

## The University of Akron IdeaExchange@UAkron

---

Honors Research Projects

The Dr. Gary B. and Pamela S. Williams Honors  
College

---

Spring 2015

# A Systematic Review: Non-pharmacological Interventions for Chemotherapy-Induced Nausea and Vomiting

Miranda L. Ayers

*The University Of Akron*, [mla32@zips.uakron.edu](mailto:mla32@zips.uakron.edu)

Olateju F. Olowe

*The University Of Akron*, [ofol@zips.uakron.edu](mailto:ofol@zips.uakron.edu)

Please take a moment to share how this work helps you [through this survey](#). Your feedback will be important as we plan further development of our repository.

Follow this and additional works at: [http://ideaexchange.uakron.edu/honors\\_research\\_projects](http://ideaexchange.uakron.edu/honors_research_projects)

 Part of the [Alternative and Complementary Medicine Commons](#), [Oncology Commons](#), and the [Other Nursing Commons](#)

---

### Recommended Citation

Ayers, Miranda L. and Olowe, Olateju F., "A Systematic Review: Non-pharmacological Interventions for Chemotherapy-Induced Nausea and Vomiting" (2015). *Honors Research Projects*. 110.

[http://ideaexchange.uakron.edu/honors\\_research\\_projects/110](http://ideaexchange.uakron.edu/honors_research_projects/110)

This Honors Research Project is brought to you for free and open access by The Dr. Gary B. and Pamela S. Williams Honors College at IdeaExchange@UAkron, the institutional repository of The University of Akron in Akron, Ohio, USA. It has been accepted for inclusion in Honors Research Projects by an authorized administrator of IdeaExchange@UAkron. For more information, please contact [mjon@uakron.edu](mailto:mjon@uakron.edu), [uapress@uakron.edu](mailto:uapress@uakron.edu).

A Systematic Review: Non-pharmacological Interventions for Chemotherapy-Induced Nausea  
and Vomiting

Miranda L. Ayers and Olateju F. Olowe

The University of Akron

Author Note

Miranda L. Ayers & Olateju F. Olowe, College of Health Professions, School of Nursing, The University of Akron. This paper is submitted in partial fulfillment for Honors Nursing Research, 8200:435.

**Abstract**

Around 70-80% of patients receiving chemotherapy are at risk of chemotherapy-induced nausea and vomiting (CINV), which can interfere with appetite and the ability to perform normal activities for daily living. When CINV is severe, psychological distress, depression, and physiological impairment occur. Patients may also stop chemotherapy treatments, which can lead to untimely deaths. The aim of this systematic review was to identify, describe, and evaluate the evidence about the use and effectiveness of non-pharmacological interventions, compared to no use of non-pharmacological interventions, on self-reported episodes of CINV among the cancer patients. Twenty articles were reviewed on the use of acupressure, yoga, ginger, Concord grape, music therapy, distraction, and other techniques. There were mixed findings on the use of these non-pharmacological methods. The level of evidence, studies, and research available is not sufficient enough to authorize the use of any of these techniques as an adjuvant in reducing CINV. However, due to low cost, ease of use, tolerance, and non-toxic effects of the non-pharmacological interventions, future studies on broader samples are recommended. The use of ginger, yoga, and distraction techniques in reducing CINV are mostly suggested as an adjuvant with pharmacological methods.

## A Systematic Review: Non-pharmacological Interventions for Chemotherapy-Induced Nausea and Vomiting

Cancer is the rapid and uncontrolled growth of mutated cells that can affect one or more body systems (LeMone, Burke, & Bauldoff, 2011). In 2011, cancer was the second leading cause of death in the United States (Centers for Disease Control and Prevention, 2013).

Approximately 7.6 million people in the world die from cancer annually (World Cancer Day, 2013). Chemotherapy, a primary treatment for cancer, uses cytotoxic medications that interrupt the cell cycle and inhibit cancer cells from replicating or surviving (LeMone et al., 2011).

Patients with cancer who receive chemotherapy treatment frequently experience the unpleasant side effects of nausea and vomiting (LeMone et al., 2011). Around 70-80% of patients receiving chemotherapy are at risk of Chemotherapy-Induced Nausea and Vomiting (CINV), which may interfere with appetite and the ability to perform activities of daily living (Vidall et al., 2011). As a result, malnutrition, weight loss, susceptibility to infections, and metabolic imbalances, such as hyponatremia, hypokalemia, and metabolic acidosis, occur (Taspinar & Sirin, 2010). When CINV is very severe, psychological distress, depression, and physiological impairment occur. Patients may also stop chemotherapy treatments, which could lead to untimely deaths (Taspinar & Sirin, 2010).

While there are numerous drugs for reducing CINV, there are non-pharmacological interventions that may be used in conjunction with or as adjuvant therapy. Decreasing CINV is relevant to nursing because nursing is holistic care; it is not just focused on killing the cancer cells, but rather on caring for patients physically, emotionally, psychosocially, and spiritually and promoting optimal happiness and health. Nursing aims to help patients learn to cope with diagnoses in order to function as members of society. Preventing CINV may enable patients to

experience less uncomfortable treatment processes. There are several advantages of non-pharmacological interventions which include decreased side effects and lower cost than medications. Patients may also be able to perform interventions in the comfort of their own home. Many of these interventions may be self-executed. These interventions also help develop a greater control for patients and enhance self-efficacy.

The aim of this systematic review is to identify, describe, and evaluate the evidence regarding the use and effectiveness of non-pharmacological interventions on self-reported episodes of CINV among the cancer patients. The PICOT question addressed in this paper is: In patients with cancer who are receiving chemotherapy, how does the use of non-pharmacological interventions, compared with no use of non-pharmacological interventions, affect reports of chemotherapy induced nausea and vomiting? The gap in knowledge that this paper is aimed at filling is evidence related to practice about the types and benefits of non-pharmacological interventions on chemotherapy-induced nausea and vomiting. Recommendations for practice and future research are then made based on a critical appraisal of the evidence.

### **Methods**

Scholarly articles were identified and reviewed from: CINAHL and PubMed. They were examined for population, intervention, and time period. Key terms included: CINV, intervention, teaching, education, reduc\*, and non-pharmacologic. Publication year was taken into consideration in that studies needed to be published within or close to the last five years. This ensured that the studies were recent and relevant to advances in technology, disease, and practice. The journals covered a wide variety of demographics including patients in China, Turkey, The United Kingdom, India, Australia, Helsinki, and Europe and with varying types of cancer, with the most prevalent being breast cancer. Statistics were obtained from resources such

as Centers for Disease Control and Prevention (CDC). The inclusion and exclusion of articles had to do with whether the articles were primary or secondary sources and if the interventions coincided with the use of non-pharmacological agents. Of the approximately thirty studies originally identified; twenty scholarly articles were obtained for this paper.

The sponsor for this project is Cheryl Owen, MSN, CNS, OCN, RN an associate instructor for The College of Nursing. The two readers for this project are also instructors for The College of Nursing, Sheau-Huey Chiu, PhD, RN and Colleen Kurzawa, MSN, RN.

### **Review of Literature**

Numerous research studies have examined CINV effects from using non-pharmacological interventions, such as yoga (Raghavendra et al., 2007; Usharani et al., 2012), acupuncture (Dibble et al., 2007; Genc, Can, and Aydiner, 2013; Genc and Tan, 2014; Molassiotis et al., 2013; Molassiotis et al., 2014; Suh, 2012; Taspinar & Sirin, 2010; Yeh, Chien, Chiang, Lin, Huang, and Ren, 2012), and ginger (Alparslan et al., 2012; Panahi et al., 2013; Pillai, Sharma, Gupta, and Bakhshi, 2011; Ryan et al., 2012; Zick et al., 2009). In general, different types of cancer (lung, hematologic, bone, prostate) were examined with breast cancer being the most prevalent. Studies included randomized clinical trials, experimental and non-experimental studies, double blind studies, and convenience and randomized sampling, cross-sectional and longitudinal trials.

Two research studies have examined the effect of yoga on CINV in women with breast cancer (Raghavendra et al., 2007; Usharani et al., 2012). “Sixty-two subjects were randomly allocated to receive yoga ( $n=28$ ) or supportive therapy intervention ( $n=34$ ) during the course of their chemotherapy. Intervention consisted of both supervised and home practice of yoga sessions lasting for 60 min daily, while the control group received supportive therapy and coping

preparation during their hospital visits over a complete course of chemotherapy” (Raghavendra et al., 2007, p. 462). There was a significant decrease in post-chemotherapy-induced nausea frequency ( $p = 0.01$ ) and nausea intensity ( $p = 0.01$ ), and intensity of anticipatory nausea ( $p = 0.01$ ) and anticipatory vomiting ( $p = 0.05$ ) as compared with the control group after yoga (Raghavendra et al., 2007). Using randomized clinical trials, (Raghavendra et al., 2007; Usharani et al., 2012) researchers have found that those using yoga, compared with the control group reported a significant ( $p < 0.05$ ) decrease in post chemotherapy and anticipatory nausea in the experimental group, but no significant difference in vomiting ( $p = 0.01$ ) (Raghavendra et al., 2007). Usharani et al. (2012) looked at stage II and III breast cancer patients, and found that yoga decreased post-chemotherapy and anticipatory nausea and vomiting ( $p < 0.05$ ). However, these studies only showed the impact of yoga on females and patients with breast cancer. More studies require vast clinical trials on males and other types of cancer patients using larger sample sizes.

There are also mixed findings about the effect of acupressure on CINV. In a randomized controlled trial, Suh (2012) studied the effects of acupressure and nurse-patient counseling on 120 women with breast cancer during a 2-week session. The design consisted of four groups: the control group used a fake pressure point as the intervention and three experimental groups consisting of just acupressure, just counseling, or both (Suh, 2012). Participants were also taking antiemetic medications along with the interventions of the trial (Suh, 2012). The study found a significantly reduced level of chemotherapy-induced nausea between the controlled and all of the experimental groups. However, chemotherapy-induced vomiting was only reduced in the groups who participated in acupressure. Suh (2012) found that a combination of both acupressure and nurse-patient counseling resulted in the lowest number of CINV episodes, with the highest reduction in nausea from acupressure.

Dibble et al. (2007) and Genc and Tan (2014) conducted similar studies and established the use of acupressure along with other antiemetic drugs to be effective in reducing chemotherapy-induced nausea (CIN) but insignificant in chemotherapy-induced vomiting (CIV) or vice versa. Dibble et al. (2007) conducted a longitudinal, randomized clinical trial on the effects of acupressure on CINV. The sample consisted of 160 women with breast cancer in their second or third cycle of chemotherapy, who experienced nausea in their first chemotherapy cycle and were receiving specific chemotherapy (Dibble et al., 2007). All participants were prescribed antiemetic medications as well. The participants were asked to record when the medication was used because it could affect the results of the study (Dibble et al., 2007). The participants were placed into an acupressure group or a placebo group and instructed to perform and record the intervention every morning and as needed (Dibble et al., 2007).

Dibble et al. (2007) found no change in the occurrence of nausea between the groups, but wrote that there was a reduction in chemotherapy-induced vomiting. Although there was a decrease in vomiting related to the use of acupressure, participants in the study recorded adding a variety of their own non-pharmacological interventions of their own including “exercise, fresh air, visualization, dry toast, crackers, peppermint tea, ginger tea, a spoonful of honey, avoiding smells, aromatherapy, avoiding stress, [and] prayer” (Dibble et al., 2007, p. 816-817).

Nonetheless, an important limitation of this trial showed that participants neglected to record information in the daily logs when they started feeling better which made the study outcome controversial (Dibble et al., 2007).

While Dibble et al. (2007) suggested that acupressure significantly reduces CIV but does not change CIN; the reverse was the result of Genc and Tan (2014). Genc and Tan (2014) conducted a 5 day study using a quasi-experimental model on 64 patients with stages 1–3 breast



cancer who received cycle two and more advanced chemotherapy in an ambulatory chemotherapy unit. There were 32 patients in the experimental and control group. Acupressure was applied to the P6 acupuncture point of patients in the experimental group with the help of a wristband (Genc and Tan, 2014). Results indicated that the mean nausea experience score for patients in the experimental group over the five days of acupressure application was significantly lower ( $p < 0.05$ ) versus those for patients in the control group (Genc and Tan, 2014). However, there was no significant difference ( $p > 0.05$ ) between the mean vomiting experience scores of the experimental and control group (Genc and Tan, 2014).

Another study was conducted by Taspinar and Sirin in 2010. A pre-test and post-test method was used to evaluate the effect of acupressure point with a wristband on nausea-vomiting. The acupressure was in addition to the antiemetic medications that were used to prevent chemotherapy induced nausea and vomiting (Taspinar and Sirin, 2010). The study was conducted on 34 patients with gynecological cancers in Turkey. Although the result showed no statistical significance ( $p > 0.05$ ), there was a decrease in the five-day mean scores of patients with wristband acupuncture and antiemetic drugs as compared to the patients who only received antiemetic drugs (Taspinar and Sirin, 2010). The researchers recommended the study be conducted on a larger group and that male patients with different types of cancer should be included to obtain more effective results.

Genc, Can, and Aydiner (2013) conducted a five-day study in Turkey using a cross-sectional single-blinded randomized trial on 120 patients with breast, gynecological, or lung cancer. The patients in the experimental ( $n=67$ ) and control ( $n=53$ ) group were the same in terms of sociodemographic components and their health conditions and were all given acupuncture bands respectively (Genc et al., 2013). Patients wore the acupuncture bands for five

days and wristbands were only removed during night sleeps and shower periods. There was no statistical difference ( $p>0.05$ ) in the use of acupressure band between the groups (Genc et al., 2013). However, the researchers recommended that future research should be completed for an extended time period and the sample population needs to be larger. Another suggestion is the use of patients with the same cancer diagnosis and treatment protocol.

A randomized trial conducted by Molassiotis et al. (2013), in the United Kingdom, studied the effects of acupressure on 500 cancer patients through four cycles of chemotherapy, from fourteen different outpatient clinics. Participants were placed into three groups consisting of usual antiemetic medications while wearing an acupressure wristband, wearing a fake acupressure wristband, or no intervention (Molassiotis et al., 2013). The trial found no evidence that acupressure helps to reduce CINV. However, the study suggested a decrease in chemotherapy-induced nausea between both the wristband groups and the non-intervention group, thus presenting a placebo effect (Molassiotis et al., 2013). Molassiotis et al. (2014) conducted another study on acupressure in CINV in 2014 using a randomized, three-group, sham-controlled trial. No statistically significant differences ( $p>0.05$ ) were found about the use of acupressure wristbands in the management of CINV and quality-of-life measures. However, the study provided evidence of encouraging signals in relation to improved nausea experience (Molassiotis et al., 2014). This evidence of encouraging signals of improved nausea experience warrants further consideration in both practice and further clinical trials. Limitations of the trial include missing data from the primary outcomes. Participants who looked up the correct way to use the sham wristbands on the internet and the use of antiemetic medications may have impacted the overall outcome of the result (Molassiotis et al., 2014).

Yeh et al. (2012) looked at the effect of an auricular acupressure point on CINV versus a

placebo group with a sham acupuncture point. A crossover-randomized trial was performed on children with cancers, ages 5 to 18 years old, who were receiving chemotherapy treatment. Following a chemotherapy session, the participants were given acupuncture on their ears, and then later given a questionnaire regarding occurrence, duration, and severity of CINV. There were no statistically significant differences ( $p > 0.05$ ) between the intervention group and the placebo group in regards to affect on CINV. The intervention group showed a lower occurrence of acute and delayed nausea and shorter vomiting duration (Yeh et al., 2012).

Many researchers have studied CINV and ginger is grown in many parts of the world and therefore is a cost effective plant. In general, they report consistent findings about the effect of ginger on CINV in those with cancer. Alparslan et al. (2012) investigated the effect of ginger on chemotherapy-induced nausea and vomiting in adults with leukemia in Turkey. The intervention group ( $n=15$ ) was given 800 mg ginger tablets twice a day for four months while the control group ( $n=30$ ) was given only antiemetic drugs. The intervention group reported no occurrence of nausea and vomiting and 76.7% of the control group reported nausea or vomiting (Alparslan et al., 2012). These findings are consistent with a randomized double-blind study by Pillai et al. (2011). Pillai et al. (2011) conducted a 10-day randomized double-blind design on 60 patients (8-21 years) with bone sarcoma cancers. In addition to ondansetron and dexamethasone, the experimental and control group were respectively given ginger root powder capsules and placebo capsules. The result indicated that acute moderate to severe nausea and vomiting were observed in (93.3%) and (76.7%) cycles in control group as compared to (55.6%) and (33.33%) cycles in experimental group ( $P = 0.003$ ) and ( $P = 0.002$ ) respectively. Delayed moderate to severe nausea and vomiting were observed in (73.3%) and (46.67%) cycles in the control group as

compared to (25.9%) and (14.81%) in the experimental group ( $p < 0.001$ ) and ( $p = 0.022$ ) respectively (Pillai et al., 2011).

Ryan et al. (2012) conducted a study showing the effect of ginger on chemotherapy-induced nausea (CIN) only. Ryan et al. (2012) performed a six-day randomized, double-blind, multicenter trial that included 744 patients. Patients with different cancers (93% women) were assigned into four groups and given placebo, 0.5g, 1.0g, or 1.5g of capsules ginger respectively along with their assigned study medications. The result illustrated that as compared to placebo, all doses of ginger significantly reduced acute nausea severity ( $p = 0.003$ ) and the largest reduction in nausea intensity occurred with 0.5 g and 1.0 g of ginger ( $p = 0.017$  and  $p = 0.036$ , respectively) (Ryan et al., 2012). Panahi et al. (2013) carried out a pilot, randomized clinical trial with 100 women diagnosed with breast cancer. The intervention group received a 500mg capsule of powdered and dried ginger root beginning thirty minutes after a chemotherapy session (Panahi et al., 2013). The intervention group continued this for four days while receiving antiemetic medications; the control group only used antiemetic therapy. The pilot study revealed that taking ginger with antiemetic medication helped to reduce chemotherapy-induced nausea, but had no effect on the occurrence of vomiting (Panahi et al., 2013).

On the other hand, Zick et al. (2009) used a randomized double blind placebo trial to compare the effect of a low-dose (1.0g) and a high-dose (2.0g) powdered ginger root extract versus placebo on reducing the prevalence and severity of delayed nausea and vomiting. The sample size included 162 patients with different types of cancer during a three-day chemotherapy session (Zick et al., 2009). There was no significant effect ( $p > 0.05$ ) on CINV between the groups (Zick et al., 2009).

Studies report mixed findings about the effect of other non-pharmacological interventions on CINV. These interventions include the use of music and visual therapy (Karagozoglu, Tekyasar, and Yilmaz, 2013), social support and distraction (Rodgers et al., 2012), grape juice flavonoids (Ingersoll et al., 2010), and smoking (Esra et al., 2011). Positive CINV outcomes resulted in an experimental and cross-sectional study about the use of music therapy and visual imagery in forty patients with cancer during a five-day chemotherapy session in Turkey (Karagozoglu et al., 2013). The patients were predominantly had lung cancers. The study consisted of a single sample group with a pre-post test and repeated-measures design. Five nature paintings (100 cm 9 200 cm) were used for guided visual imagery. Paintings depicted such views of nature as beach, forest, lake and mountain, prairie, and sky and clouds. Researchers prepared a different music CD for each painting. Music CDs included soft, serene instrumental Turkish Music. During the second chemotherapy course, the individuals in the control group were not informed about the music therapy and visual imagery intervention while patients in the experimental group were informed.

Roles were then switched during the third chemotherapy course. Patients reported severity of nausea and vomiting thirty minutes before chemotherapy sessions (Karagozoglu et al., 2013). Participants were asked to turn on the music 15 minutes before chemotherapy starts and focus on the visual images while listening to the music all through the chemotherapy session (Karagozoglu et al., 2013). Results suggested that music therapy and visual imagery had a positive impact on chemotherapy induced nausea and vomiting. 40% of the patients did not have anticipatory nausea and 55% of the patients did not have anticipatory vomiting during the third cycle of chemotherapy (Karagozoglu et al., 2013). CINV levels decreased significantly after the third chemotherapy cycle during which music therapy and visual imagery were implemented

( $52.18 \pm 9.356$ ) ( $p < 0.05$ ) (Karagozoglu et al., 2013). Limitations of the study are the small sample size and only a single sample group was used. Patients were made to switch roles as either in the control or experimental group during the second and third cycle of their chemotherapy sessions.

Rodgers et al. (2012) used a cohort design to study the effects of coping strategies in forty children with cancer, age seven to twelve. Rodgers et al. (2012) revealed that social support and distraction were the most effective strategies for coping with CINV. Although these strategies did not result in decreased episodes of CINV. Helping to cope with the debilitating side effects of chemotherapy may lead to a better quality of life for the patient.

Some interventions have been reported to have unpleasant outcomes in controlling CINV. Ingersoll et al. (2010) used a double blind randomized clinical trial to study the effect of Concord grape juice flavonoid on CINV with seventy seven adult cancer patients. Participants in the intervention group drank 4 ounces of grape juice before meals for four weeks, while those in the control group were given 4oz of placebo before each meal as well (Ingersoll et al. 2010). Patients were instructed to record the frequency, duration, and severity of CINV daily. Although reports of nausea-vomiting frequency and duration were lower for the intervention group, there were no significant statistical group differences in frequency and direction over time ( $p > 0.05$ ) due to a high attrition rate of 50% (Ingersoll et al., 2010).

A pilot study, conducted in Istanbul, by Esra et al. (2011) used an observational questionnaire on 121 cancer patients with diagnoses including lung cancer, sarcoma, urothelial cancer, breast cancer, and melanoma. The majorities were males and smokers while some participants were non-smokers and/or females (Esra et al., 2011). Patients wrote in a diary any episodes of nausea or vomiting following the first cycle of chemotherapy and the frequency of

using cigarettes (Esra et al., 2011). Although the study suggested that there was a lower incidence of CINV in smokers than in non-smokers, it admitted to the inability to rule out other possible causes for this finding. It must be noted that the damages caused by smoking greatly outweigh the findings of this study and in no way should smoking be recommended for patient use (Esra et al., 2011).

A cross-sectional survey by Lou (2011) questioned 277 Chinese, chemotherapy patients to report their most frequently used and most effective personal methods of relieving nausea and vomiting caused by chemotherapy. Participants reported the most frequently used methods for reducing CINV as dietary modification, taking antiemetic with distraction and acupressure as the most effective methods (Lou, 2011). Another finding of this study suggested that an increase in social support towards the patients from health care professionals resulted in an increase in management of CINV (Lou, 2011). These findings are consistent with the studies listed above (Dibble et al., 2007; Eduardo et al., 2013; Suh, 2012; Taspinar and Sirin, 2010) which suggested acupressure to help with reduction of CINV, and Rodgers et al. (2012) who found distraction and social support to be helpful as well.

In general, studies concerned with the effect of non-pharmacological interventions on CINV have shown mixed results. In particular the use of yoga, ginger and distraction techniques have shown some promise although with limited effectiveness. Also, the small samples, gender differences, and study on patients with different types of cancer often make it difficult to generalize findings. Studies suggested that the use of non-pharmacological interventions can help to reduce CINV if used in combination with antiemetic medications.

### **Critical Appraisal of the Evidence**

In the randomized clinical trial by Raghavendra et al. (2007) and Usharani et al. (2012), limitations included the impact of yoga on females with only breast cancer. In a study by Raghavendra et al. (2007), subjects in the control group were offered supportive counseling and coping preparation less frequently than those who received yoga intervention and length of days of the experiment was not specified. Several studies require vast clinical trials on males and other types of cancer patients using larger sample sizes. A limitation to Dibble et al.'s (2007) longitudinal randomized clinical trial showed that participants neglected to record information in the daily logs when they started feeling better which made the study outcome controversial. Limitations to Taspinar and Sirin (2010) pre-test and post-test experiment were insufficient sample size, not a randomized clinical trial, and the result cannot be generalized since only patients with gynecologic cancers were in the experiment.

A limitation to Karagozoglu et al.'s (2013) repeated-measures design also included insufficient sample size and the use of a single sample group. Zick et al. (2009) randomized double blind controlled trial's limitation were insufficient sample size and patients were able to determine the group they were assigned based on the taste of the capsules. Limitations to Ingersoll et al.'s (2010) double blind randomized clinical trial were high attrition rate of 50%, reliance on self-report measures, pool of participants from a single cancer center and use of time frame for recording CINV differ from the INV-R tool. In some studies, participants only recorded effects of the interventions if they impacted negatively on their health status (Ingersoll et al., 2010). The type, duration, and intensity of some interventions, for example exercise, were not always consistent throughout participants and may have affected the findings (Raghavendra et al., 2007). Lastly, some participants figured out if they were in the experimental or control



group, or used the Internet to determine the correct way to use the acupressure bracelets, further skewing the results (Molassiotis et al., 2013).

Common limitations present in the research findings included only one period of or short-term data analysis instead of long-term analysis of nausea and vomiting, resulting in less data regarding the effectiveness of the interventions (Zick et al., 2009; Genc et al., 2013). Another common limitation was that participants were provided with options to describe the effects of the interventions instead of being able to describe them in their own words (Rodgers et al. 2012; Panahi et al., 2013; Usharani et al., 2012). Limitations of small sample sizes or narrow samples, such as only one gender, age group, or certain type of cancer, were also identified (Suh, 2012; Dibble et al., 2007; Lou, 2011; Alparslan et al., 2012; Taspinar and Sirin, 2010; Ingersoll et al., 2010). Most of the interventions in the research studies were used in combination with antiemetic medications, limiting the ability to analyze the full effect of the interventions.

Despite these limitations, the studies have a high level of validity and reliability. Most of the studies examined were randomized trials and had a level of evidence of II. A variety of reliable assessment scales and data evaluation methods were used. The studies clearly stated and described the populations, controls and variables, methods, references, and materials. There were similarities in the results of the studies reviewed and the studies were conducted at different locations. Based on the level of evidence of the twenty articles, eight articles were reviewed on the use of acupressure and only one of the articles (Suh, 2012) found a significant statistical difference ( $p < 0.05$ ) between the experimental and control group. Also, out of the five articles reviewed on the effect of ginger on CINV, two (Alparslan et al., 2012; Pillai et al., 2011) found that there was a significant statistical difference ( $p < 0.05$ ) in the group who use ginger as an adjuvant as compared to the control group who only used antiemetic drugs. Out of the two

articles reviewed on yoga, one (Usharani et al., 2012) showed that yoga had a significant effect on CINV while the other (Raghavendra et al., 2007 ) showed that yoga was only effective in reducing CIN, but no effect on CIV. In addition, four articles were either reviewed on the effect of music therapy and guided imagery (Karagozoglu et al., 2013); social support and distraction (Rodgers et al., 2012); dietary modification (Lou, 2011); or tobacco smoking (Esra et al., 2011). The researchers all found that these distraction techniques had a positive correlation in reducing CINV as compared to patients in the control group who only used pharmacological methods to reduce CINV. One article (Ingersoll et al., 2010) reviewed on the effect of Concord grape juice flavonoid on CINV found out that reports of nausea-vomiting frequency and duration were lower for the intervention group but there were no significant statistical group differences in frequency and direction over time ( $p>0.05$ ).

### **Synthesis of the Evidence**

From the eight articles reviewed on the use of acupressure, only one (Suh, 2012) found a significant statistical difference ( $p<0.05$ ) between the experimental and control group. One of the articles also found the use of acupressure along with other antiemetic drugs to be effective in reducing CIN but insignificant in CIV (Genc and Tan, 2014), while Dibble et al. (2007) showed that acupressure had a statistical difference in the reduction of CIV but insignificant in CIN, when the control and experimental groups were compared. The other five articles (Taspinar and Sirin, 2010; Genc et al., 2013; Molassiotis et al., 2013; Molassiotis et al., 2014; Yeh et al., 2012) that were reviewed on acupressure showed that there was a decrease in the mean scores of patients with acupressure/ acupuncture and antiemetic drugs as compared to the patients who only received antiemetic drugs. However, the result showed no significant statistical significance ( $p>0.05$ ) between those two groups. Since there were mixed findings on the use of acupressure

to reduce CINV along with antiemetic drugs and only one of the articles (Suh, 2012) showed a significant statistical difference ( $p<0.05$ ) between the experimental and control group, there is not enough evidence yet to show that acupressure is an effective non-pharmacological technique.

Also, two of the five articles (Alparslan et al., 2012; Pillai et al., 2011) reviewed on the effect of ginger on CINV found that there was a significant statistical difference ( $p<0.05$ ) in the group who used ginger as an adjuvant as compared to the control group who only used antiemetic drugs. Another article (Ryan et al., 2012) conducted an experiment to determine the effect of ginger on only CIN and found a significant reduction between the two groups; while Panahi et al. (2013) studies also showed that there was a decrease of CIN in the experimental group but found no significant effect on CIV between the two groups. The last article (Zick et al., 2009) on ginger showed that ginger was not effective in reducing CINV. The number of studies that showed that ginger is an effective technique is significantly small and future clinical trials are needed to confirm these findings.

From the two articles reviewed on yoga, Usharani et al.'s (2012) experiment showed that yoga had a significant effect on CINV; while Raghavendra et al.'s (2007) studies revealed that yoga was only effective in reducing CIN but no effect on CIV. A conclusion that yoga is an effective technique cannot be drawn since only two articles were reviewed. There are limited studies conducted on yoga till date.

Four articles that were either reviewed on the effect of music therapy and guided imagery (Karagozolu et al., 2013); social support and distraction (Rodgers et al., 2012); dietary modification (Lou, 2011); or tobacco smoking (Esra et al., 2011) showed similar results. The researchers all discovered that these distraction techniques had a positive correlation in reducing CINV as compared to patients in the control group who only used pharmacological methods to

reduce CINV. Although Esra et al.'s (2011) study suggested that there was a lower incidence of CINV in smokers than in non-smokers. Esra et al. (2011) said that other possible causes that may have led to decreased CINV cannot be ruled out as well. Smoking may have been used as a distraction method resulting in a reduction in CINV. However it must be noted that the damages caused by smoking greatly out way the findings of this study and in no way should smoking be recommended for patient use (Esra et al., 2011). Only one study (Rodgers et al., 2012) was done on the distraction techniques mentioned and significant evidence cannot be based on these findings due to insufficient studies. One article (Ingersoll et al., 2010) that reviewed the effect of Concord grape juice flavonoid on CINV said that reports of nausea-vomiting frequency and duration were lower for the intervention group. However, there were no significant statistical ( $p>0.05$ ) group differences in frequency and direction over time (Ingersoll et al., 2010). One study is not enough evidence to dismiss the use of Concord grape as an adjuvant and more clinical trials will be ideal in establishing whether grape use should be encouraged or not.

Based on the state of science, there were mixed findings on the use of non-pharmacological methods and the level of evidence. Available research is not sufficient to authorize the use of any of these techniques as an adjuvant in reducing CINV. Many clinical trials with larger samples over longer duration of times need to be done by researchers all over the world and the findings have to be consistent over time. Multiple longitudinal studies are needed on the use of these techniques and researchers should be encouraged to conduct these experiments, since the techniques are inexpensive and have non-toxic effects on patients. Although, based on the evidence available in this paper, the use of ginger (Alparslan et al., 2012), yoga (Usharani et al., 2012), and distraction techniques (Karagozoglu et al., 2013;

Rodgers et al., 2012; Lou, 2011) seem to be more promising than other techniques reviewed but Concord grape and acupuncture should not be ruled out as well.

### **Recommendations**

Recommendations for clinical practice are based on the evidence (Usharani et al., 2012; Raghavendra et al., 2007; Suh, 2012; Dibble et al., 2007; Genc and Tan 2014; Alparslan et al., 2012; Ryan et al., 2012; Panahi et al., 2013; Pillai et al., 2011; Karagozoglu et al., 2013; Rodgers et al., 2012; Lou, 2011) which suggest using interventions in combination with antiemetic medications, but non-pharmacological methods should not be used alone. Further studies should be conducted specifically on ginger (Alparslan et al., 2012), yoga (Usharani et al., 2012), music therapy, visual imagery, and social distractions (Karagozoglu et al., 2013; Rodgers et al., 2012; Lou, 2011) which have shown more positive results in reducing CINV along with pharmacological methods. Due to the low cost, ease of use, good tolerance, and non-toxic effects of these non-pharmacological techniques, they should be tested and used on broader samples as prophylaxis (Alparslan et al., 2012; Usharani et al., 2012; Suh, 2012). Intermittent training regarding the use of these non-pharmacological methods should be provided to professional teams working in oncology units to increase their awareness and interest.

Recommendations for future studies to advance nursing practice include testing the effects of the interventions more than once and for long periods of time, allowing participants to describe how each intervention affects them in their own words and remind them to still record how they feel, even if they are feeling in better health; larger sample sizes are recommended, which incorporate all genders, ages, and types of cancer. The interventions should also be used alone instead of with antiemetic medications, as well as kept consistent throughout participants regarding type, duration, and intensity. Lastly, researchers should ensure that the participants, or

the individuals helping the participants will not know the identities of the control versus experimental groups, and the studies are kept double blind if the trials so require.

## References

- Alparslan, G., Ozkarman, A., Eskin, N., Yilmaz, S., Akay, M., Acikgoz, A., & Orsal, O. (2012). Effect of ginger on chemotherapy-induced nausea and/or vomiting in cancer patients. *Journal Of The Australian Traditional-Medicine Society*, 18(1), 15-18.
- Centers for Diseases Control and Prevention. (2013, January 11). Leading causes of death. *Deaths: Preliminary Data for 2011*. Retrieved from <http://www.cdc.gov/nchs/fastats/lcod.htm>
- Dibble, S., Luce, J., Cooper, B., Israel, J., Cohen, M., Nussey, B., & Rugo, H. (2007). Acupressure for chemotherapy-induced nausea and vomiting: A randomized clinical trial. *Oncology Nursing Forum*, 34(4), 813-820.
- Esra, Y. E., Aziz, Y., Zeki, U., Gülsah, G., Mert, B., Yesim, E., Sevil, B. (2011). Is chemotherapy-induced nausea and vomiting lower in smokers? *International Journal of Clinical Pharmacology and Therapeutics*, 49, 709-712. <http://dx.doi.org/10.5415/CP201585>
- Genç, A., Can, G., & Aydiner, A. (2013). The efficiency of the acupressure in prevention of the chemotherapy-induced nausea and vomiting. *Supportive Care In Cancer*, 21(1), 253-261. doi:10.1007/s00520-012-1519-3
- Genç, F., & Tan, M. (2014). The effect of acupressure application on chemotherapy-induced nausea, vomiting, and anxiety in patients with breast cancer. *Palliative & Supportive Care*. Advance online publication. doi: 10.1017/S1478951514000248
- Ingersoll, G. L., Wasilewski, A., Haller, M., Pandya, K., Bennett, J., He, H., Berry, C. (2010). Effect of concord grape juice on chemotherapy-induced nausea and vomiting: Results of a pilot study. *Oncology Nursing Forum*, 37(2), 213-221.

doi:10.1188/10.ONF.213-221

Karagozoglu, S., Tekyasar, F., & Yilmaz, F. (2013). Effects of music therapy and guided visual imagery on chemotherapy-induced anxiety and nausea-vomiting. *Journal Of Clinical Nursing*, 22(1/2), 39-50. doi:10.1111/jocn.12030

LeMone, P., Burke, K., & Bauldoff, G. (2011). *Medical-surgical nursing: Critical thinking in patient care* (5th ed.). Upper Saddle River, NJ: Pearson Education.

Lou, Y. (2011) Self-management of chemotherapy-related nausea and vomiting: A cross sectional survey of Chinese cancer patients. *Cancer Nurs.* 2013 May 8. [Epub ahead of print] PubMed PMID: 23666267.

Molassiotis, A., Russell, W., Hughes, J., Breckons, M., Lloyd-Williams, M., Richardson, J., ... Ryder, W. (2013). The effectiveness and cost-effectiveness of acupuncture for the control and management of chemotherapy-related acute and delayed nausea: Assessment of Nausea in Chemotherapy Research (ANCHoR), a randomized controlled trial. *Health Technology Assessment*, 17(26). doi: 10.3310/hta17260.

Molassiotis, A., Russell, W., Hughes, J., Breckons, M., Lloyd-Williams, M., Richardson, J., ... Ryder, W. D. (2014). The effectiveness of acupuncture for the control and management of chemotherapy-related acute and delayed nausea: a randomized controlled trial. *Journal Of Pain & Symptom Management*, 47(1), 12-25. doi:10.1016/j.jpainsymman.2013.03.007

Panahi, Y., Saadat, A., Sahebkar, A., Hashemian, F., Taghikhani, M., & Abolhasani, E. (2012). Effect of ginger on acute and delayed chemotherapy-induced nausea and vomiting: A pilot, randomized, open-label clinical trial. *Integrative Cancer Therapies*, 11(3), 204-211. doi:10.1177/1534735411433201

Pillai, A., Sharma, K., Gupta, Y., & Bakhshi, S. (2011). Anti-emetic effect of ginger powder



versus placebo as an add-on therapy in children and young adults receiving high emetogenic chemotherapy. *Pediatric Blood & Cancer*, 56(2), 234-238.

doi:10.1002/pbc.22778

Raghavendra, R. M., Nagarathna, R. R., Nagendra, H. R., Gopinath, K. S., Srinath, B. S., Ravi, B. D., & Nalini, R. R. (2007). Effects of an integrated yoga programme on chemotherapy-induced nausea and emesis in breast cancer patients. *European Journal Of Cancer Care*, 16(6), 462-474. doi:10.1111/j.1365.2354.2006.00739.x

Rodgers, C., Norville, R., Taylor, O., Poon, C., Hesselgrave, J., Gregurich, M., & Hockenberry, M. (2012). Children's coping strategies for chemotherapy-induced nausea and vomiting. *Oncology Nursing Forum*, 39(2), 202-209.

Ryan, J., Heckler, C., Roscoe, J., Dakhil, S., Kirshner, J., Flynn, P., ... Morrow, G. (2012). Ginger (*zingiber officinale*) reduces acute chemotherapy-induced nausea: a URCC CCOP study of 576 patients. *Supportive Care In Cancer*, 20(7), 1479-1489.

doi:10.1007/s00520-011-1236-3

Suh, E. (2012). The effects of P6 acupressure and nurse-provided counseling on chemotherapy-induced nausea and vomiting in patients with breast cancer. *Oncology Nursing Forum*, 39(1), E1-9. doi:10.1188/12.ONF.E1-E9

Taspinar, A., & Sirin, A. (2010). Effect of acupressure on chemotherapy-induced nausea and vomiting in gynecologic cancer patients in Turkey. *European Journal Of Oncology Nursing*, 14(1), 49-54. doi:10.1016/j.ejon.2009.07.006

Usharani, M. R., Raghavendra, R. M., Gopinath, K. S., Bilimagga, R., Diwakar, R. B., Rao, N. K., ... Nandini, P. K. (2012). Analysis of pretreatment nonpharmacologic, pharmacologic factors, and yoga intervention on CINV outcomes in breast cancer patients undergoing

adjuvant chemotherapy. *Journal of Clinical Oncology*, 30.

Vidall, C., Dielenseger, P., Farrell, C., Lennan, E., Muxagata, P., Fernández-Ortega, P., & Paradies, K. (2011). Evidence-based management of chemotherapy-induced nausea and vomiting: a position statement from a European cancer nursing forum. *Ecancermedicalscience*, 51-6. doi:10.3332/ecancer.2011.211

World cancer day. (2013, July 16). Retrieved October 18, 2013, from Centers for Disease Control and Prevention website: <http://www.cdc.gov/cancer/dcpc/resources/features/WorldCancerDay/>

Yeh, C. H., Chien, L., Chiang, Y. C., Lin, S. W., Huang, C. K., & Ren, D. (2012). Reduction in nausea and vomiting in children undergoing cancer chemotherapy by either appropriate or sham auricular acupuncture points with standard care. *Journal Of Alternative & Complementary Medicine*, 18(4), 334-340. doi:10.1089/acm.2011.0102

Zick, S., Ruffin, M., Lee, J., Normolle, D., Siden, R., Alrawi, S., & Brenner, D. (2009). Phase II trial of encapsulated ginger as a treatment for chemotherapy-induced nausea and vomiting. *Supportive Care In Cancer*, 17(5), 563-572. doi:10.1007/s00520-008-0528-8

Running head: NON-PHARMACOLOGICAL INTERVENTIONS

EBP Review of Literature Summary Table

	Author(s) (year). Article Title. *Categories	Background of Clinical Problem	**Purpose statement & PICOT. Study Design.	***Clinical Practice Setting and Sample.	Evidence-based Findings	Practice & Research Implications	****Limitations
1	Rodgers et al. (2012). Children's Coping Strategies for Chemotherapy- Induced Nausea and Vomiting. (a) P (b) MM (c) V	Frequency of and coping with CINV	To identify anticipatory, acute, and delayed CINV frequency and coping strategies used among pediatric patients with cancer. In pediatric patients with cancer receiving chemotherapy, what are the preferred coping strategies for CINV, compared with those not preferred?	Convenience sample 40 cancer patients of 7-12yo receiving chemotherapy	Most CINV occurred during delayed times; most used coping strategies were distraction and wishful thinking; most effective coping strategies were social support and distraction.	Recognize that CINV can occur at all points of chemotherapy; assist client with developing strategies to manage CINV	There was only one period of data collection and participants were given options to describe the effects of the intervention instead of being allowed to use their own words.
2	Suh (2012). The Effects of P6 Acupressure and Nurse-Provided Counseling on Chemotherapy-Induced Nausea and Vomiting in Patients With Breast Cancer. (a) P (b) QUAN (c) II	Pericardium 6 acupressure and counseling on CINV	To evaluate the effects of P6 acupressure and nurse-provided counseling on CINV in patients with breast cancer. In breast cancer patients receiving chemotherapy, how do P6 acupressure or nurse-provided counseling, compared with neither or both, affect reports of CINV?	Randomized, controlled 120 women in second cycle of adjuvant chemotherapy after surgery for breast cancer, had more than mild levels of n/v with first cycle of chemotherapy	Group that received P6 acupressure and counseling had lowest reports of CINV.	P6 acupressure combined with counseling by nurses is a safe and easy-to-apply tool in CINV management in practice.	Too small of a sample size and a lack of research to investigate the CINV subdimensions.
3	Dibble et al. (2007). Acupressure for Chemotherapy-Induced Nausea and Vomiting: A Randomized Clinical Trial. (a) P (b) QUAN (c) II	Acupressure for CINV	To compare differences in CINV among three groups of women (acupressure, placebo acupressure, and usual care) undergoing chemotherapy for breast cancer. In breast cancer patients receiving chemotherapy, how do acupressure, compared with placebo or usual care, affect reports of CINV?	Longitudinal, randomized 160 women beginning second or third cycle of chemotherapy for breast cancer with moderate nausea intensity scores with previous cycle	Decreased CINV in acupressure group; no difference between placebo and usual care group.	Acupressure is a safe and effective tool for managing delayed CINV and should be offered to women undergoing chemotherapy for breast cancer.	Only women, only BRCA, participants also took antiemetics, lack of participants recording data when they felt better
4	Lou (2011). Self-Management of Cancer Treatment-Related Fatigue, Nausea, Vomiting and Oral Mucositis in Chinese Cancer Patients. (a) P (b) QUAL (c) V	Self-management of fatigue, n/v, and oral mucositis	To contribute to the understanding of cancer symptom self-management in a Chinese sample. In Chinese cancer patients receiving chemotherapy, what are the preferred self-management strategies for fatigue, n/v, and oral mucositis, compared with those not preferred?	Cross-sectional survey 277 Chinese cancer patients receiving chemotherapy with fatigue, n/v; 100 Chinese cancer patients receiving radiotherapy with oral mucositis	Dietary modification and taking medication were rated as most popular and effective for CINV. Distraction and acupressure were also rated moderately effective.	Patients should be supported to engage in behaviors including taking antiemetics, modifying their diet, using psychological strategies, and creating a pleasant environment.	Too small of a sample size. Type, duration, and intensity of exercise was not consistent.
5	Alparslan et al. (2012).	Problems of	To determine the effect of ginger on	n=45. Identification form	Significant difference	Future studies are	Small sample size and

	Effect of Ginger on Chemotherapy-Induced Nausea and/or Vomiting in Cancer Patients. (a) P (b) MM (c) II	CINV in cancer patients	chemotherapy induced nausea and/or vomiting in cancer patients. In patients with hematological cancer who are receiving chemotherapy, how does the use of ginger for chemotherapy induced nausea and vomiting, compared with no use of ginger affect reports of nausea and vomiting during the 4-month chemotherapy session?	for descriptive characteristics, SPSS 15.0. 2 tablets of ginger (800mg) administered to patients in the experimental group in the morning and evening throughout the course of treatment. 3mg of Setron IV administered to the control group	between the two groups. Ginger effective in reducing CINV. ( $P < 0.05$ ). Ginger more effective than antiemetic Setron.	needed with broader sample of patients with hematological cancer. Ginger may help prevent side effects of antiemetic drugs and its interaction with other drugs.	the result cannot be generalized since only patients with hematologic cancers were in the experiment.
6	Taspinar & Sirin (2010). Effect of acupressure on chemotherapy-induced nausea and vomiting in gynecologic cancer patients in Turkey. (a) P (b) QUAN (c) II	Problems of CINV in cancer patients	To determine the effect of wrist-band acupressure on chemotherapy induced nausea and vomiting in gynecologic cancer patients in Turkey. In patients with gynecological cancer in Turkey who are receiving chemotherapy, how does the use of wrist-band acupressure for chemotherapy induced nausea and vomiting, compared with no use of wrist-band acupressure affect reports of nausea and vomiting during the 5-day chemotherapy session?	N= 34. Females in Turkey. Pre- and posttests. SPSS, R-ANOVA. Patients wore bands on both wrists for 5 days and only removed to wash hands or take showers.	Although the result showed no statistical significance, there was a striking decrease in the 5-day mean scores of patients with wristband acupuncture and antiemetic drugs as compared to the patients who only received antiemetic drugs	The researchers recommended the study to be conducted on a larger sample sized groups and also include male patients with different types of cancer. Easy to learn how to use the wristband for acupressure on the P6 point, no side effects and not expensive.	Small sample size and the result cannot be generalized since only patients with gynecologic cancers were in the experiment. Not a randomized trial
7	Ingersoll et al. (2010). Effect of Concord Grape Juice on Chemotherapy-Induced Nausea and Vomiting: Results of a Pilot Study. (a) P (b) QUAN (c) II	CINV affects the quality of life, control of events and psychological state	To determine the feasibility of administering a flavonoid-rich adjunctive treatment (Concord grape juice) for the management of (CINV) chemotherapy induced nausea and/or vomiting; to evaluate the usefulness of existing measures for assessing CINV frequency and severity, quality of life, control over life events, and psychological state. In adult patients with cancer who are receiving chemotherapy, how does the use of Concord grape juice for chemotherapy induced nausea and vomiting, compared with no use of Concord grape juice affect reports of nausea and vomiting during a 4-week chemotherapy session? Independent variable is Concord grape juice. Dependent variable is	N= 77. (n= 36) in experimental group and (n= 36) in control group. Methods: Double blind randomized clinical trial. data collection and analysis with generalized estimating equations methodology. Patients drank 4oz of grape juice or placebo before meals for 4 weeks after each of four chemotherapy treatment cycles.	Nausea and vomiting duration and frequency were lower for experimental group members but there was no significant statistical difference due to a high attrition rate (50%)	Use of an alternative form of grape is encouraged. Findings suggested that continued study of flavonoid effect on CINV should be investigated further with a large sample size. Flavonoid-rich fruits and vegetable may provide additional protection against CINV which will offer a low-cost, readily available adjunctive treatment in managing CINV	39 people withdrew from the experiment (especially from the experimental group). High attrition rate. Reliance on self-report measures. Pool of participants from a single cancer center. Use of time frame for recording CINV differ from the INV-R tool

			nausea and vomiting frequency and duration				
8	Raghavendra et al. (2007). Effects of an integrated yoga programme on chemotherapy-induced nausea and emesis in breast cancer patients. (a) P (b) MM (c) II	Effects of yoga on post-chemotherapy nausea and vomiting frequency and intensity	To determine the effect of integrated yoga program on chemotherapy induced nausea and/or vomiting in cancer patients. In patients with breast cancer who are receiving chemotherapy, how does the use of integrated yoga program for chemotherapy induced nausea and vomiting, compared with no use of integrated yoga program affect reports of nausea and vomiting during chemotherapy session?	N=62. Females. Yoga (n=28), supportive therapy (n=34) breast cancer. Randomization using opaque envelope with group assignment. Yoga session lasting for 60 mins daily. Bangalore, India. MANE scale	Significant decrease in post chemotherapy and anticipatory nausea in the experimental group as compared to the control group. However, there was no notable statistical difference of decreased vomiting between the two groups	Have no toxic effects on patients. Yoga found to also reduce stress level and served as a useful additive to antiemetic treatment. Larger experimental studies under controlled conditions are required to validate findings.	Small sample size. Management of delayed emesis was not according to current guidelines. Also, subjects in the control group were offered supportive counseling and coping preparation less frequently than those who received yoga intervention. Length of days of the experiment was not specified. Only women, only BRCA
9	Karagozoglu et al. (2013). Effects of music therapy and guided visual imagery on chemotherapy-induced anxiety and nausea-vomiting. (a) P (b) MM (c) II	Behavioral techniques are important in dealing with CINV	To determine the effect of music therapy and guided visual imagery on chemotherapy induced nausea and/or vomiting in cancer patients. In patients with cancer who are receiving chemotherapy, how does the use of music therapy and guided visual imagery for chemotherapy induced nausea and vomiting, compared with no use of music therapy and guided visual imagery affect reports of nausea and vomiting during a 5-day chemotherapy session?	N=40. Experimental, cross-sectional, pre-post test design. Morrow Assessment of Nausea and Vomiting scale, SPSS. Participants were asked to turn on the music 15 minutes before chemotherapy starts and focus on the visual images while listening to the music	Music therapy and visual imagery reduced the frequency and intensity of CINV. (P<0.05)	Practical complementary approaches in reducing CINV and its easy to use and cost-efficient	Small sample size. Single sample group.
10	Panahi et al. (2013). Effect of Ginger on Acute and Delayed Chemotherapy-Induced Nausea and Vomiting: A Pilot, Randomized, Open-Label Clinical Trial. (a) P (b) MM (c) II	Ginger on CINV	To evaluate the effects of ginger against both acute and delayed forms of CINV in advanced breast cancer. In breast cancer patients receiving chemotherapy, what are the effects of ginger on CINV, compared with no just pharmacological interventions?	Randomized, open-label; 100 women with advanced breast cancer	Reports of CINV were lower in patient who received ginger treatment.	Ginger can be used as a side treatment to help reduce CINV	Only women, only BRCA
11	Esra et al. (2011). Is chemotherapy-induced	Effects of smoking on	To investigate the effects of smoking on CINV.	X2-test and Fisher's exact-test; 121 cancer	CINV was more prevalent in non-	Smoking is not necessarily	Most participants were male and smokers

	nausea and vomiting lower in smokers? (a) P (b) QUAN (c) V	CINV	In cancer patient, what are the effects of smoking, versus non-smoking, on CINV?	patients; in Helsinki	smokers. CINV was higher in women than in men.	recommended, however this study may suggest that methods of distraction and relieving stress can help reduce CINV.	prior to the intervention.
12	Usharani et al. (2012). Analysis of pretreatment nonpharmacologic, pharmacologic factors, and yoga intervention on CINV outcomes in breast cancer patients undergoing adjuvant chemotherapy. (a) P (b) QUAL (c) II	Effects of yoga and other mind-body interventions on CINV	To evaluate the effects of mind body intervention such as yoga in modulating CINV outcomes. In breast cancer patients, does participating in yoga or other mind-body interventions result in fewer episodes of CINV than not participating in these interventions?	Breast cancer patients; Morrows Assessment of nausea and emesis	Yoga intervention influences CINV outcomes when controlled for pretreatment and pharmacological factors in breast cancer patients poorly controlled for nausea and vomiting.	Nurses should encourage patient to try non-pharmacological methods for CINV, like yoga.	only BRCA
13	Pillai et al. (2011). Anti-emetic effect of ginger powder versus placebo as an add-on therapy in children and young adults receiving high emetogenic chemotherapy. (a) P (b) QUAL (c) II	Problems of CINV in patients with cancer	To determine the effect of ginger on chemotherapy induced nausea and/or vomiting in cancer patients. In children and young adults patients with bone cancer who are receiving chemotherapy, how does the add-on use of ginger powder for chemotherapy induced nausea and vomiting, compared with no use of ginger affect reports of nausea and vomiting during a 10-day chemotherapy session?	N= 60. Double blind randomized design. Age 8-21. Edmonton Assessment Scale. SPSS, Chi-Square	Ginger root powder was effective in reducing severity of acute and delayed CINV as additional therapy	Ginger powder was well tolerated, cheap and easy to administer. Due to its effectiveness and inexpensiveness, future studies should employ the use of ginger along with pharmacological methods in reducing CINV	Small sample size and the result cannot be generalized since only patients with emetogenic cancers were in the experiment.
14	Ryan et al. (2012). Ginger (Zingiber officinale) reduces acute chemotherapy-induced nausea: a URCC CCOP study of 576 patients. (a) P (b) MM (c) II	Problems of CINV in patients with cancer	To determine the dose and efficacy of ginger at reducing the severity of chemotherapy induced nausea and/or vomiting in cancer patients. In patients with cancer who are receiving chemotherapy, how does the use of ginger for chemotherapy induced nausea and vomiting, compared with no use of ginger affect reports of nausea and vomiting during a 6-day chemotherapy session?	N=744. Randomized Double blind. ANCOVA, mixed data analysis. Patients took 3 capsules (250mg) of ginger or placebo twice daily which started on the 3 <sup>rd</sup> day prior to the first chemotherapy session.	Ginger was significantly effective in reducing CIN. Ginger at dose of 0.5g to 1.0g daily significantly (P<0.05) aids in reducing acute CIN in patients receiving standard antiemetics.	For future practices, the severity of the level of nausea of patients should be known and documented before the experiment	The small effect size for nausea severity and the lack of effect on delayed nausea and quality of life
15	Zick et al. (2009). Phase II trial of encapsulated	Problems of CINV in	To compare the effect of a low-dose (1.0g) and a high-dose (2.0g)	N= 162. Randomized, double blind, placebo-	Ginger was not effective in reducing CINV. It	Ginger was well tolerated and there	Insufficient sample size. Patients were

	ginger as a treatment for chemotherapy-induced nausea and vomiting. (a) P (b) MM (c) II	patients with cancer	powdered ginger root extract versus placebo for reducing the prevalence and severity of delayed nausea and vomiting in cancer patients. In patients with cancer who are receiving chemotherapy, how does the use of ginger for chemotherapy induced nausea and vomiting, compared with no use of ginger affect reports of nausea and vomiting during the 3-day chemotherapy session?	controlled trial. MANE scale. Participants were randomized to receive either 1.0 g (four capsules ginger and four capsules placebo daily) ginger, 2.0 g (eight capsules daily) ginger daily, or matching placebo (eight capsules daily) for 3 days.	tends to increase the severity of delayed nausea when given with aprepitant.	was no significant adverse effect. Ginger may have positive benefits in decreasing fatigue and non-GI adverse events during chemotherapy	able to determine the group they were assigned based on the taste of the capsules.
16	Molassiotis et al. (2013). The effectiveness and cost-effectiveness of acupressure for the control and management of chemotherapy-related acute and delayed nausea. (a) P (b) MM (c) II	Effect of acupressure on chemotherapy-related nausea	To assess the effectiveness and cost-effectiveness of self-acupressure using wristbands compared with sham acupressure wristbands and standards care alone in management of chemotherapy-induced nausea. In cancer patients experiencing chemotherapy-induced nausea, what is the effectiveness on reduction of nausea from self-acupressure wristbands compared to sham acupressure wristbands?	Randomized three-arm sham-controlled trial, 500 cancer patients, ages 16-50+yo, 4 cycles of chemotherapy	No statistically significant differences between the three arms of the trial, but a positive indication of a reduction in nausea.	No implications for practice can be drawn from this study because there were no statistically significant findings.	Lack of follow up techniques, missing data, choice of sham wristbands
17	Yeh et al. (2012). Reduction in Nausea and Vomiting in Children Undergoing Cancer Chemotherapy by Either Appropriate or Sham Auricular Acupuncture Points with Standard Care (a) P (b) QUAN (c) II	Effect of acupressure on chemotherapy-induced nausea and vomiting	To determine whether there is preliminary evidence to suggest that the auricular acupressure point treatment is more effective than the placebo to prevent/treat CINV. In children with cancer receiving chemotherapy, is an auricular acupressure point more effective in reducing CINV than the placebo sham acupressure point?	Crossover randomized trial; 10 cancer patients between 5 and 18 years; for three rounds of chemotherapy	No statistically significant differences between the intervention group and the placebo group in regards to affect on CINV. The intervention group did show a lower occurrence of acute and delayed nausea and shorter vomiting duration than the placebo group.	Acupressure may be used as a way to lessen the nausea and vomiting effects of chemotherapy in combination with antiemetic medications.	Too small of a sample size, only children, use of antiemetics
18	Molassiotis et al. (2014). The effectiveness of acupressure for the control and management of chemotherapy-related acute and delayed nausea: a randomized controlled trial	Effectiveness of acupressure on CINV	To clarify whether acupressure is effective in the management of chemotherapy-related nausea and vomiting. In cancer patients, are acupressure wristbands more effective in reducing CINV than sham acupressure wristbands or	Randomized, three-group, sham controlled trial; 500 heterogeneous patients from 14 cancer units in the UK	No statistically significant differences were found about the use of acupressure wristbands in the management of CINV and quality-of-life measures. However, the	Evidence of encouraging signals of improved nausea experience warrants further consideration in both practice and further clinical trials.	Missing data from the primary outcomes; participants looked up the correct way to use the sham wristbands on the internet; use of antiemetic medications

	(a) P (b) QUAN (c) II		antiemetic medications alone?		study provided evidence of encouraging signals in relation to improved nausea experience.		
19	Genç, A., Can, G., & Aydiner, A. (2013). The efficiency of the acupressure in prevention of the chemotherapy-induced nausea and vomiting. (a) P (b) MM (c) II	Effect of acupressure on chemotherapy-induced nausea and vomiting	To assess the efficiency of the acupressure in prevention of the chemotherapy-induced nausea and vomiting (CINV). In patients with gynecological, lung or breast cancer in Turkey who are receiving chemotherapy, how does the use of wrist-band acupressure for chemotherapy induced nausea and vomiting, compared with no use of wrist-band acupressure affect reports of nausea and vomiting during the 5-day chemotherapy session?	N=120. Experimental (n=67) and control groups (n=53) at Istanbul University Institute of Oncology. Single-blinded randomized trial. Rhodes Index of Nausea, Vomiting, and Retching (INVR),	No statistically significant differences (p>0.05) were found about the use of acupressure wristbands in the management of CINV	It has been determined that CINV is directly related to the treatment, and acupressure wristband was not an effective approach in preventing CINV.	Small sample size, short duration
20	Genc, F., & Tan, M. (2014). The effect of acupressure application on chemotherapy-induced nausea, vomiting, and anxiety in patients with breast cancer. (a) P (b) MM (c) II	Effect of acupressure on chemotherapy-induced nausea, vomiting and anxiety	To determine the effect of acupressure applied to the pericardium 6 (P6 or neiguan) acupuncture point on chemotherapy-induced nausea, vomiting, and anxiety in patients with breast cancer. In patients with breast cancer in Atatirk Hospital who are receiving chemotherapy, how does the use of wrist-band acupressure for chemotherapy induced nausea and vomiting, compared with no use of wrist-band acupressure affect reports of nausea and vomiting during the 5-day chemotherapy session?	N=64. Quasi-experimental model. The Beck Anxiety Inventory, and the Index of Nausea and Vomiting, SPSS. Stages 1-3 breast cancer received cycle two and more advanced chemotherapy in an ambulatory chemotherapy unit. There were 32 patients in the experimental group and 32 patients in the control group	There was a statistical significant difference in the mean nausea experience scores between the control and experimental group. However, there was no statistical difference in the mean vomiting scores of both groups.	The efficacy of applying acupressure was demonstrated. Applying acupressure at the P6 point is effective in decreasing chemotherapy-induced nausea, vomiting, and anxiety in patients with breast cancer. Further research with more subjects is needed.	Small sample size and the result cannot be generalized since only patients with breast cancers were in the experiment.
<p>*Indicate each: (a) primary(P) or secondary(S) source: (b) qualitative(QUAL), quantitative(QUAN), or mixed methods(MM). (c) Level of evidence(LOE)                  ** Construct purpose statement and PICOT if not stated in article. Indicate independent variables, dependent variables &amp; population.                  *** Include size, age, gender, ethnicity, other relevant sample characteristics, &amp; sampling method.                  **** Validity, Reliability, Applicability of findings. Consider Strengths, Weaknesses, Feasibility, Utility.</p>							



