



Effectiveness of Aromatherapy Against Nausea and Vomiting in Patients Cancer Undergoing Chemotherapy: Literature Review

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ARTICLE INFO

Article history:

Received 11 June 2021
Accepted 21 October 2021
Published 10 December 2021

Keyword:

Aromaterapy
Cancer
Chemotherapy
Nausea and Vomiting

ABSTRACT

Cancer became the second leading cause of death in the world at about 9.6 million deaths in 2018. One of the most common treatments is chemotherapy. Chemotherapy has side effects such as nausea vomiting, stomatitis, anorexia, bone marrow damage, and alopecia. Treatment of vomiting nausea can be done through non-pharmacological therapy, namely by using aromatherapy. The review aims to find out and synthesize the scientific literature on the effectiveness of aromatherapy against nausea and vomiting in cancer patients undergoing chemotherapy. The literature search method uses the electronic databases PubMed, Proquest, Science Direct, and Google Scholar using search keywords: cancer + chemotherapy + aromatherapy + nausea + vomiting; cancer AND chemotherapy OR aromatherapy AND nausea AND vomiting. Out of a total of 3946 articles found, 30 were determined from the results of matching the title with the abstract. After removing duplicate articles, each abstract article is evaluated. The next 23 articles were obtained, read in full, and searched for relevant articles. Selected 8 articles used to be included in the final data set. A total of 8 articles use aromatherapy from various types of herbal medicinal plants such as lavender, ginger, and peppermint. The conclusion is that aromatherapy has been shown to be effective for reducing symptoms of nausea and vomiting in cancer patients undergoing chemotherapy.

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Efektivitas Aromaterapi Terhadap Mual dan Muntah pada Pasien Kanker yang Menjalani Kemoterapi: Literature Review

ABSTRAK

Kanker menjadi penyebab kematian kedua di dunia sekitar 9,6 juta kematian pada 2018. Salah satu perawatan yang paling umum adalah kemoterapi. Kemoterapi memiliki efek samping seperti mual muntah, stomatitis, anoreksia, kerusakan sumsum tulang, dan alopecia. Pengobatan mual muntah dapat dilakukan melalui terapi non-farmakologis, yaitu dengan menggunakan aromaterapi. Tinjauan ini bertujuan untuk mencari tahu dan mensintesis literatur ilmiah tentang efektivitas aromaterapi terhadap mual dan muntah pada pasien kanker yang menjalani kemoterapi. Metode pencarian literatur menggunakan database elektronik PubMed, Proquest, Science Direct, dan Google Scholar menggunakan kata kunci pencarian: cancer + chemotherapy + aromatherapy + nausea + vomiting; cancer AND chemotherapy OR aromatherapy AND nausea AND vomiting. Dari total 3946 artikel yang ditemukan, 30 artikel ditentukan dari hasil pencocokan judul dengan abstrak. Setelah menghapus artikel duplikat, setiap artikel abstrak dievaluasi. 23 artikel berikutnya diperoleh, dibaca

Kata kunci:

Aromaterapi
Kanker
Kemoterapi
Mual dan Muntah

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DOI: 10.30604/jika.v6i4.700

secara lengkap, dan mencari artikel yang relevan. Dipilih 8 artikel yang digunakan untuk dimasukkan dalam kumpulan data akhir. Sebanyak 8 artikel menggunakan aromaterapi dari berbagai jenis tanaman obat herbal seperti lavender, ginger, dan peppermint. Kesimpulannya adalah aromaterapi telah terbukti efektif untuk mengurangi gejala mual dan muntah pada pasien kanker yang menjalani kemoterapi.



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INTRODUCTION

Cancer became the second originator of death in the world of about 9.6 million deaths in 2018. According to the *International Agency for Research on Cancer* (IARC) (2020) shows that the most cancer cases in Indonesia are breast cancer with 65,858 cases or 16.6% of the total 396,914 cases of cancer, then cervical cancer with 36,633 cases or 9.2%, lung cancer with 34,783 cases or 8.8%, colorectal cancer with 34,189 cases or 8.6%, and the last is liver cancer with 21,392 cases or 5.4%.

Based on data from Basic Health Research (Riskesmas) tahun 2018 from Ministry of Health Republic of Indonesia (2019) the prevalence of tumor or cancer in Indonesia showed an increase from 1.4 per 1000 population in 2013 to 1.79 per 1000 population in 2018. According to Riskesdas data, the highest prevalence of cancer is in the province of Yogyakarta Special Region at 4.86 per 1000 population, then West Sumatra by 2.4779 per 1000 population, and Gorontalo by 2.44 per 1000 population.

One of the most frequent treatments of choice for cancer patients is chemotherapy. Chemotherapy is very important because it is systemically deadly cancer cells, and is often an effective choice in overcoming cancer, especially local advanced cancers (Desen, 2008). Administration of chemotherapy therapy at certain doses in accordance with chemotherapy drugs can cause changes in the functional status of respondents due to side effects caused.

Side effects of chemotherapy felt by patients are nausea and vomiting, stomatitis, anorexia, bone marrow damage, and alopecia (Melia et al., 2008). The impact caused if nausea and vomiting occur prolonged then there will be conditions that can threaten the body including dehydration, worsening of nutritional status, quality of life and decreased physical function (Marx et al., 2016).

Treatment of nausea and vomiting can be done with non-pharmacological therapy. Treatment using non-pharmacological therapy or complementary therapy can overcome health problems, because the implementation of this therapy is relatively easy and does not cause side effects. Non-pharmacological therapies that can be used to reduce nausea and vomiting in cancer patients undergoing chemotherapy are using aromatherapy.

Aromatherapy is an essential oil produced from fragrant parts of the plant, useful for treating or relieving physical and emotional symptoms. Aromatherapy can be used to reduce symptoms of nausea and vomiting in people with diemtherapy cancer. The mechanism goes through the circulation and respiratory system, when etheric oil in light particle inhalation evaporates to bring aromatic particles to the nostrils. The nose hair vibrates as receptors send

electrochemical impulses to the emotional and memory centers. These impulses are passed throughout the body through the circulatory system, appearing an olfactory response and stimulating brain cells (Price & Price, 2011). The aroma stimulates the thalamus to secrete enkephalin which serves to reduce pain and create a feeling of calm (Howard & Hughes, 2008).

The advantages of peppermint aromatherapy that can be found include being able to provide a feeling of comfort, as a sedative, reduce stress hormones, overcome spasms, feeling dizzy, and lower the symptoms of nausea vomiting. Aromatherapy is a cheap and noninvasive method with few complications experienced especially when compared to standard drugs (Hines S & Gibbons, 2018; Supatmi, S., & Agustiniingsih, 2015).

Other benefits that can be found in aromatherapy include rapid onset of action, easy-to-use treatment free of side effects, and cost-effective (Eghbali et al., 2018; Jafarimanesh et al., 2020; Sari et al., 2015). In this regard, researchers are interested in researching the effectiveness of the use of aromatherapy against nausea and vomiting in cancer patients undergoing chemotherapy.

METHOD

According to Rusmawan (2019) in Nurmawati & Handayani (2021) literature review is an activity to collect data and information by exploring knowledge or knowledge from various sources such as books or written works. In this study, an analysis of 8 articles to find out the effectiveness of the use of aromatherapy to reduce nausea and vomiting in cancer patients in chemotherapy.

Sources of Data and Information

The search for articles was carried out on the PubMed, Proquest, Science Direct, and Google Scholar using the keywords cancer + chemotherapy + aromatherapy + nausea + vomiting, cancer AND chemotherapy OR aromatherapy AND nausea AND vomiting. Inclusion criteria in this article are free full text article, publication year 2015 to 2021, English language and Indonesia language, RCT research method or quasy experiment, chemotherapy cancer patients, associated with vomiting nausea, associated with aromatherapy. Then for, the exclusion criteria used are articles that are not full text.

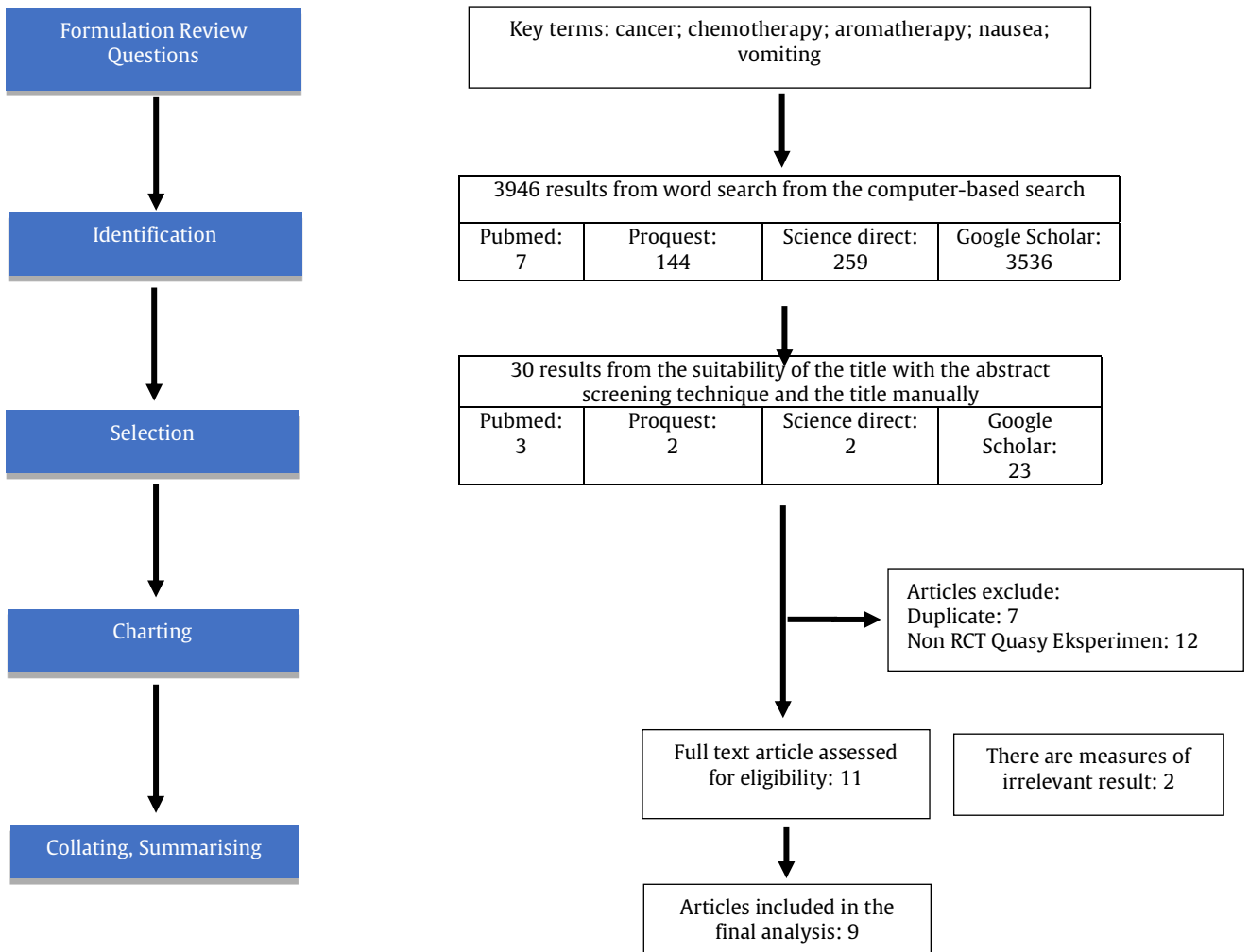
RESULTS AND DISCUSSION

Table Article Review

After the author selects and extracts each article that has been determined, then the author describes the article by dividing the categories: the name of the author and the year, the title of the article, the purpose of the research, the design of the study, participants, the country, and the results of the

study. Eight articles that have been selected using various types of aromatherapy include ginger, lavender, and peppermint. The results of the 8 articles explained that there was a significant difference between the pre group and post test groups after being given aromatherapy ginger, lavender, and peppermint. That is, the use of aromatherapy ginger, lavender, and peppermint is effective to reduce nausea and vomiting in cancer patients undergoing chemotherapy along with the use of chemotherapy treatment drugs.

Article Selection Flow



PRISMA Flow Chart

A total of 8 articles have been reviewed in the literature review. The research conducted came from the Indonesian state article, Iran two articles, and Turkey one article. All of these articles use aromatherapy from various types of herbal medicinal plants such as lavender, ginger, and peppermint. The findings of eight articles suggest that in cancer patients undergoing aromatherapy chemotherapy ginger, lavender and peppermint can effectively reduce the severity of nausea and vomiting (Ain et al., 2019; Eghbali et al., 2018; Ertürk & Taşcı, 2021; Jafarimanesh et al., 2020; Lestari & Khurniawan, 2017; Manurung & Adriani, 2018; Sriningsih & Lestari, 2017; Wiryani et al., 2019).

Four articles (Eghbali et al., 2018; Ertürk & Taşcı, 2021; Jafarimanesh et al., 2020; Lestari & Khurniawan, 2017)

reported that peppermint aromatherapy has an effect on nausea and vomiting in cancer breast patients who receive chemotherapy. Another study Ain et al., (2019) reported that there was a significant difference in the use of lavender aromatherapy to the severity of vomiting nausea that is done routinely in breast cancer patients. Ghani & Ibrahim, (2013) research supports the results of this study, namely pregnant women experience a little nausea and vomiting on the third day after getting aromatherapy. Another study Ovayolu et al., (2014) reported that in the experimental group, from week 6 to week 10, the physical signs of breast cancer patients decreased and quality of life improved.

Tabel 1
Summary Of Selected Articles

Author (Year)	Title	Research objectives	Research Design	Participants	Country	Research Results
Ain <i>et al.</i> , (2019)	Aromatherapy Lavender Dalam Upaya Menurunkan Nausea dan Vomiting Pasien Kanker Payudara yang Menjalani Kemoterapi Di RSUD Dr. Soetomo Surabaya.	Explains the effects of lavender aromatherapy on nausea and vomiting in breast cancer patients with chemotherapy	Randomized pre-post test with control group	40 breast cancer participants undergoing one-day treatment chemotherapy	Indonesia	There was a difference in nausea and vomiting between the sample group before and after the intervention group, with a p value (0.001).
Efe Ertürk & Taşcı, (2021)	The Effects of Peppermint Oil on Nausea, Vomiting and Retching in Cancer Patients Undergoing Chemotherapy: An Open Label Quasi-Randomized Controlled Pilot Study.	Evaluate the effects of peppermint oil on the severity of nausea, vomiting, and retching in cancer patients undergoing chemotherapy.	Quasi randomized controlled study.	80 participants (36 intervention group participants and 44 control group participants)	Turkey	There were significant differences in changes in the frequency of nausea, vomiting, retching across all drug schedules (Folfinirox, Paclitaxel-Trastuzumab, Carboplatin-Paclitaxel and Cyclophosphamide-Adriamycin) excluding cisplatin schedules (P<0.05).
Jafarimanesh <i>etal.</i> , (2020)	The Effect Of Peppermint (Mentha Piperita) Extract On The Severity Of Nausea, Vomiting And Anorexia In Patients With Breast Cancer Undergoing Chemotherapy: A Randomized Controlled Trial.	Know the effect of peppermint extract on the severity of nausea, vomiting, and anorexia in breast cancer patients undergoing chemotherapy.	Triple blinded randomized placebo controlled trial.	84 participants with breast cancer who underwent chemotherapy, with divisions for each control and intervention group (42 participants in each group).	Iran	There was an average difference in the weight score of nausea, vomiting, and anorexia in the intervention group lower than that of the control group (p = < 0.05).
Lestari & Khurniawan, (2017)	Decreasing Nausea and Vomiting Due to Chemotherapy Induction Through Peppermint Aromatherapy.	Determine the effectiveness of peppermint aromatherapy in reducing CINV	Quasy experiments with control groups	285 cancer participants undergoing chemotherapy	Indonesia	It showed that peppermint aromatherapy was effective against reduced nausea scales in chemotherapy patients, seen from the experimental group p value (0.001) ≤ from the control group (0.02).
Manurung & Adriani, (2018)	Pengaruh Pemberian Aromatherapy Jahe terhadap Penurunan Mual dan Muntah pada Pasien Kanker	Know the effect of ginger aromatherapy on nausea and vomiting in cancer patients.	Quasy eksperimen dengan pre-post test one group only	30 cancer participants undergoing chemotherapy	Indonesia	Showed that ginger aromatherapy can reduce nausea and vomiting in cancer patients p value (0.003).

Author (Year)	Title	Research objectives	Research Design	Participants	Country	Research Results
M. Eghbali <i>et al.</i> , (2018)	yang Menjalani Kemoterapi di Rumah Sakit Umum Imelda Pekerja Indonesia Medan Tahun 2017. The Effect Of Aromatherapy With Peppermint Essential Oil On Nausea And Vomiting In The Acute Phase Of Chemotherapy In Patients With Breast Cancer.	Know the effect of peppermint essential oil aromatherapy on nausea and vomiting in the acute chemotherapy phase in the first 24 hours in breast cancer.	Randomized clinical trial.	The 100 participants underwent chemotherapy at the Cancer Institute of Imam Khomeini Hospital, and were divided into control and intervention groups (50 participants in each group).	Iran	The use of aromatherapy peppermint essential oil along with the use of antimual drugs or vomiting regularly, can reduce nausea and vomiting in the acute chemotherapy phase.
Sriningsih & Lestari, (2017)	Aromatherapy ginger use in patients with nausea & vomiting on post cervical Cancer chemotherapy.	Knowing the effect of ginger aromatherapy on nausea and vomiting in patients undergoing postoperative chemotherapy cervical cancer	Quasy eksperimen	60 post cervical cancer participants undergoing chemotherapy	Indonesia	There was a significant difference in the intervention and control group with a nausea score (p value = 0.005) and a vomiting score (p value = 0.013).
Wiryani <i>et al.</i> , (2019)	Efektivitas Aromaterapi Jahe terhadap Keluhan Mual dan Muntah pada Pasien CA Serviks dengan Kemoterapi di RSUD Prof dr. Margono Soekarjo Purwokerto.	Understand the effectiveness of ginger aroma therapy against the main complaints of vomiting nausea in cervical cancer patients undergoing chemotherapy.	Quasy eksperimen	62 cervical cancer participants who were undergoing chemotherapy	Indonesia	The value of p (0.000) so the main complaints of nausea and vomiting differ in cervical cancer patients who get chemotherapy after ginger aromatherapy.

Three articles (Manurung & Adriani, 2018; Sriningsih & Lestari, 2017; Wiryani *et al.*, 2019) reported that in cancer patients undergoing chemotherapy, ginger aromatherapy is able to reduce nausea and vomiting. Enikmawati, (2016) reported that the average frequency of nausea and vomiting in the intervention group was lower than that of the control group, so it can be interpreted that ginger aromatherapy was able to reduce the frequency of nausea and vomiting associated with chemotherapy in breast cancer patients.

This review shows the effectiveness and benefits of aromatherapy (lavender, ginger, and peppermint) all three aromatherapy ingredients containing essential oils, essentials, and menthol can help reduce the severity of

nausea and vomiting in cancer patients undergoing chemotherapy. Eight articles discussing nonpharmacological aromatherapy interventions against nausea and vomiting in cancer patients undergoing chemotherapy were included in this literature review.

Based on information obtained from the article shows that aromatherapy has been widely used in three countries namely Indonesia, Iran, and Turkey, all of which are muslim countries who have a habit of using herbal therapy as a nonpharmacological therapy to provide a relaxed and comfortable feeling for the body when inhaled (inhalation) and to reduce the severity of nausea vomiting for cancer patients who are undergoing chemotherapy.

When inhaling aromatherapy, volatile particles will bring the aromatic elements contained in the oil to the top of the nose. Vibrating nose hair sends electrochemical information to the emotional center, and then sends that information to other parts of the body through the circulatory system by releasing nerve chemicals. The smell response produced by aromatherapy stimulates the work of neurochemical cells in the brain (Eghbali et al., 2018).

The smell of aromatherapy stimulates the hypothalamus to secrete enkephalins, which can be used as a natural pain reliever and provide a soothing taste. The pituitary gland releases chemicals into the blood circulation to regulate the function of other glands. The soothing aroma stimulates the raphe nucleus in the brain to release serotonin, reduces cortisol secretion, and activates the 5HT₃ receptor that can block the center of nausea vomiting so that vomiting nausea will not occur after inhaling aromatherapy (Howard & Hughes, 2008; Sari et al., 2015).

Aromatherapy is a treatment that uses essential oils that have the effect of improving physical and mental conditions and making the body and mind become more relaxed. Each essential oil has pharmacological effects, including antibacterial, antiviral, diuretic, vasodilator, sedative, and adrenal stimulation (Wiryani et al., 2019). Ginger aromatherapy is a spice plant and rhizomes are very widely used one of them as a traditional medicinal herb (Ramadhan, 2013). The advantage of ginger is that it has an essential oil content that has a refreshing effect and blocks vomit reflexes (Winarti, 2017).

Lavender aromatherapy also contains essential oils when inhaling the scent of lavender. This essential ingredient stimulates the olfactory bulb receptor, which has a calming effect and reduces nausea and vomiting (Sowndhararajan & Kim, 2016). Peppermint aromatherapy contains menthol, menthone, and menthyl acetate. The content if inhaled (inhalation) can also reduce fever, reduce symptoms of nausea vomiting, and improve the digestive process (Fundukian, 2009; Tisserand & Young, 2013).

This is in line with research conducted Astrilita et al., (2016) his research reported there is a significant influence of ginger aromatherapy on the reduction of vomit nausea in post-chemotherapy patients at Telogorejo Hospital Semarang. Zorba & Ozdemir, (2018) stated that the severity of nausea was significantly lower among patients in the inhaled aromatherapy group compared to the control group.

Haddadi et al., (2017) research shows that sucking on ice sheets containing mint extract during chemotherapy can reduce the severity of nausea. Rahayu & Sugita, (2018) study reported a significant difference in the intensity of nausea and vomiting before and after being given lavender aromatherapy compared to the administration of ginger aromatherapy.

LIMITATION OF THE STUDY

This study has limitations in the number of database articles analyzed due to the lack of research that raises this issue. Research in the form of further literature studies is expected to use more databases so that the results of the research obtained are more variable and describe the conditions that developed at that time.

CONCLUSIONS AND SUGGESTIONS

Based on reviews from several journals that have been outlined, it can be concluded that aromatherapy has been shown to be effective in reducing symptoms of nausea and

vomiting in cancer patients undergoing chemotherapy. Aromatherapy commonly used as a non-pharmacological therapy to reduce nausea and vomiting in cancer patients undergoing chemotherapy includes ginger, lavender, and peppermint aromatherapy. Aromatherapy can be used as an alternative therapy to reduce nausea and vomiting in cancer patients undergoing chemotherapy.

ETHICAL CONSIDERATIONS

Funding Statement

The authors did not receive support from any organization for the submitted work.

Conflict of Interest Statement

The authors report there is no conflict of interest. The authors themselves will be responsible for the content and writing of the paper.

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