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The Effect of Aromatherapy with Peppermint Essential Oil on Nausea and Vomiting in the Acute Phase of Chemotherapy in Patients with Breast Cancer

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ABSTRACT

BACKGROUND AND OBJECTIVE: Chemotherapy is one of the main treatment options for cancer patients. Nausea and vomiting are also the most common side effects of chemotherapy drugs. The aim of this study was to determine the effect of aromatherapy with peppermint essential oil on nausea and vomiting in the acute phase of chemotherapy (the first 24 hours) in patients with breast cancer.

METHODS: This randomized clinical trial was conducted on 100 women with breast cancer who were referred to the chemotherapy centers of Imam Khomeini Hospital on an outpatient basis for the first course. Patients were randomly divided into intervention and control groups. Peppermint essential oil was used in the intervention group, while normal saline was used in the control group. Frequency and severity of acute nausea and vomiting in the first night after chemotherapy were recorded and compared using Rhodes standard questionnaire with a mean score of 0 – 32.

FINDINGS: The two groups were not statistically different in terms of age, duration of cancer, history of alcohol abuse and history of nausea and vomiting. The mean score of nausea in the aromatherapy group was 1.1±1.02 and in the in the control group was 1.82±1.39 ($p<0.014$). The mean score of vomiting in the intervention group was 0.34±0.66 and in the control group was 0.66±0.97 ($p<0.032$).

CONCLUSION: The results of this study showed that the use of aromatherapy with peppermint essential oil, along with the use of routine anti-nausea/vomiting drugs, can reduce nausea and vomiting in the acute phase of chemotherapy.

KEY WORDS: *Aromatherapy*, *Nausea And Vomiting*, *Breast Cancer*, *Peppermint*.

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Introduction

Breast cancer is the most common cancer among women worldwide, as well as in Iran, and the disease is among the most common cancers in women whose prevalence is estimated to be 24.2% (1). Treatment for breast cancer is complex and includes surgery, chemotherapy, biotherapy, radiotherapy, and reconstructive surgery (2). One of the main treatment options for breast cancer is chemotherapy, which is still widely used (3). Nausea and vomiting are the most common side effects of these drugs, which affects approximately 40 – 80% of patients (4).

The effort to control nausea has been less effective and despite receiving anti-nausea / vomiting drugs, 60% of the patients report this condition. As a result, nausea is the most common discomfort experienced in patients (5). Studies have shown that nausea and vomiting may affect food intake, malnutrition and quality of life in patients (6). Various drugs are used to control chemotherapy-induced nausea and vomiting, such as serotonin receptor antagonists, dexamethasone, neurokinin receptor antagonists, and metoclopramide. Although these treatments have been effective in controlling vomiting, they can lead to complications such as headaches, dizziness, constipation, and insomnia (7).

Although anti-nausea / vomiting treatments reduce nausea and vomiting, they do not completely eliminate it, so the use of non-pharmacological treatments combined with pharmacological treatments to reduce chemotherapy-induced nausea and vomiting is recommended (8). Although the use of complementary and alternative therapies by cancer patients is not part of the sedation regimens in care centers in some countries, according to the World Health Organization, 80% of cancer patients use complementary medicine (3). The highest rate of using complementary medicine was in patients with breast cancer with a percentage of 76-83% (9). One of the most commonly used complementary therapies is the aromatherapy that is the controlled use of aromatic oils to maintain and enhance physical and mental health and is used in many countries, such as Switzerland, Germany, the United Kingdom, Canada and the United States (10).

Aromatherapy with peppermint essential oil is considered as herbal remedy. Inhaling the essential oil through the nasal mucosa and lung leads to systemic absorption of the aroma, which appears in the bloodstream only a few minutes after inhalation. Since these substances are lipophilic, they are absorbed by the brain and the nervous system. Aromatherapy with peppermint essential oil is recommended as a cost effective and efficient supplemental therapy for the treatment of postoperative nausea. Potential benefits of aromatherapy with peppermint essential oil include rapid onset of action and easy to use treatment that is free of any side effects and economically cost effective, so it can be used as a traditional anti-nausea / vomiting drug (11). Peppermint is a plant that is well known for its antispasmodic, analgesic, anti-inflammatory, decongestant and antioxidant effects (15). Aromatherapy is a cheap and non-invasive method with very little complications, especially when compared with standard drugs (12).

In several studies, the effect of peppermint on nausea and vomiting have been evaluated, but the results were contradictory, and so far, no study has been conducted to determine its effect on chemotherapy-induced nausea and vomiting. The results of one study showed that aromatherapy had better effects on nausea than on vomiting, and the women felt energetic after aromatherapy (13). In addition, a review article found that inhaling peppermint aroma resulted in a reduction in nausea and vomiting after cesarean section, and its safety has been confirmed by the United States Food and Drug Administration (14).

Therefore, if the effect of this treatment on chemotherapy-induced nausea and vomiting is proved, nurses as main members of the therapeutic team that play the role of implementing chemotherapy and providing care after chemotherapy can use this method as a strategy to reduce the complications of chemotherapy in patients and improve the quality of patient care and take an effective step to alleviate these patients' pain and increase their satisfaction with treatment. Considering the complications of chemotherapy that cancer patients face, and since the existing data have not yet been dedicated to the effect of chemotherapy on nausea and vomiting, the present study was designed to investigate the effect of aromatherapy with peppermint essential oil on nausea and vomiting in the acute phase of chemotherapy in patients with breast cancer.

Methods

This randomized parallel clinical trial was approved by the Ethics Committee of Tehran University of Medical Sciences with the code of ethics 93-02-28-25630-123568 and the Iranian Registry of Clinical

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Trials with the code IRCT2014050215649N2 on 100 patients undergoing chemotherapy at the Cancer Institute of Imam Khomeini Hospital, who were assigned to control and intervention groups (50 patients in each group). If the incidence of nausea in the control group is 41% based on similar studies (15) and we want to detect a 25% difference between the two groups as significant, the sample size was determined to be 47 in each group and 94 in total with 95% confidence and 80% power in each group and considering the potential drops of samples, the sample size was estimated to be 100. Patients who had the inclusion criteria were randomly allocated into intervention and control groups.

Patients with definitive diagnosis of breast cancer and undergoing chemotherapy with moderate to severe nausea-inducing drugs (cyclophosphamide and adriamycin), the first course of chemotherapy, having reading and writing literacy, having a healthy sense of smell, and not having physical, mental, and psychological diseases, non-allergenic to plants (herbal plants), not having respiratory diseases such as asthma, allergic diseases, chronic obstructive pulmonary disease, not using anti-nausea/vomiting drugs other than medications prescribed by the physician, lack of diseases that lead to vomiting such as liver failure, kidney failure, digestive problems, acute stage of hepatitis B, gastrointestinal obstruction and brain malignancies were included in the study. Subjects who were reluctant to continue to participate in the study, the lack of regular use of aroma and discomfort from the aroma of essential oils were excluded.

After referring to the outpatient chemotherapy department of Imam Khomeini Hospital, and after explaining the research goals and obtaining written informed consent from patients, sampling was performed among women with breast cancer who had the criteria for entering the research.

Each participant was given a package containing 20 ml dropper bottle (containing normal saline or 100% peppermint essential oil), a tissue paper and pin. In the intervention group, in addition to the standard medications prescribed by the physician, two drops of 100% peppermint essential oil (Barij Essence in Kashan) were poured over the tissue paper (20×20 cm) and it was attached to the collar of the patient's clothes by a pin (11). They were then asked to breathe normally for 20 minutes, and this procedure was performed three times a day (morning, noon, and night). Patients in the control group used a placebo (normal saline) instead of inhaling the peppermint oil during this specified period. The data were collected using a two-part questionnaire; part one included demographic data, and part two was Rhodes Index of Nausea and Vomiting (16). The standard Rhodes Index of Nausea and Vomiting consists of eight five-option questions with Likert scale, which is completed by the patient within 24 hours, and measures the severity of nausea, frequency of nausea, discomfort caused by nausea, frequency of vomiting, quantity of vomited matter, discomfort caused by vomiting, frequency of retching, and discomfort caused by retching.

This scale includes the separate measurement of the objective and subjective cases of nausea and vomiting. The patient completes and scores the questionnaire by selecting one of the options, including minimum signs or no sign (score zero) to the worst condition (score 4). Thus, the total scores of 0 – 32 are obtained. It is also a standard instrument whose validity and reliability of its Persian version have been assessed and the Cronbach's alpha coefficient has been reported to be 0.88 (16). The patients was trained on how to complete the questionnaire so that she could complete it at home. To be sure about the implementation of aromatherapy, the aromatherapy checklist was given to the participants and the researcher reminded them by telephone or texting. The questionnaires were delivered to the chemotherapy center at the next referral. Data were analyzed using SPSS software version 19 and Mann-Whitney, Chi-square and independent t-test. $P < 0.05$ was considered significant.

Results

The mean age in the intervention group was 47.86±9.52 years and in the control group was 45.74±9.92 years. The two groups did not differ significantly in terms of age, duration of cancer, education, history of smoking, alcohol use, and motion sickness, occupation and marital status (Table 1). 76% of the patients were satisfied with the aromatherapy, and 54% of them recommended this method to others. The mean score of nausea during the acute phase was 1.1±1.02 in the intervention group and 1.82±1.39 in the control group ($p<0.014$).

The results also showed that the mean score of the frequency of cases, the discomfort caused by it and the duration of nausea in the acute phase in the group receiving aromatherapy with peppermint essential oil were lower and this difference was statistically significant ($p<0.036$) (Table 2). In addition, the results of Mann-Whitney test showed that the mean score of

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vomiting in the intervention group was 0.34±0.66 and in the control group was 0.66±0.97, which was statistically significant (p<0.032). However, the mean score of the frequency and amount of vomiting in the aromatherapy group was lower than the control group, but this decrease was not statistically significant, and this level was statistically significant between the two groups only in terms of discomfort caused by vomiting (p<0.025) (Table 2). Regarding the experience of retching in the acute phase, the results of the study showed that the frequency of cases of retching and discomfort caused by retching in aromatherapy group was lower than the control group, but this difference was not statistically significant (Table 2).

Table 1. Comparison of demographic characteristics of the samples in two groups of intervention and control (n=50)

Specifications		Intervention group Mean±SD	Control group Mean±SD	P-value
Age		47.89±9.52	45.74±9.92	0.27 *
Duration of cancer		5.16±8.14	7.96±17.72	0.31 *
Marital status		N(%)	N(%)	0.83 **
	Single	1(2)	2(4)	
	Married	49(98)	48(96)	
History of alcohol consumption	Never	49(98)	49(98)	1.00 **
	In the past	1(2)	1(2)	
	At the moment	0	0	
History of smoking	Never	46(92)	47(94)	0.33 **
	In the past	2(4)	3(6)	
	At the moment	2(4)	0	
History of motion sickness	Never	35(70)	34(68)	0.21 **
	In the past	9(18)	14(28)	
	At the moment	6(12)	2(4)	
Level of Education	Illiterate	5(10)	4(8)	0.55 **
	Elementary school	8(16)	10(20)	
	High school	33(66)	28(54)	
	University degree	4(8)	8(16)	

*** Independent T ** Chi-square**

Table 2. Comparison of mean scores of nausea, vomiting and retching in acute phase among the samples in the two groups of intervention and control

Variable	Group	Intervention Mean±SD	Control Mean±SD	P-value*
Nausea	Duration	1.3±1.23	2.16±1.59	0.008
	Discomfort	1.14±1.04	1.72±1.29	0.026
	Frequency	0.88±1.2	1.58±1.53	0.036
	Total	1.1±1.02	1.82±1.39	0.014
Vomiting	Frequency	0.2±0.52	0.46±1.16	0.633
	Discomfort	0.64±1.17	1.26±1.42	0.025
	Amount	0.18±0.56	0.26±0.72	0.56
	Total	0.34±0.66	0.66±0.97	0.032
Retching	Discomfort	0.76±1.06	1.36±1.46	0.068
	Frequency	0.74±1.19	1.1±1.37	0.311
	Total	0.75±1.04	1.23±1.29	0.171

*** Mann-Whitney statistical test**

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Discussion

The results of this study showed that the use of aromatherapy with peppermint essential oil during the acute phase significantly reduced nausea in patients with breast cancer. In this regard, Ghani et al., in their pilot study entitled "The Effect of Aromatherapy Inhalation on Nausea and Vomiting in Early Pregnancy among Women in Saudi Arabia" came to the same conclusion and stated that aromatherapy with peppermint and lavender essential oil as well as dietary education has led to a significant reduction in the frequency and severity of nausea during pregnancy (17). Moreover, the results of the study by Seale in the United States showed that aromatherapy with peppermint reduced nausea (18).

On the contrary, Ferruggiari et al. in the United States investigated the effect of the aromatherapy on postoperative nausea in women and stated that the use of aromatherapy with peppermint essential oil cannot reduce the frequency and severity of postoperative nausea and vomiting, and more supplementary studies seem necessary. The reason for this difference may be associated with the type of patients, as well as the difference in the method of performing the aromatherapy for these patients (11).

The results of the present study showed that the frequency and amount of vomiting in the acute phase in patients receiving aromatherapy with peppermint essential oil was lower than the control group, and this decrease was not statistically significant. However, aromatherapy has significantly reduced the discomfort caused by vomiting in the treated patients. Furthermore, evaluation of different studies showed that aromatherapy with peppermint essential oil resulted in decreased vomiting, but it was not statistically significant (8, 11, 17), which is not consistent with the findings of Pasha (19). However, other studies have shown that the aromatherapy has significantly reduced vomiting (13). The reason for this inconsistency may be the difference in the type of substance used for aromatherapy, the severity of vomiting and the difference in the type of disease. The results of the present study showed that aromatherapy with peppermint essential oil did not significantly reduce retching in the patients, which was not consistent with the results of Abdel Ghani et al. (13).

According to this research, it can be stated that the use of aromatherapy with peppermint essential oil at the recommended dosage does not cause any side effects and can be used as a therapeutic method along with medical treatments to improve chemotherapy-induced nausea and vomiting.

Therefore, by providing inexpensive equipment and supplies to implement aromatherapy, we can prepare the conditions for using this complementary therapy for nurses in the chemotherapy departments to improve the status of patients and reduce the complications caused by chemotherapy along with other medical interventions.

However, since this study was conducted only among female patients with breast cancer who received one-day chemotherapy courses, it is suggested that future studies be performed among patients with various cancers as well as cancer patients undergoing several days of chemotherapy so that the results of using this approach become clearer. Since chemotherapy-induced nausea and vomiting occurs after chemotherapy, this study compared the information only after the intervention due to lack of basic information about this complication in patients, which is one of the limitations of this study. Ethical considerations: The authors state that all relevant ethical principles, including the confidentiality of the questionnaires, obtaining informed consent from the participants in the research, and the discretion of leaving the research have been observed in this study.

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