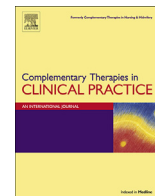




Contents lists available at ScienceDirect

## Complementary Therapies in Clinical Practice

journal homepage: [www.elsevier.com/locate/ctcp](http://www.elsevier.com/locate/ctcp)

## Guided imagery effects on chemotherapy induced nausea and vomiting in Iranian breast cancer patients



Mahboobehsadat Hosseini <sup>a</sup>, Batool Tirgari <sup>b,\*</sup>, Mansooreh Azizzadeh Forouzi <sup>c</sup>, Yunes Jahani <sup>d</sup>

<sup>a</sup> Department of Nursing and Midwifery, Kerman University of Medical Sciences, Kerman, Iran

<sup>b</sup> Kerman Neuroscience Research Center and Neuropharmacology Institute, Kerman, Iran

<sup>c</sup> Kerman Neuroscience Research Center and Neuropharmacology Institute, Kerman, Iran

<sup>d</sup> Department of Epidemiology and Biostatistics, School of Public Health, Kerman University of Medical Sciences, Kerman, Iran

### ARTICLE INFO

#### Article history:

Received 10 April 2016

Received in revised form

27 July 2016

Accepted 27 July 2016

#### Keywords:

Guided imaginary

Chemotherapy

Nausea

Vomiting

Breast cancer

### ABSTRACT

**Background:** The objective of this study was to examine the effect of guided imagery on chemotherapy induced nausea and vomiting in breast cancer patients.

**Design:** This was a quasi-experimental study in which a group of sample was evaluated pre and post intervention. A convenience sample of 55 eligible breast cancer patients enrolled to participate in this study after giving informed consent. They completed the Morrow Assessment of Nausea and Vomiting, before and after the intervention. The intervention consisted of listening to the two guided imagery tracks.

**Findings:** After the intervention, patients at the third session of chemotherapy had significantly lower mean scores in the frequency and severity of nausea and vomiting pre and post chemotherapy ( $p < 0.05$ ). **Conclusions:** Guided imagery, as an inexpensive and noninvasive method, is particularly appealing option to alleviate chemotherapy induced nausea and vomiting. It can be used in addition to pharmacological strategies and can be implemented by patients independently with sufficient training. Therefore, this therapy will considerably improve severity and frequency of chemotherapy induced nausea and vomiting.

© 2016 Elsevier Ltd. All rights reserved.

## 1. Introduction

Breast cancer incidences are increasing worldwide. Approximately one in eight American women will develop breast cancer during her lifetime [1]. Breast cancer also is the most common cancer in Iranian women and mainly affects them about a decade earlier than western countries [2]. Currently, chemotherapy remains the first option to control the postoperative progression of cancer to increase the survival rate [1].

Chemotherapy-induced nausea and vomiting (CINV) are the most problematic and serious side effects among patients with cancer [3–5] and its prevalence has been reported between 54% and 96% [4].

Despite numerous advances in the treatment, CINV continues to remain a challenge and distressing side effect to a proportion of patients undergoing systemic anti-cancer treatment [6,7]. On the other hand, standard pharmacological methods of antiemetic therapy are inadequate for dealing with these side effects [3,8,9]. According to Karagozoglou et al. (2013) [3] although antiemetic agents are widely used today, approximately 40% of the patients receiving chemotherapy still suffer from nausea and 75% from vomiting. Vanbockstael et al. (2015) [5] concluded that, despite improvements in pharmacological antiemetic treatment, 52.4% of patients experience CINV during the first cycle of chemotherapy [4].

If CINV is not controlled properly, it leads to further complications including effects on food intake [10], anorexia and metabolic imbalances [3,4] weight loss, social interactions, dehydration, difficulty sleeping [10] and anxiety [4,10]. These complications can have significant negative impact on patients' quality of life [3,4,10].

Some of the important recent approaches used for controlling

\* Corresponding author.

E-mail addresses: [M\\_hosseiny\\_85@yahoo.com](mailto:M_hosseiny_85@yahoo.com) (M. Hosseini), [batool.tirgari@gmail.com](mailto:batool.tirgari@gmail.com) (B. Tirgari), [forozy@gmail.com](mailto:forozy@gmail.com) (M.A. Forouzi), [yonesjahani@yahoo.com](mailto:yonesjahani@yahoo.com) (Y. Jahani).

nausea and vomiting are alternative and complementary therapies. These therapies can be applied as independent therapy methods or along with other standard therapy methods for cancer patients [4]. Evidences also suggest that, the addition of alternative and complementary therapies can improve control of anticipatory, acute and delayed chemotherapy-induced nausea and vomiting. These integrative interventions need to be included in standard clinical practice guidelines [11].

complementary and alternative therapies such as mind-body interventions are techniques that focus on the interactions between the brain, mind, body and behavior in which emotional, mental, social, spiritual and behavioral factors can directly affect health [12]. These therapies include hypnosis, biofeedback, relaxation techniques, meditation, and guided imagery [13].

Guided imagery is a widely used complementary and alternative therapy [14] and is becoming increasingly important in dealing with chemotherapy-induced nausea and vomiting [3]. Imagery has been defined as a dynamic, psychophysiological process in which a person imagines and experiences an internal reality in the absence of external stimuli [15]. Guided imagery is defined as the generation or recall of different mental images, such as perception of objects or events, and can engage mechanisms used in cognition, memory, and emotional and motor control [14]. Guided imagery's effectiveness have been studied in many different methodologies for controlling cancer and various treatment related side-effects including pain [12,13], stress [16], fatigue [12,16,17], anxiety [3,17,18], depression [4] and sleep disturbance [12].

Lee et al. (2013) [16] examined the effect of guided imagery on stress and fatigue in patients with thyroid cancer undergoing radioactive iodine therapy. They showed that, guided imagery can be recommended as an effective intervention to thyroid cancer patients with stress and fatigue. They also proposed more studies are necessary to examine the efficacy of guided imagery in a more diverse patients and setting.

Charalambous et al. (2015) [18] assessed the effectiveness of guided imagery and progressive muscle relaxation as stress reducing interventions in patients with prostate and breast cancer who were undergoing chemotherapy. They found that intervention group's anxiety and depression scores were significantly decreased compared to the control group.

In a study, Mustian et al. (2011) [11] provided an overview on treatment of nausea and vomiting during chemotherapy. They concluded that adequate control of nausea remains a challenge and requires more research to be conducted on this subject.

In an experimental study, Karagozoglu et al. (2013) showed that, music therapy and visual guided imagery reduced the severity and duration of CINV significantly. They concluded that, since cancer patients, who suffer from nausea/vomiting, cannot cope sufficiently with intense and repeated nausea and vomiting, they decide not to continue the treatment. Therefore, more studies are needed to determine the effect of guided imagery on CINV [3].

Nausea and vomiting are two of the most problematic side effects that patients experience during chemotherapy. While newly available treatments have improved our ability to manage nausea and vomiting, anticipatory and delayed nausea and vomiting are still a major problem for patients receiving chemotherapy. Many patients with cancer will delay or refuse future chemotherapy treatments and contemplate stopping chemotherapy altogether because of their fear of experiencing further nausea and vomiting [11,19].

Although the nature, intensity, and duration of treatment vary in different types of cancer, it is essential that various types of complementary and alternative therapies to be exclusively studied in each type of cancer. Accordingly, more studies are necessary to examine the efficacy of guided imagery in a more diverse setting [16].

According to Menzies et al. (2011) further scientific research is needed to use standard guided imagery interventions in a variety of different populations [17]. Therefore, more studies are needed to determine the effect of guided imagery on CINV in patients with cancer.

Based on our knowledge, current study is the first experimental research to assess the effectiveness of guided imagery in managing CINV in breast cancer patients in Iran. The rationale for this research was to continue investigations into the possible palliative effects of guided imagery on two of the most problematic chemotherapy side effects. Therefore, this study tests the hypothesis that guided imagery reduces duration and severity of chemotherapy-induced nausea and vomiting in breast cancer patients.

## 2. Method

### 2.1. Design and participants

In this quasi-experimental study, 55 breast cancer patients were participate based on pilot study. Power calculations showed that, a sample size of 55 patients would have 80% power to detect an effect size of approximately 0.5 ( $\alpha = 0.05$ ).

The inclusion criteria included: being 18–70 years old, being at stage I, II, or III of breast cancer, experienced nausea and vomiting within 24-hour period after the first course of chemotherapy and being told to undergo the second course of chemotherapy to receive 30–90 min sessions of intravenous chemotherapy infusion. Patients who were administered the same doses of the same chemotherapy agents and antiemetic both were also eligible for inclusion. Having psychological or nervous system disorders (Bipolar disorder, Epilepsy, Major nervous system disorders such as multiple sclerosis and myasthenia gravis), having hearing impairment, using sedative medication and gastrointestinal or nervous system cancer, were considered as exclusion criteria. A convenience approach was used for sampling. Having explained the objectives of the study and its methodology, eligible subjects were asked to sign a consent form at the first visit. Patients at the second session of chemotherapy were chosen as control group and the same group was chosen as intervention group at the third chemotherapy session [3].

### 2.2. Instruments

Data were gathered through demographic information form including age, marital status, stage of cancer, level of education. Morrow Assessment of Nausea and Vomiting was used for evaluation of nausea and vomiting. This tool was developed by Morrow (1992) and was used in many studies for the self-assessment of the severity and frequency of nausea and vomiting. Patients could evaluate nausea and vomiting occurring in two periods: before and after the chemotherapy. This instrument was used in more than 12 studies and its reported reliability was (0.66–0.78) [19]. The form included the following 16 questions: suffering nausea and vomiting in one or both periods (yes, no), severity (very mild, mild, moderate, severe, very severe and unbearable), duration (in hours) and the period during which patients suffered worst nausea/vomiting, how many hours before and after chemotherapy the first nausea/vomiting occurs, medication taken for nausea/vomiting (yes, no) and if yes, how beneficial the medication was (a lot, quite a lot, somewhat, not at all).

### 2.3. Intervention

Prior to the starting of the second chemotherapy course, and based on the inclusion criteria, patients entered to the study. In the

second session of chemotherapy patients were chosen as control group and their nausea and vomiting were measured before and after the second session. The participants in the control group were not informed about guided imagery, but they were informed about the procedure regarding the severity and frequency of their chemotherapy-induced nausea and vomiting. Participants were informed that they would be administered antiemetic drugs they were supposed to take during and after the therapy.

The intervention used by study participants at the third session consisted of listening to two audio-recorded guided imagery scripts, formatted as two separate tracks on two CDs. Each track was 10 min in length to elicit imagery response. The first track consisted of soft, slow-tempo, mixed nature sounds (e.g., the sounds of water flowing or birds singing) served as background music. The second track of the intervention included a pleasant scene imagery script, instructing listeners to imagine their feeling is getting better and better within a pleasant scene of their own choice. Participants were encouraged to become familiar with the surroundings of their imagery, imagine themselves in a safe and secure place where it was possible to rest and relax fully and completely.

Patients were asked to listen to the first track the night before the third session for 10 min. On the morning of the third session before starting chemotherapy, severity and frequency of their nausea and vomiting were measured.

Guided imagery CD including the second track was inserted in a CD player and was given to them. They were also provided with easy to use, small and lightweight headphones to prevent environmental noise to ensure their concentration on the CD content. Researcher recommended participants to close their eyes and listen to the CD track so they could stimulate their imaginations.

Guided imagery CDs had been prepared by the teaching staffs of the Iranian Department of Hypnotism. All the patients were asked to mark the frequency and severity of their nausea and vomiting during and after the intervention at third chemotherapy session.

#### 2.4. Statistical analysis

Data were analyzed by SPSS 21 for Windows (SPSS, Inc., Chicago, IL, USA). Descriptive statistics were computed for the study variables. To compare pre and post chemotherapy nausea and vomiting paired *t*-test was used. *P* values < 0.05 considered as significant.

#### 2.5. Ethical consideration

In the planning stage, hospital management was contacted for permission to conduct the study, and the approval was obtained from the Ethics committee of Kerman Medical University (ethical code: Ir.kmu.rec.1394.43). As mentioned before, all participants were informed about the goals and procedure of the study and signed a consent form. All samples consented to participate in the study. Patients were told they have the right to withdraw at any time throughout the study, and not participating would not have any detrimental effects in terms of the essential or regular hospital treatments and services they were receiving.

### 3. Results

#### 3.1. Demographic characteristics

The sample consisted of 55 women with breast cancer who had a mean age of 57.5 years (*SD* = 8.43). Their education levels ranged from some illiterate to college degrees. The majority of participants were married (89.9%) and 65.5% were at the stage II of breast cancer (Table 1).

#### 3.2. Nausea

Mean score of pre-chemotherapy nausea severity was ( $1.91 \pm 1.97$ ) in the second cycle and it decreased significantly in the third cycle ( $1.28 \pm 0.85$ ). Similarly, the mean nausea severity score decreased from  $2.07 \pm 1.63$  in the second cycle to  $0.98 \pm 0.84$  in the third cycle after chemotherapy. When the patients' pre and post chemotherapy nausea frequency for each cycle (2<sup>ed</sup> and 3<sup>ed</sup> cycles) were evaluated, it was determined that patient's pre and post chemotherapy nausea frequency were significantly lower at the third session than their pre and post chemotherapy nausea frequency when they were at the second session (Table 2).

#### 3.3. Vomiting

The patients' mean pre-chemotherapy vomiting severity score was ( $0.48 \pm 0.09$ ) at the second cycle and it decreased statistically significantly at the third cycle ( $0 \pm 0$ ) ( $p < 0.05$ ). Similarly, the mean vomiting severity score decreased from  $0.62 \pm 0.05$  to  $0 \pm 0$  after chemotherapy. When the patients' pre and post chemotherapy vomiting frequency for each cycle (2<sup>ed</sup> and 3<sup>ed</sup> cycles) were evaluated, it was determined that patient's pre and post chemotherapy vomiting frequency were significantly lower at the third session than their pre and post chemotherapy vomiting frequency at the second session (Table 3).

### 4. Discussion

The results of this study indicated that, guided imagery reduced severity and frequency of chemotherapy induced nausea and vomiting in breast cancer patients. The results of the present study are supported by findings of previous studies that examined the effectiveness of complementary and alternative therapies such as mind-body interventions for controlling cancer treatments' side-effects [16,18].

Mind-body interventions such as guided imagery, deep breathing, meditation and progressive muscle relaxation have been shown to decrease the stress response and can be beneficial for depression and anxiety. These therapies reduce levels of Cortisol and Cytokines in humans [19].

Charalambous et al. (2015) in their study showed that, patients with prostate and breast cancer undergoing chemotherapy treatment can benefit from guided imagery and progressive muscle relaxation to reduce their anxiety and depression [18].

Lee et al. (2013) [16] evaluated the effect of guided imagery on stress and fatigue in patients undergoing radioactive iodine therapy

**Table 1**  
Demographical characteristics of breast cancer patients.

Characteristics	N	%
Age		
41–59	33	60
≥60	22	40
<b>Level of education</b>		
Illiterate	10	18.18
Literate	6	10.9
Elementary	23	41.8
High school	3	5.4
College	13	23.6
<b>Marital status</b>		
Married	49	89.09
Unmarried	6	10.9
<b>Breast cancer stage</b>		
Stage I	5	9.09
Stage II	14	25.5
Stage III	36	65.5
	5	9.09

**Table 2**  
Pre and post chemotherapy mean scores for Nausea in breast cancer patients.

Nausea	Chemotherapy	Second cycle X ± SD	Third cycle X ± SD	p
Severity	Pre	1.91 ± 1.97	1.28 ± 0.85	0.0001
	Post	2.07 ± 1.63	0.98 ± 0.84	0.0001
Frequency	Pre	1.67 ± 0.88	1.46 ± 0.91	0.0001
	Post	1.91 ± 0.63	1.18 ± 1.20	0.0001

**Table 3**  
Pre and post chemotherapy mean scores for vomiting in breast cancer patients.

Vomiting	Chemotherapy	Second cycle X ± SD	Third cycle X ± SD	p
Severity	Pre	0.48 ± 0.09	0 ± 0	0.0001
	Post	0.62 ± 0.05	0 ± 0	0.0001
Frequency	Pre	1.10 ± 0.24	0 ± 0	0.0001
	Post	0.42 ± 0.05	0 ± 0	0.0001

after thyroidectomy. Their findings revealed that guided imagery can be considered as an effective intervention to control above mentioned side effects.

This may be due to affects of mind and body interventions. These interventions provide patients with the knowledge and skills to cope with their disease and control their symptoms. These kinds of therapies are particularly appealing options for the treatment of cancer symptoms in addition to pharmacological strategies, as these methods have beneficial outcomes including few negative side effects, ability to be used by patients independently with sufficient training and being inexpensive [12].

In line with our findings, some literature revealed that, guided imagery is generally considered as more powerful technique for reducing two of the most troubling side effects including nausea and vomiting experienced by patients during chemotherapy [3, 20–22].

Chen et al. (2015) [20] examined the effect of relaxation with guided imagery on the physical and psychological symptoms of breast cancer patients undergoing chemotherapy. They showed that, this approach led to a significant reduction in nausea and vomiting between the pre and post-tests.

Karagozoglu et al. (2013) [3] showed that, complementary and alternative therapies such as music therapy and visual guided imagery had positive effects on chemotherapy induced anxiety, nausea and vomiting. Gimeno, (2010) [21] stated that, music and visual imagery significantly reduced the incidence of chemotherapy-induced nausea and vomiting and could be used as a supportive approach in the process of chemotherapy for patients.

Yoo et al. (2005) [22] also determined that, the progressive muscle relaxation training and guided imagery were associated with both the improvements in anticipatory and post chemotherapy nausea and vomiting and in the quality of life of patients with breast cancer.

Although there is no clear explanation of how guided imagery brings about positive physical changes in regard to nausea and vomiting, possible explanations have been provided by some researchers. Chan et al. (2015) [21] believed that, guided imagery is a technique which uses a favorable and relaxing mental image to distract an individual's attention from the distressful side effects of the chemotherapy. Lee et al. (2013) claimed that, guided imagery often gives a sense of wellbeing. The positive content of these images interacts with the body's immune system and causes body to identify any abnormality such as a cancer cell [16].

Weydert et al. (2006) in their study concluded that, during guided imagery process, a state of deep relaxation is induced using progressive muscle relaxation which allows the patients to be guided in actively creating images that facilitate resolution of

certain problems. What makes imagery clinically relevant is that, a person who uses imagery may experience an effective behavioral or physiological response without a real stimulus event [13], as perceptual processes are involved in imagery [23]. Therefore, this mental imagery may be used to alter one's physiologic process, mental state, self-image, performance, or behavior [21]. According to Lee et al. (2013) further studies should focus on exploring the mechanism behind the effects of guided imagery on physical healing to ensure a better understanding of its importance and provide more effective clinical implementation of guided imagery [16].

Inconsistent with present finding, some researcher showed that, mind-body interventions including mindfulness and massage cannot be considered an effective intervention to control cancer treatments' side effects. Bränström et al. (2012) assessed the effects of mindfulness training on psychological well-being and symptoms of stress in patients treated for cancer. They found that, although participants underwent an 8-weeks mindfulness training course, there were no differences in stress between experimental and control groups [24]. Krohn et al. (2011) investigated the effects of massage on stress in breast cancer patients and found no significant changes after therapy [25].

These discrepancies may be due to the fact that, guided imagery is easier to learn and practice than mindfulness and self-massage is usually not easy. While Guided imagery is a simple, easily taught and acquired intervention, but it has been considered less as an intervention method in cancer patients [16].

#### 4.1. Limitations

Study limitations included: 1) The participants were selected only from one hospital and may not have been representative of the general population with breast cancer; 2) Small sample size; 3) Use of convenience sample; 4) Brevity of the intervention; and 5) Lack of any follow-up data. Therefore more research on this subject is needed with 1) longer follow-up and 2) larger sample.

## 5. Conclusion

Although chemotherapy results in nausea and vomiting, the therapeutic efficacy of guided imagery was found in this study. Unfamiliar to many nurses, guided imagery is a simple, non-invasive therapy with potential benefit for controlling complications of chemotherapy such as nausea and vomiting. Guided imagery is clinically effective and not associated with any apparent side effects. The early use of this type of therapies in the course of chemotherapy, may reduce not only the number of days with nausea and vomiting and subsequent return to regular activities, but also reduces health care costs by decreasing the use of medical services [13].

#### 5.1. Implications for practice

1. Nurses are in the central and bridging position of caring and communicating with oncology patients. Oncology patients undergoing chemotherapy suffer a range of side-effects that have impact upon their quality of life and require care and counseling by healthcare professionals [26].
2. Since nurses are playing a vital role in CANV prevention and management, they should be well-equipped to facilitate assessment, education and management of CANV [1]. Guided imagery can aid health care providers in developing and taking responsibility for effective management of chemotherapy side effects. It is recommend that, health providers consider guided imagery to reduce nausea and vomiting when patients undergo

chemotherapy. Nurses who are closely associated with patients and remain with them longer than any other health professionals feel frustrated with their inability to assist patients in coping with the side effects of chemotherapy. Guided imagery can increase the sphere of competence and skills of oncology nursing staffs and enable oncology nurses to apply holistic models of health care.

3. If nurses are more aware of the benefits of guided imagery, they will be better able to guide breast cancer patients as they make choices to alleviate their symptoms. If nurses have a full understanding of the effects of guided imagery, they will be better able to plan strategies to manage chemotherapy induced nausea and vomiting [19].

### Acknowledgement

The authors wish to acknowledge Kerman University of Medical Science. Special thanks due breast cancer patients for their valuable participation in this study.

### References

- [1] C.W. Chan, L.W. Lam, C.K. Li, J.S. Cheung, K.K. Cheng, K.W. Chik, et al., Feasibility of psychoeducational interventions in managing chemotherapy-associated nausea and vomiting (CANV) in pediatric oncology patients, *Eur. J. Oncol. Nurs.* 19 (2) (2015) 182–190.
- [2] M.D.M. Shadi Kolahdoozan, M.D.M. Alireza Sadjadi, A.R. Radmard, M.D.M. Hooman Khademi, Five common cancers in Iran, *Archives Iran. Med.* 13 (2) (2010) 143.
- [3] S. Karagozoglul, F. Tekyasar, F.A. Yilmaz, Effects of music therapy and guided visual imagery on chemotherapy-induced anxiety and nausea–vomiting, *J. Clin. Nurs.* 22 (1–2) (2013) 39–50.
- [4] A.S. Montazeri, M. Raei, A. Ghanbari, A. Dadgari, A.S. Montazeri, A. Hamidzadeh, Effect of herbal therapy to intensity chemotherapy-induced nausea and vomiting in cancer patients, *Iran. Red Crescent Med. J.* 15 (2) (2013) 101–106.
- [5] J. Vanbockstael, E. Coquan, S. Gouerant, D. Allouache, A. Faveyrial, S. Noal, et al., How to improve the prevention of chemotherapy-induced nausea and vomiting? the French NAVI study, *Support. Care Cancer* (2015) 1–8.
- [6] S. Grunberg, Patient-centered management of chemotherapy-induced nausea and vomiting, *Cancer Control.* (2) (2012) 19.
- [7] L. Kottschade, P. Novotny, A. Lyss, M. Mazurczak, C. Loprinzi, D. Barton, Chemotherapy-induced nausea and vomiting: incidence and characteristics of persistent symptoms and future directions NCCCTG N08C3 (Alliance), *Support. Care Cancer* (2016) 1–7.
- [8] J. Middleton, E. Lennan, Effectively managing chemotherapy-induced nausea and vomiting, *Br. J. Nurs.* 20 (17) (2011), <http://dx.doi.org/10.12968/bjon.2011.20.Sup10.S7.S7-8.S10-2.S14-15>.
- [9] J.M. Tipton, R.W. McDaniel, L. Barbour, M.P. Johnston, Putting evidence into practice: evidence-based interventions to prevent, manage, and treat chemotherapy-induced nausea and vomiting, *Clin. J. Oncol. Nurs.* 11 (1) (2007) 69.
- [10] A. Molassiotis, W. Russell, J. Hughes, M. Breckons, M. Lloyd-Williams, J. Richardson, et al., The effectiveness of acupressure for the control and management of chemotherapy-related acute and delayed nausea: a randomized controlled trial, *J. Pain Symptom Manag.* 47 (1) (2014) 12–25.
- [11] K.M. Mustian, K. Devine, J.L. Ryan, M.C. Janelins, L.K. Sprod, L.J. Peppone, et al., Treatment of nausea and vomiting during chemotherapy, *U. S. Oncol. Hematol.* 7 (2) (2011) 91.
- [12] K.L. Kwekkeboom, C.H. Cherwin, J.W. Lee, B. Wanta, Mind-body treatments for the pain-fatigue-sleep disturbance symptom cluster in persons with cancer, *J. Pain Symptom Manag.* 39 (1) (2010) 126–138.
- [13] J.A. Weydert, D.E. Shapiro, S.A. Acra, C.J. Monheim, A.S. Chambers, T.M. Ball, Evaluation of guided imagery as treatment for recurrent abdominal pain in children: a randomized controlled trial, *BMC Pediatr.* 6 (1) (2006) 29.
- [14] P. Posadzki, W. Lewandowski, R. Terry, E. Ernst, A. Stearns, Guided imagery for non-musculoskeletal pain: a systematic review of randomized clinical trials, *J. Pain Symptom Manag.* 44 (1) (2012) 95–104.
- [15] V. Menzies, A.G. Taylor, The idea of imagination: an analysis of “imagery”, *Adv. Mind-Body Med.* (2) (2004) 20.
- [16] M.H. Lee, D.-H. Kim, H.S. Yu, The effect of guided imagery on stress and fatigue in patients with thyroid cancer undergoing radioactive iodine therapy, *Evidence-Based Complementary Altern. Med.* (2013) 2013.
- [17] V. Menzies, N. Jallo, Guided imagery as a treatment option for fatigue: a literature review, *J. Holist. Nurs.* (2011), 0898010111412187.
- [18] A. Charalambous, M. Giannakopoulou, E. Bozas, L. Paikousis, A randomized controlled trial for the effectiveness of progressive muscle relaxation and guided imagery as anxiety reducing interventions in breast and prostate cancer patients undergoing chemotherapy, *Evidence-Based Complementary Altern. Med.* (2015) 2015.
- [19] A.M. Henneghan, T. Harrison, Complementary and alternative medicine therapies as symptom management strategies for the late effects of breast Cancer treatment, *J. Holist. Nurs.* 33 (1) (2015) 84–97.
- [20] S.-F. Chen, H.-H. Wang, H.-Y. Yang, U.-L. Chung, Effect of relaxation with guided imagery on the physical and psychological symptoms of breast cancer patients undergoing chemotherapy, *Iran. Red Crescent Med. J.* (11) (2015) 17.
- [21] M.M. Gimeno, The effect of music and imagery to induce relaxation and reduce nausea and emesis in patients with cancer undergoing chemotherapy treatment, *Music Med.* 2 (3) (2010) 174–181.
- [22] H.J. Yoo, S.H. Ahn, S.B. Kim, W.K. Kim, O.S. Han, Efficacy of progressive muscle relaxation training and guided imagery in reducing chemotherapy side effects in patients with breast cancer and in improving their quality of life, *Support. Care Cancer* 13 (10) (2005) 826–833.
- [23] F.L. Bedford, A perception theory in mind–body medicine: guided imagery and mindful meditation as cross-modal adaptation, *Psychonomic Bull. Rev.* 19 (1) (2012) 24–45.
- [24] R. Bränström, P. Kvillemo, J.T. Moskowitz, A randomized study of the effects of mindfulness training on psychological well-being and symptoms of stress in patients treated for cancer at 6-month follow-up, *Int. J. Behav. Med.* 19 (4) (2012) 535–542.
- [25] M. Krohn, M. Listing, G. Tjahjono, A. Reissauer, E. Peters, B.F. Klapp, et al., Depression, mood, stress, and Th1/Th2 immune balance in primary breast cancer patients undergoing classical massage therapy, *Support. Care Cancer* 19 (9) (2011) 1303–1311.
- [26] N. Klafke, C. Mahler, C. von Hagens, G. Blaser, M. Bentner, S. Joos, Developing and implementing a complex Complementary and Alternative (CAM) nursing intervention for breast and gynecologic cancer patients undergoing chemotherapy—report from the Congo (complementary nursing in gynecologic oncology) study, *Support. Care Cancer* (2015) 1–10.