



# Effects of inhaled ginger aromatherapy on chemotherapy-induced nausea and vomiting and health-related quality of life in women with breast cancer



Pei Lin Lua<sup>a,\*</sup>, Noor Salihah<sup>b</sup>, Nik Mazlan<sup>c</sup>

<sup>a</sup> Community Health Research Cluster, Faculty of Health Sciences, Universiti Sultan Zainal Abidin (UniSZA), Kampus Gong Badak, 21300 Kuala Nerus, Terengganu, Malaysia

<sup>b</sup> Faculty of Health Sciences, Universiti Sultan Zainal Abidin (UniSZA), Kampus Gong Badak, 21300 Kuala Nerus, Terengganu, Malaysia

<sup>c</sup> Kulliyah of Allied Health Sciences, International Islamic University Malaysia (IIUM), Kuantan Campus, 25710 Kuantan, Pahang, Malaysia

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## KEYWORDS

Aromatherapy;  
Chemotherapy-induced nausea  
vomiting;  
Ginger;  
*Zingiber officinale*;  
Essential oil

## Summary

**Objective:** To assess the efficacy of inhaled ginger aromatherapy on nausea, vomiting and health-related quality of life (HRQoL) in chemotherapy breast cancer patients.

**Design:** Single-blind, controlled, randomized cross-over study. Patients received 5-day aromatherapy treatment using either ginger essential oil or fragrance-matched artificial placebo (ginger fragrance oil) which was instilled in a necklace in an order dictated by the treatment group sequence.

**Setting:** Two oncology clinics in the East Coast of Peninsular Malaysia.

**Main outcome measures:** VAS nausea score, frequency of vomiting and HRQoL profile (EORTC QLQ-C30 scores).

**Results:** Sixty female patients completed the study (age =  $47.3 \pm 9.26$  years; Malay = 98.3%; on highly emetogenic chemotherapy = 86.7%). The VAS nausea score was significantly lower after ginger essential oil inhalation compared to placebo during acute phase ( $P = 0.040$ ) but not sustained for overall treatment effect (treatment effect:  $F = 1.82$ ,  $P = 0.183$ ; time effect:  $F = 43.98$ ,  $P < 0.001$ ; treatment  $\times$  time effect:  $F = 2.04$ ;  $P = 0.102$ ). Similarly, there was no significant effect of aromatherapy on vomiting [ $F(1, 58) = 0.29$ ,  $P = 0.594$ ]. However, a statistically significant change from baseline for *global health status* ( $P < 0.001$ ) was detected after ginger essential oil inhalation. A clinically relevant 10 points improvement on *role functioning* ( $P = 0.002$ ) and *appetite loss* ( $P < 0.001$ ) were also documented while patients were on ginger essential oil.

\* Corresponding author. Tel.: +60 9 6688520; fax: +60 9 6687896; mobile: +60 17 6228430.  
E-mail addresses: [peilinlua@unisza.edu.my](mailto:peilinlua@unisza.edu.my), [peilinlua@hotmail.com](mailto:peilinlua@hotmail.com) (P.L. Lua).

**Conclusion:** At present time, the evidence derived from this study is not sufficiently convincing that inhaled ginger aromatherapy is an effective complementary therapy for CINV. The findings for HRQoL were however encouraging with significant improvement in several domains.  
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## Introduction

Despite dramatic improvements in antiemetic control conferred by 5-HT<sub>3</sub> receptor antagonist, chemotherapy-induced nausea and vomiting (CINV) remains the most worrisome adverse effects of anti-neoplastic treatment.<sup>1,2</sup> As many as 80% of patients who received anthracycline-based chemotherapy and cyclophosphamide; a commonly prescribed adjuvant regimens for breast cancer, did experience some degree of nausea and vomiting.<sup>3,4</sup> Poorly controlled CINV symptoms may result in multiple physiologic consequences, pose impact on patient's quality of life (QoL) and alter patient's compliance with treatment.<sup>5-7</sup>

In view of the gaps in the current practices, attention given to the use of complementary and alternative medicine (CAM) as an adjuvant treatment has recently been escalating. Aromatherapy is a particular kind of CAM widely used for the purposes of inhalation of the vapors or absorption of the oil into the skin, to treat or alleviate physical and emotional symptoms.<sup>8</sup> Early clinical trials suggest that aromatherapy may have some benefit as a complementary treatment in reducing stress, pain, nausea, and depression.<sup>9</sup> In cancer populations, a recent study had stipulated that 47% ( $n=21$ ) of nauseous oncology patients had settled the symptom by using personalized aromatherapy inhalation device.<sup>10</sup> A compilation of available scientific evidence related to inhaled aromatherapy had also suggested that the inhaled vapor of peppermint or ginger essential oil not only reduced the incidence and severity of nausea and vomiting but also decreased antiemetic requirements and improved patient satisfaction.<sup>11</sup> However, the therapeutic use of aromatherapy remains controversial possibly due to lack of scientific effectiveness and safety.

On the other side, ginger, the rhizome of *Zingiber officinale* historically has been used in Asian countries, particularly in China and India for hundreds of years as a remedy for conditions such as headaches, nausea, rheumatism and colds. Primarily, gingerol is the pungent ketones that is accountable for the strong aroma of ginger.<sup>12</sup> Previous studies have reported ginger's effectiveness against nausea in various conditions including motion sickness; pregnancy-induced and post-operative nausea.<sup>12</sup> In relation to CINV, most studies demonstrated favorable results but a few have been contradictory.<sup>13</sup> Although a firm conclusion cannot be drawn from previous clinical studies, it is hypothesized that the direct effect of ginger on the gastrointestinal tract may be due to the aromatic, spasmolytic carminative and absorbent properties of ginger.<sup>14</sup> While the ingestion of ginger was associated with minimal toxicity, it was not without adverse effects. Mild gastrointestinal effects like heart burn, diarrhea, and irritation of mouth were among the uncommon side effects. Despite these minimal invasive properties of ginger, previous studies have used the ingested formulation of powdered or extract of ginger rather than

aromatherapy. If the ingested form of ginger is safe and lacks toxicity, the inhaled form has greater likelihood of safety, but the efficacy has not been determined. This study, therefore aims to determine the impact of aromatherapy using ginger essential oil in alleviating CINV in breast cancer patients. Additionally, patients' health-related quality of life (HRQoL) profile following aromatherapy treatment was also assessed.

## Methods

### Study design and sample selection

A single-blind, randomized, controlled, cross-over study was conducted in two oncology clinics whereby the study participants were recruited from Hospital Sultanah Nur Zahirah (HSNZ), Kuala Terengganu and Hospital Raja Perempuan Zainab II (HRPZ II), Kota Bharu, Kelantan, Malaysia. At each center, standard procedures for nausea and emesis prevention and management were conducted in accordance with the standard chemotherapy protocol and patient's clinical condition. Patients were eligible for this study if they met the following selection criteria: (1) women aged 18 years and above, with a normal sense of smell; (2) were diagnosed with breast cancer; (3) were receiving chemotherapy and experienced nausea and/or vomiting of any severity; (4) had at least two remaining chemotherapy courses using similar chemotherapeutic agents; (5) consenting to participate in the study. Excluded from this study included those with other malignancies, being allergic to ginger, perfumes or cosmetics or patients undergoing concurrent radiotherapy. Patients were randomized using permuted block four randomization with an allocation ratio 1:1. Permission to conduct this study was obtained from Malaysia Ministry of Health's (MOH) Research and Ethics Committee (MREC) (Ref. no: (2) dlm.KKM/NIHSEC/08/0804/P11-42).

### Intervention procedures

In addition to standard care, an aromatherapy necklace (Murano glass, Mizitco Sdn. Bhd. Sungai Petani, Kedah, Malaysia) was given to the patients to wear it for five days during day and night. The aromatherapy necklace was a crystal chamber like a small bottle pendant which was made from glass which was hang around their neck, and placed approximately 20 cm from their nose. On each day, patients were asked to hold the necklace just under their nose and breathe in deeply at least 3 times a day for at least 3 periods of 2 min duration, even if they did not have symptoms. This aromatherapy necklace was filled with either two drops of ginger essential oil or ginger fragrance oil (fragrance-matched artificial placebo) depending on the randomization

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