the gauze to their clothing collars to manage nausea and vomiting for up to 18 h after treatment. Since the patients typically left the clinic following the end of chemotherapy, the assessment of nausea and vomiting was carried out via phone calls at three six-hour intervals after chemotherapy, covering the 18 h postchemotherapy period. Also, in addition to the intervention, standard antiemetic care was also provided for the patients. In this way, granisetron 3 mg/3 ml and dexamethasone 8 mg/2 ml were injected before starting chemotherapy. In addition, three capsules of aprepitant were prescribed for the patients, and the patient took 125 mg capsules on the first day and 80 mg capsules on the second and third days.

Patient information was gathered through a questionnaire covering demographic variables such as age, sex, marital status, place of residence, employment status, level of education, family history of disease, and any underlying medical conditions. Additionally, the state of nausea and vomiting was assessed using the VAS. The VAS was initially introduced by Clark and Spear in 1972, and it utilizes a score ranging from 0 to 10. A score of 0 indicates the absence of nausea and vomiting, while scores 1–3 represent mild nausea and vomiting, scores 4–6 indicate moderate levels, scores 7–9 correspond to severe nausea, and a score of 10 indicates very severe nausea[17]. The VAS is a widely accepted and standardized tool, and its validity and reliability have been verified[18].

Blinding

No placebo intervention was applied due to characteristic odor of rose essential oil. Therefore, blinding of researchers and patients to study groups could not be achieved.

Statistical analysis

Data analysis was performed using SPSS software (version 16.0, SPSS Inc.). Descriptive statistics, including means (SD) for continuous variables and frequencies (percentages) for categorical variables, were reported. To compare qualitative demographic variables, both the χ^2test and Fisher's exact test were employed. Also, quantitative demographic variables were compared using the independent *t*-test. To explore the main effects of group and time, as well as the interaction effect of group-time on nausea and vomiting scores, repeated measures analysis of variance was utilized. Specifically, the significance of the group-time interaction effect during the second cycle was examined through a simple main effects test. For this purpose, the mean scores of nausea and vomiting between the control and intervention groups were compared for each period using independent *t*-tests. Moreover, the mean scores of nausea and vomiting were compared separately for each period within the control and intervention groups using repeated measures analysis of variance. Effect sizes were also reported, including partial eta-squared for repeated measures analysis of variance and Cohen's d for independent *t*-tests. A significance level of 0.05 was used for determining statistical significance.

Results

Participants

As shown in Table 1, the study included 64 patients who were undergoing chemotherapy, with 33 assigned to the control group and 31 to the intervention group. The participants in the study had an average age of 52.81 (SD = 8.07). Among them, 60.9% were female, and 98.4% were married. Additionally, 60.9% of the participants had nonacademic education, and 48.4% were housewives. Of the participants, 67.2% had a family history of cancer, 62.5% had hypertension, 37.5% had diabetes, and 48.4% had hyperlipidemia. Additionally, 48.4% of the participants had colon cancer, and in 89.1% of them, the cancer was classified as stage II. The chemotherapy regimen used in 46.9% of the participants consisted of Oxaliplatin (135 mg), Leucovorin (600 mg), Irinotecan (250 mg), and Fluorouracil (4000 mg). There was no significant difference in demographic and clinical characteristics between the control and intervention groups ($P > 0.05$).

Table 1

Individual and clinical characteristics of the participants ($N = 64$)

	Total ($N = 64$)	Groups		*P*
		Control ($N = 33$)	Intervention ($N = 31$)	
Individual characteristics				
Age	52.81 (SD = 8.07)	53.03 (SD = 8.03)	52.58 (SD = 8.25)	0.872*
Sex				
Male	25 (39.1)	15 (45.5)	10 (32.3)	0.280**
Female	39 (60.9)	18 (54.5)	21 (67.7)	
Marital status				
Single	1 (1.6)	0 (0)	1 (3.2)	0.484***
Married	63 (98.4)	33 (100)	30 (96.8)	
Level of education				
Nonacademic	39 (60.9)	22 (66.7)	17 (54.8)	0.332**
Academic	25 (39.1)	11 (33.3)	14 (45.2)	
Job				
Housewife	31 (48.4)	15 (45.5)	16 (51.6)	0.264***
Self-employed	18 (28.1)	12 (36.4)	6 (19.4)	
Employee	7 (10.9)	4 (12.1)	3 (9.7)	
Retired	8 (12.5)	2 (6.1)	6 (19.4)	
Clinical characteristics				
Cancer history in the family				
Yes	43 (67.2)	21 (63.6)	22 (71.0)	0.532**
No	21 (32.8)	12 (36.4)	9 (29.0)	
Hypertension				
Yes	40 (62.5)	22 (66.7)	18 (58.1)	0.477**
No	24 (37.5)	11 (33.3)	13 (41.9)	
Diabetes				
Yes	24 (37.5)	16 (48.5)	8 (25.8)	0.061**
No	40 (62.5)	17 (51.5)	23 (74.2)	
Hyperlipidemia				
Yes	31 (48.4)	14 (42.4)	14 (45.2)	0.321**
No	33 (51.6)	19 (57.6)	17 (54.8)	
Type of cancer				
Breast	28 (43.8)	13 (39.4)	15 (48.4)	0.745**
Colon	31 (48.4)	17 (51.5)	14 (45.2)	
Stomach	5 (7.8)	3 (9.1)	2 (6.5)	
Stage of cancer				
II	57 (89.1)	29 (87.9)	28 (90.3)	0.754**
III	7 (10.9)	4 (12.1)	3 (9.7)	
Type of chemotherapy drugs				
Endoxan (1000 mg) - Adriamycin (100 mg)	29 (45.3)	14 (42.4)	15 (48.4)	0.858**
Oxaliplatin (135 mg) - Leucovarin (600 mg) - Irinotecan (250 mg) - Fluorouracil (4000 mg)	30 (46.9)	16 (48.5)	14 (45.2)	
Taxotere (80 mg) - Oxaliplatin (80 mg) - Leukovarin (400 mg) - Fluorouracil (3000 mg)	5 (7.8)	3 (9.1)	2 (6.5)	

Values are given as a mean (SD) for continuous variables and a number (percentage) for categorical variables.

*P-value was obtained with an independent *t*-test.

**P-value was obtained with a χ^2 test.

***P-value was obtained with a Fisher exact test.

Nausea and vomiting in patients undergoing chemotherapy

According to the assessment based on VAS before chemotherapy on patients in both control and intervention groups, none of the patients showed symptoms of nausea and vomiting.

As shown in Table 2, in all three time periods of the second cycle, the intervention group exhibited lower levels of nausea and vomiting compared to the control group. A significant interaction between group and time ($F = 6.91$, $\eta_p^2 = 0.100$, $P = 0.001$) was observed. This indicates that the disparity in average nausea and vomiting scores between the control and aromatherapy groups is influenced by the varying levels of time, and conversely, the effect of time on the scores depends on the group assignment. Significant differences were found between the aromatherapy group using rose essential oil and the control group in the first six hours after chemotherapy regarding average nausea and vomiting scores ($t = 10.20$, $d = 2.530$, $P < 0.001$). This trend persisted in the second six hours ($t = 15.60$, $d = 3.871$, $P < 0.001$) and the third six hours after chemotherapy ($t = 13.56$, $d = 3.404$, $P < 0.00$). Cohen's d-effect size values for these time intervals were considerable, measuring 2.530, 3.871, and 3.404, respectively. Based on the findings, the control group showed a statistically significant difference in average nausea and vomiting scores

Table 2

Nausea and vomiting in patients undergoing chemotherapy in both control and aromatherapy groups with rose essence in the second cycle (*N* = 64).

	Groups			
	Control (*N* = 33)	Intervention (*N* = 31)	*t*	*P*
The first six hours after chemotherapy (T1)	2.33 (SD = 0.60)	0.68 (SD = 0.70)	10.20	< 0.001*
The second six hours after chemotherapy (T1)	4.21 (SD = 0.55)	2.10 (SD = 0.54)	15.60	< 0.001*
The third six hours after chemotherapy (T1)	3.03 (SD = 0.64)	1.06 (SD = 0.51)	13.57	< 0.001*
F	194.44	168.09		
P	< 0.001**	< 0.001**		

Values are given as a mean for continuous variables.
*P was obtained with an independent *t*-test.
**P was obtained with a repeated measure ANOVA test.

across different time points ($F = 194.47$, $\eta_p^2 = 0.859$, $P < 0.001$). Specifically, the mean scores of nausea and vomiting in the second six hours after chemotherapy were significantly higher than those in the first six hours and the third six hours after chemotherapy ($P < 0.001$). Additionally, the mean scores of nausea and vomiting in the third six hours were significantly higher than those in the first six hours ($P < 0.001$). According to the findings, the aromatherapy group using rose essence exhibited a statistically significant difference in average nausea and vomiting scores across different time points ($F = 194.44$, $\eta_p^2 = 0.849$, $P < 0.001$). Specifically, the mean scores of nausea and vomiting in the second six hours after chemotherapy were significantly higher than those in the first six hours and the third six hours after chemotherapy ($P < 0.001$). Additionally, the mean scores of nausea and vomiting in the third six hours were significantly higher than those in the first six hours ($P = 0.002$).

As shown in Table 3, throughout the third cycle, the intervention group consistently demonstrated lower mean values for nausea and vomiting compared to the control group at all three-time points. The absence of a significant interaction between group and time ($F = 1.57$, $\eta_p^2 = 0.025$, $P = 0.217$) indicates that the impact of the intervention did not differ significantly across various time points. Nevertheless, the effect of time itself was found to be significant ($F = 215.82$, $\eta_p^2 = 0.777$, $P < 0.001$). This means that both studied groups exhibited a statistically significant difference in the average scores of nausea and vomiting at different time points, irrespective of the specific intervention. Based on the two-by-two comparisons, the mean scores of nausea and vomiting during the second six hours after chemotherapy were significantly higher than those during the first six hours and the third six hours after chemotherapy ($P < 0.001$). However, there was no statistically significant difference between the average scores of nausea and vomiting during the first six hours and the third six hours after chemotherapy ($P = 0.650$). Furthermore, the group effect was found to be significant ($F = 291.69$, $\eta_p^2 = 0.825$, $P < 0.001$). This indicates that, across all time points, the average scores of nausea and vomiting in the aromatherapy group using rose essential oil were significantly lower than in the control group. The effect size for the group variable was large, highlighting the substantial impact of the aromatherapy intervention on reducing nausea and vomiting.

Table 3

Nausea and vomiting in patients undergoing chemotherapy in both control and aromatherapy groups with rose essence in the third cycle (*N* = 64).

	Groups	
	Control (*N* = 33)	Intervention (*N* = 31)
The first six hours after chemotherapy (T1)	3.58 (SD = 0.66)	1.71 (SD = 0.64)
The second six hours after chemotherapy (T1)	5.12 (SD = 0.42)	3.00 (SD = 0.63)
The third six hours after chemotherapy (T1)	3.73 (SD = 0.57)	1.56 (SD = 0.61)

Values are given as a mean for continuous variables.

Discussion

In this study, the impact of rose essential oil aromatherapy on nausea and vomiting in cancer patients undergoing chemotherapy was examined. The findings indicated a significant decrease in postchemotherapy nausea among patients treated with rose essential oil aromatherapy, as compared to the control group. The study conducted by Sriningsih and Lestari[1] titled 'Aromatherapy with ginger for managing nausea and vomiting in chemotherapy among cervical cancer patients' produced outcomes that were consistent with the findings of the current research.

The study's findings indicated that the variation in average nausea and vomiting scores between the control and aromatherapy groups using rose oil was influenced by different time intervals. Similarly, the relationship worked both ways, with the time intervals also being affected by the differences between the two groups. Notably, the discrepancies between the control and aromatherapy groups differed during the first six hours, second six hours, and third six hours, highlighting the dynamic nature of the interaction. In their study entitled 'Effect of mint extract on the severity of nausea, vomiting, and anorexia in breast cancer patients undergoing chemotherapy' as in the current study, Jafarimanesh *et al.*[19] showed that there is a significant interaction between group and time, which means that in 24 h and 48 h after chemotherapy, the difference between the two control and test groups is different, and on the contrary, the time trend is dependent on the group, that is, the increasing and decreasing trend in the control group is different from the intervention group.

The findings of this study revealed that during the second cycle of chemotherapy, the aromatherapy group using rose essence exhibited significantly lower average scores of nausea and vomiting compared to the control group in the first six hours, second six hours, and third six hours after the treatment. Similarly, in Tohidi *et al.*'s study titled 'Comparison of aromatherapy with lavender and rose essential oil on the rate of nausea in chemotherapy patients', comparable results were obtained. They observed a statistically significant difference in terms of nausea between the patients in the aromatherapy group with rose essential oil and the control group at three-time points: the first, second, and third day after chemotherapy. At these specific time points, the average nausea scores in the aromatherapy group were notably lower than those in the control group[20].

The current study's findings revealed significant differences in the average scores of nausea and vomiting at different time points

during the second cycle for both the control group and the aromatherapy group with rose essence. In the control group, the average scores of nausea and vomiting were notably higher in the second six hours after chemotherapy compared to the first six hours and the third six hours. Additionally, during the third six hours, the mean scores of nausea and vomiting were significantly higher than those during the first six hours. Similarly, in the aromatherapy group with rose essence, the average scores of nausea and vomiting in the second six hours after chemotherapy were significantly higher than in the first six hours and the third six hours. The mean scores of nausea and vomiting in the third six hours were also significantly higher than in the first six hours. Zorba *et al.* conducted a study titled 'Investigation of the effects of massage and inhalation aromatherapy on chemotherapy-induced nausea and vomiting'. They found that in the control group during the second cycle, there was a significant difference in the average levels of nausea and vomiting in the periods following chemotherapy. Specifically, the average scores of nausea were higher in the second and third six hours compared to the first six hours. However, unlike the present study, there was no difference in the mean nausea scores during the third six hours. In contrast, the aromatherapy group showed similar results to our study, with the average scores of nausea in the second six hours being higher than in the first six hours and the third six hours[21].

In the present study, it was observed that the mean and standard deviation of nausea and vomiting scores in patients undergoing chemotherapy during the third cycle were lower in all three time periods in the intervention group compared to the control group. Afiat *et al.* conducted a study titled 'Comparison of the effect of inhalation aromatherapy with rose gold and metoclopramide on anxiety and depression of women with nausea and vomiting during pregnancy'. They reported that after 5 days of intervention, the nausea and vomiting levels in the aromatherapy group with placebo were comparable to the control group. On the other hand, the group that received aromatherapy with metoclopramide showed a decreasing trend in the severity of nausea and vomiting. These findings are consistent with the results of our current study, suggesting that aromatherapy with rose essential oil may be effective in reducing the intensity of nausea and vomiting[22].

In the present investigation, no significant interaction between group and time was observed during the third cycle of chemotherapy. This indicates that the time trend of nausea and vomiting was not dependent on the group, meaning the decreasing trend in the control group was similar to the aromatherapy group. However, the effect of time was significant in both groups in the third cycle, showing a statistically significant difference in average nausea and vomiting scores at different time points. Specifically, the average scores of nausea and vomiting in the second six hours after chemotherapy were significantly higher than those in the first six hours and the third six hours. However, there was no statistically significant difference between the average scores of nausea and vomiting in the first six hours and the third six hours after chemotherapy. Additionally, the group effect was significant, indicating that at all time points, the average scores of nausea and vomiting in the aromatherapy group with rose essential oil were significantly lower than in the control group. In the study conducted by Shirzad *et al.* titled 'Comparison of the effect of two methods of rosehip aromatherapy and Benson's relaxation on preoperative anxiety, hemodynamics, and complications after nose surgery', they found that in both the rose aromatherapy group and Benson's relaxation group, none of the subjects reported experiencing nausea and vomiting after surgery. This finding supports the results of the present study, suggesting that aromatherapy with rose essential oil, as well as in the intervention group of our study, had a positive effect on reducing or eliminating nausea and vomiting during specific time intervals after the intervention[23].

Limitations

This study has two notable limitations. Firstly, the sampling was conducted from a single clinic, which may limit the generalizability of the findings to a broader population. Secondly, participants in the aromatherapy group might experience a placebo effect, as their perception of improvement could be influenced by their belief in the effectiveness of the aromatherapy intervention.

Recommendations for future research

Given the significance of the research topic and the scarcity of prior studies on the impact of aromatherapy with rose essential oil on chemotherapy-induced nausea and vomiting, the current study's findings can serve as a pivotal starting point and inspiration for future research. Therefore, it is recommended that forthcoming studies explore the effects of rose essential oil aromatherapy on nausea and vomiting in postchemotherapy cancer patients with larger and more diverse populations. Additionally, future investigations should take into account other potential factors that may influence nausea and vomiting in cancer patients after chemotherapy.

Conclusions

In total, the study's results revealed a significant reduction in postchemotherapy nausea for patients treated with rose essential oil aromatherapy compared to the control group. Based on the study's findings, it is suggested that health managers and policymakers in the healthcare sector take steps to offer appropriate educational opportunities for nursing personnel. This would aim to enhance their understanding of the advantages of nonpharmacological treatments and introduce them to various complementary medicine methods, such as aromatherapy. Consequently, if patients admitted to medical centers show interest in using aromatherapy, it should be integrated into nursing care as a viable approach to effectively alleviate nausea and vomiting.

Ethical approval

This study was registered in the Iranian Registery of clinical Trials and received ethical approval from the Ethics Committee of Guilan University of Medical Sciences. All participants provided informed consent after being thoroughly briefed on the objectives of the study. They were explicitly informed that they had the right to withdraw from the study at any point if they wished to do so.

Consent

Written informed consent was obtained from the patient for publication and any accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal on request.

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Author contribution

All authors contributed in study concept and design, data acquisition, data interpretation, drafting the manuscript, revision of the manuscript, and the final version of the manuscript.

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Research registration unique identifying number (UIN)

We could not register our manuscript in the Research Registry UIN: www.researchregistry.com due to internet access restrictions and international sanctions. We live in Iran. We hardly even meet the basic needs of our daily life. We do not receive any funding for our research and we cannot pay for our research. Please excuse us from registering this manuscript in the Research Registry UIN: www.researchregistry.com. Also, this study was registered in the Iranian Registry of clinical Trials (IRCT20100921004787N7). https://en.irct.ir/user/trial/65005/view Trial Id: 65005.

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Data availability statement

The datasets generated and analyzed during the current study are available from the corresponding author on reasonable request.

Provenance and peer review

Not commissioned, externally peer reviewed.

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