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Combining Essential Ginger Oil and Acupressure Relaxation Techniques for Cancer Patients, Post-Chemotherapy

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An intervention with the aroma of ginger essential oil and relaxation techniques, upon acupressure meridian PC6, could reduce nausea and vomiting, and increase comfort and decrease anorexia. However, the research has not been found to prove effectiveness if these two interventions are combined. This research explains the effect of combinations of the aroma of ginger essential oil and relaxation techniques, upon acupuncture meridian PC6, on nausea, vomiting, comfort and anorexia. Quantitative research was designed for a Quasi-Experiment with pre-post-test control group design (four groups pre-post-test). This research was upon a population of cancer patients post chemotherapy, who experienced nausea and vomiting. Non-probability consecutive sampling was used to select 30 respondents for each group, according to inclusion criteria. The research variables were essential ginger oil aroma, relaxation technique acupressure upon meridian PC6, nausea, vomiting, comfort, and anorexia. The instruments used were a nausea and vomiting questionnaire, an anorexia questionnaire, and a shortened general comport questionnaire (GCQ) analysed using MANOVA. There was a decrease in nausea and vomiting p=0,000, an increase in comfort p=0,000, a decrease in anorexia p=0,000 before and after the intervention of a combination of ginger essential oil and relaxation technique upon the acupressure PC6 meridian. The combination of essential ginger aroma and relaxation techniques for acupressure meridian PC6 were one of the alternative interventions that was effective in reducing nausea and vomiting, increasing comfort, decreasing anorexia in cancer patients.

Key words: *Acupressure, Anorexia, Comfort, Chemotherapy, Ginger, Nausea Vomiting.*

Introduction

Chemotutan Induced Nausea and Vomiting (CINV) is a term used to describe the incidence of nausea and vomiting in post-chemotherapy patients (1). Nausea and vomiting is a condition caused by a strong contraction of the abdominal muscles, causing stomach contents to be pushed out through the mouth (2). Nausea and vomiting can also cause disorders of the immune system, impaired cognitive function, social problems, inability to fulfill social responsibilities, disruption of physical activity, and discomfort (3). Nausea and vomiting in post-chemotherapy patients is a common symptom that can debilitate and delay chemotherapy as well as cause dehydration, electrolyte imbalance, weight loss, and anorexia (4). Anorexia is a loss of appetite often experienced by cancer patients but often ignored (5). In advanced cancer, anorexia is the fourth most common symptom after nausea and vomiting, pain, and fatigue (Dalal & Bruera, 2011).

According to Globocan data, from the International Agency for Research on Cancer (IARC), in 2012 cancer caused about 8.2 million deaths, and there were 14,067,894 new cases of cancer and 8,201,575 deaths from cancer worldwide. The biggest causes of cancer deaths each year are due to lung, liver, stomach, colorectal and breast cancer (Indonesian Ministry of Health Data and Information Centre, 2015). The number of cancer sufferers is expected to increase every year and is estimated to reach 23.6 million new cases per year in 2030 (Indonesian Ministry of Health, 2016).

Non-pharmacological therapy is a nurse's independent nursing action for patients who receive chemotherapy, comforting patients by reducing or eliminating nausea and vomiting due to chemotherapy. Complementary therapy can be used as supportive therapy for cancer patients undergoing chemotherapy. One herb that can be used is ginger (Zingiber officinale) (Panahi et al., 2012). Ginger has been shown to be effective in increasing comfort, controlling emotions, and reducing nausea, vomiting, anorexia, motion sickness, seasickness, post-surgery, and pregnancy (1) (Panahi et al., 2012) (13). Acupressure relaxation techniques are also one method that can focus on a feeling of relaxation, because they can reduce stretching and relaxation in the muscles; acupressure on the PC6 point meridians can eliminate nausea and vomiting (W. Marx, Isenring, & Lohning, 2017) (Shen & Yang, 2017) (15). This study aims to analyse the effect of the combination of essential ginger oil and acupressure relaxation techniques meridian point pc6, upon nausea, vomiting, comfort, and the anorexia of cancer patients post chemotherapy.

Literature Review

Chemotherapy

Chemotherapy is a way of treating tumours by eradicating cancer cells (called cytostatics) that are drunk or infused into blood vessels. So, chemotherapy drugs spread throughout the body's tissues. They can eradicate cancer cells that have spread widely throughout the body. Because of their wide spread, and their broad killing power, side effects are usually more severe than the two previous treatment modalities. Chemotherapy drugs are commonly called sitostatics, which have the effect of inhibiting or killing all cells that are actively dividing. The working principle of treatment with chemotherapy is to poison or kill cancer cells, control the growth of cancer cells, and stop their growth from spreading, or to reduce the symptoms caused by cancer. Chemotherapy is sometimes the first choice for dealing with cancer. Chemotherapy is systemic, in contrast to radiation or surgery that is local, so chemotherapy can reach cancer cells that may have spread and spread to other parts of the body (Konmun et al., 2017).

The use of chemotherapy is different for each patient. Sometimes it is the main treatment. In other cases it is used before or after surgery or radiation. The success rate of chemotherapy also varies depending on the type of cancer (Manuaba, 2007). Two or more drugs are often used in combination. The reason for combination therapy is to use drugs that work on different parts of the cell's metabolic process, thus increasing the likelihood of destruction of the cancer cells. In addition, the harmful side effects of chemotherapy can be reduced if drugs with different toxic effects are combined, each in a lower dose than the required dose if the drug is used alone (Lucksamon Thamlikitkul et al., 2017).

Uncontrolled nausea and vomiting can affect not only therapy in the cancer patient as a whole, but also the therapeutic response, and reduce the cure rate. In addition, uncontrolled nausea and vomiting can also cause dehydration, electrolyte imbalance, weight loss, and malnutrition. Prolonged vomiting can cause esophageal, gastric damage and bleeding (Hanahan and Weinberg, 2015). Nausea and vomiting are early manifestations that are often found from the toxicity of chemotherapy drugs. The etiology of nausea and vomiting touches many different problems, therefore the limitation is also different; it can be simple or complex (Dipiro and Thomas, 2005). Controlling nausea and vomiting is an important consideration in cancer treatment and supportive therapy (Cavallo, De Giovanni, Nanni, Forni, & Lollini, 2011).

Comfort

Convenience is defined as a prosperous condition and is the end of the nursing action taken to the client. Comfort is a basic value of nursing goals at all times. Comfort is a necessity in the range of pain to health, and the final stage of the nurse's therapeutic action towards the patient (Siefert, 2002). The comfort theory approach developed by Kolcaba offers comfort at the forefront of the nursing process. Kolcaba considers that holistic comfort is a total comfort covering physical, psycho-spiritual, environmental and psychosocial comfort. Comfort levels are divided into three; namely relief where the patient needs specific comfort needs, ease which is free from discomfort or increase comfort, and transcendence to tolerate or adapt to discomfort (Kolcaba & Dimarco. 2005: Tomey & Alligood, 2006).

In the perspective of Kolcaba, holistic comfort is defined as an immediate experience that becomes a force through needs that will reduce the relief, ease, and transcendence that can be fulfilled in four contexts of experience which include physical, psycho-spiritual, social and environmental aspects.

Other assumptions developed by Kolcaba depict comfort as a concept that has a strong relationship with nursing. Nurses comfort patients and their families through interventions with a comfort measurement orientation. Acts of consolation by nurses greatly strengthen patients and families who can feel like they are in their own homes. The condition of the family and the patient is strengthened by the actions of the health service performed by the nurse, by involving behaviour (Alligood, 2014).

Essential Ginger Oil

Aromatherapy is a way of treating the body or healing diseases by using essential oils (Essential Oil) (Marx et al., 2017). Essential oils are the main raw material for the benefit of aromatherapy preparations (Lua, Salihah, & Mazlan, 2015). Aromatherapy is the use of essential oils aimed at handling the mind, body and spirit (Marx et al., 2017). Aromatherapy is the use of essential oils obtained from aromatic plants for therapeutic properties (Lua et al., 2015). Clinical aromatherapy is recognised as part of holistic nursing by the American Holistic Nurses Association and by most state nursing boards.

Aromatherapy has a positive effect. It is known that fresh and fragrant aromas stimulate sensory receptors, and ultimately affect other organs so that it can have a powerful effect on emotions. The aroma is captured by nasal receptors which then provide further information towards the brain, which controls emotions and memory as well as providing information to the hypothalamus; a regulator of the body's internal systems including sexuality, body temperature, and reactions to stress (W. Marx, Ried, et al., 2017).

Zingiber officinalis can ward off nausea and gastrointestinal discomfort (Marx et al., 2017). Ginger rhizomes contain essential bioactive compounds (gingerols), primary bioactive agents in non-volatile and stinging components (Bhattarai, Van Tran, & Duke, 2001). Ginger is an effective herbal remedy for nausea and vomiting and does not cause side effects. Antiemetic activity in ginger can be caused by gingerols and shogaols, both of which are phenolic compounds. The content of 5-Hydroxytryptamine3 receptor antagonists in ginger which is also antiemetic and has odours that can reduce emotions (Konmun et al., 2017).

Acupressure

Acupressure is an intervention that has been proven effective in improving the quality of life of patients with cancer. Acupoint acupressure is often used at the Shenmen point (HT-7), Yongquang (K11), Neiguan (PC6), Tian-Zhu, Ju-Que, and Bai-Hui (Deye, N., (2016). The Pericardium point PC6 or Nei Guan is derived from the words "Nei", meaning medial and "Guan" which means to pass through. The PC6 point is the location of the forearm, the PC6 point stimulation is carried out with the palm facing upward, the PC6 point is 5 cm from the distal wrist crease (Poulsen et al., 2008). The PC6 point is located on the meridian path. The heart membrane has two branches namely the heart membrane and heart, then penetrates the diaphragm in the middle space and below the stomach; these meridians also cross the stomach and intestine (Lenz et al., 2014).

Acupressure therapy for nausea and vomiting can be done by pressing the forearm manually on PC6 in the wrist area three fingers from the distal area between two tendons (flexor carpi radialis and palmaris longus muscle) for 30 seconds to two minutes; acupressure can work quickly, usually two up to three minutes upon indigestion (PJ Hesketh et al., 2015). The stimulatory effect at this point can increase beta-endorphin release in the pituitary and ACTH along the Chemoreceptor Trigger Zone (CTZ), inhibiting the vomiting center (Poulsen et al., 2008).

Acupressure aims to balance the body's energy so that optimal body conditions are achieved, and optimal body organs can function properly. Acupressure is done to stimulate the acupressure point with a massage that is strong enough or a comfortable massage, the time required is 30 seconds, and ordered in the direction of the meridian flow. Acupressure with the aim of depression (analgesia) is done through a strong massage or massage that hurts. The time required is 40 seconds, and sorted in the opposite direction of the meridian flow. The effects of analgesic massage can be identified through pain due to massage that gradually decreases and disappears (McKeon, Smith, Hardy, & Chang, 2013).

Methodology

This research is a quantitative study with a Quasi-Experimental research design and pre-post test control group research design. The intervention group was given a combination treatment of ginger essential oil aroma and PC6 meridian point acupressure relaxation techniques for nausea, vomiting, comfort, and anorexia. Whereas, the control group consisted of three groups; namely the group that was given essential oil, the group given acupressure relaxation points for the PC6 meridian point, and the group given the intervention according to hospital standards. The target population in this study is cancer patients in Makassar. The population in this study were post-chemotherapy cancer patients. The research sample of 30 patients for each group with inclusion criteria is as follows: Clients are experiencing acute nausea, vomiting after chemotherapy, Cancer stage II and III, Clients aged ≥ 21 years and over, Getting drugs for chemotherapy in the form of FAC (5-Fluorourasil, Doxorubicin, Cyclophosphamide), Clients who do adjuvant and neoadjuvant chemotherapy, Clients who have done ≥ 2 times of chemotherapy.

Clients who have done chemotherapy can describe nausea vomiting after chemotherapy. Before the intervention, the administrator first asked the client whether the client likes the smell of ginger and whether or not the client has a history of an allergy to ginger. (Nervus olfaktoris). This can be seen in the assessment, physically, in the patient's status that the olfactory system is normal by using one of the tests (odour sticks, smelling, 12-inch alcohol test and scratch and sniff card), the patient is conscious, can be oriented as to people, place and time (can communicate verbally). Consecutive sampling was used. The independent variable in this study was the combination of the aroma of ginger essential oil and PC6 acupressure meridian point relaxation technique. The dependent variable in this study was nausea, vomiting, comfort, anorexia in cancer patients after chemotherapy.

The aroma of ginger essential oil (EO) contains essential oil (gingerol); simple ingredients purchased at Materia Medika Batu Malang. It was then distilled by the pharmacy section of Airlangga University to become EO. The aroma of this essential oil uses an aromatherapy diffuser and acupressure relaxation techniques, using the hands to stimulate / massage the patient's four forearms from the distal at the PC6 meridian points according to the SOP instrument for variable nausea, vomiting and anorexia, using questionnaires and observation sheets created by researchers. The comfort questionnaire sheet comes from the Kathy Colkaba Web comfort line used by researchers at California State University, at San Marcos. This questionnaire sheet is used to measure holistic changes in patient comfort levels, using the Shortened General Comfort Questionnaire (GCQ) as modified by the researcher. Researchers have tested validity at the Dr. Wahidin Sudirohusodo General Hospital; as many as 30 respondents. This study passed the ethical review conducted by the Ethics Commission

of the Faculty of Nursing, Airlangga University, with the number 1275-KEPK dated 30 January 2019.

Results and Findings

Below are complaints of nausea, vomiting, comfort and anorexia in the ginger essential oil combination group and PC6 meridian point acupressure relaxation techniques, ginger essential oil group, PC6 meridian point acupressure relaxation group and the standard group.

Table 1: Distribution of nausea, vomiting, comfort, anorexia before intervention

Independent Variable	**Combination**		**Essential oil jahe**		**Acupressure PC6**		**Standard**	
	f	**%**	**f**	**%**	**f**	**%**	**f**	**%**
Nausea and Vomiting								
Mild	4	13,3	2	6,7	2	6,7	9	30,0
Moderate	20	66,7	13	43,3	16	53,3	10	33,3
Severe	4	13,3	8	26,7	9	30,0	9	30,0
Very Severe	2	6,7	7	23,3	3	10,0	2	6,7
Comfort								
Comfort	-	-	-	-	-	-	-	-
Do not comfort	30	100	30	100	30	100	30	100
Anorexia								
Anorexia	26	86,7	23	76,7	24	80,0	25	83,3
Do not Anorexia	4	13,3	7	23,3	6	20,0	5	16,7

From the table above it can be seen that each group has the same comfort score. That is, 100 percent have a score of 30 (uncomfortable), with complaints of nausea and vomiting. Each group has almost the same distribution for mild, moderate, severe and severe vomiting while all four groups had anorexia complaints.

Table 2: Distribution of nausea, vomiting, comfort, anorexia after the intervention

Independent Variable	**Combination**		**Essential oil jahe**		**Acupressure PC6**		**Standard**	
	f	**%**	**f**	**%**	**f**	**%**	**f**	**%**
Nausea and Vomiting								
Mild	28	93,3	23	76,7	25	83,3	3	10,0
Moderate	2	6,7	7	23,3	5	16,7	9	30,0
Severe	-	-	-	-	-	-	12	40,0
Very Severe	-	-	-	-	-	-	6	20,0
Comfort								
Comfort	28	93,3	22	73,3	22	73,3	3	10,0
Do not comfort	2	6,7	8	26,7	8	26,7	27	90,0
Anorexia								
Anorexia	4	13,3	11	36,7	11	36,7	22	73,3
Do not Anorexia	26	86,7	19	63,3	19	63,3	8	26,7

From the table above it can be seen that the mildest nausea and vomiting complaints are 28 respondents (93.3%), highest comfort 28 respondents (93.3%), and no anorexia, 26 respondents (86.7%) in the ginger essential oil combination group and PC6 acupressure. To see the effect of the combined intervention of the aroma combination of ginger essential oil and PC6 meridian point acupressure relaxation techniques for nausea, vomiting, comfort, anorexia in cancer patients after chemotherapy, a multivariate MANOVA test was performed. The results show that the box's test value is 28,144 with p = 0.083. That means the homogeneity of the variance and the homogeneity test of the variance and covariance matrices are the same. Wilks Lamba test results obtained p = 0,000. Thus, in general there is a combination of the aroma effect of ginger essential oil and PC6 meridian point acupressure relaxation techniques to reduce nausea, vomiting, increased comfort, decreased anorexia in cancer patients after chemotherapy.

The difference in nausea, vomiting, comfort and anorexia can be seen in Table 3. Statistical test results, a Multiple Comparison Test as to the variables of nausea and vomiting, shows the combination treatment group of ginger essential oil aroma and PC6 meridian point acupressure relaxation techniques have the most significant effect on nausea vomiting p = 0,000 , comfort p = 0,000 and anorexia p = 0,000.

Table 3: Effects of a combination of the aroma of ginger essential oil and PC6 meridian point acupressure relaxation techniques, aroma of ginger essential oil and PC6 acupressure relaxation techniques on nausea, vomiting, comfort and post-test anorexia between treatment and control groups (n = 30).

Dependent Variable	**(I) Group**	**(J) Group**	**Sig.**	**95% *Confidence Interval***	
				Lower Bound	***Upper Bound***
Nausea and Vomiting	Combination	Control	0,000	-6,56	-5,57
		Essential oil	0,000	-4,10	-3,10
		acupressure PC6	0,000	-3,06	-2,07
	acupressure PC6	Control	0,000	-4,00	-3,00
		Essential oil	0,000	-1,53	-0,54
		Combination	**0,000**	**2,07**	**3.06**
	Essential oil jahe	Control	0,000	-2,467	2,96
		acupressure PC6	0,000	0,54	4,00
		Combination	**0,000**	**3,10**	**6,56**
	Control	*Essential oil*	0,000	1,97	2,96
		acupressure PC6	0,000	3,00	4,00
		Combination	**0,000**	**5,57**	**6,56**
Comfort	Combination	Control	0,000	16,79	27,21
		Essential oil	0,000	12,12	22,55
		acupressure PC6	0,000	7,19	17,61
	acupressure PC6	Control	0,000	4,39	14,81
		Essential oil	0,063	-0,28	10,15
		Combination	0,000	-17,61	-7,19
	Aroma *Essential oil* jahe	Control	0,079	-0,55	9,88
		acupressure PC6	0.063	-10,15	0,28
		Combination	**0,000**	**-22,55**	**-12,12**
	Control	*Essential oil*	0,79	-9,88	0,55
		acupressure PC6	0,000	-14,81	-4,39
		Combination	**0,000**	**-27,21**	**-16,79**

Dependent Variable	**(I) Group**	**(J) Group**	**Sig.**	**95% *Confidence Interval***	
				Lower Bound	***Upper Bound***
Anorexia	Combination	Control	0,000	0,34	0,80
		Essential oil	0,011	0,07	0,53
		acupressure PC6	0,390	-0,13	0,33
	acupressure PC6	Control	0,000	0,24	0,70
		Essential oil	0,087	-0,03	0,43
		Combination	**0,390**	**-0,33**	**0,13**
	Aroma *Essential oil* jahe	Control	0,023	0,04	0,50
		acupressure PC6	0,087	-0,43	0,03
		Combination	**0,011**	**-0,53**	**-0,07**
	Control	*Essential oil*	0,023	-0,50	-0,04
		acupressure PC6	0,000	-0,70	-0,24
		Combination	**0,000**	**-0,80**	**-0,34**

The results of this study indicate that the aroma of ginger essential oil and PC6 meridian point acupressure relaxation techniques combine to reduce nausea and vomiting, increase comfort and decrease anorexia. The combined interventions of ginger essential oil aroma and PC6 meridian point acupressure relaxation techniques occur through different mechanisms. The essential or gingerol content found in the aroma of ginger essential oil can stimulate receptor (olfactory) receptors, and then the limbic system, to stimulus the hypothalamus which is catalysed into the neuroserotonengis in the digestive organs; namely the gastrointestinal system which can cause anti-emetic and digestive effects.

The results of this study are in line with those of an earlier study (Poulsen et al., 2008). Specifically, the aroma of ginger essential oil containing essential oils (gingerol) can stimulate receptor (olfactory) receptors, and stimulate the limbic system to stimulate the hypothalamus, to then be sent to neuroserotogenengis which can stimulate gastrointestinal receptors (olfactory). This then suppresses gastrointestinal muscles that cause anti-emetic effects so as to reduce nausea, vomiting, increase comfort, and stimulate the patient's

appetite. Reduced anorexia in cancer patients after chemotherapy can accelerate the healing process (W. M. Marx et al., 2013).

Gingerol is the most active ingredient. It has antagonistic activity on M3 cholinergic and serotoninergic 5-HT3 receptors and can speed up the time of emptying the stomach, and prevent nausea and vomiting (Giacosa et al., 2015). Ginger (Zingiber offficinale roscoe) is a medicinal plant with many claimed therapeutic uses such as anti-flatulence, anti-emetics, reviving gingivitis, expectorants and appetite stimulants. Phytochemical ginger consists of 6-gingerol, 8-gingerol, and 6-shogaol (Haniadka, Rajeev, Palatty, Arora, & Baliga, 2012). Even though 6-gingerol is the most active compound, 6-gingerol is not competitively inhibiting the recombinant human activity, and the original 5-HT3 receptor of enteric neurons. In addition, gingeonal, especially 6-gingeonal, and 6-shogaol are markedly suppressed by central and peripheral dopamine, P substance, and NK-1 reseotor (Qian et al., 2010).

In this study the mean post-chemotherapy nausea and vomiting affects the female sex due to hormonal influences that contribute to sensitivity. This view is supported by the results of research Sholihah et al., (2016). Women are more likely to experience nausea and vomiting influenced by the female hormone estrogen. The high frequency of female sex with nausea and vomiting after chemotherapy is due to hormonal influences that contribute to sensitivity to the incidence of nausea and vomiting after chemotherapy.

The intervention of the aroma of ginger essential oil can suppress the gastrointestinal system. This has anti-emetic effect so that it can reduce nausea and increase comfort and reduce anorexia. This intervention is very simple, generally affordable, and inexpensive, in line with research by Konmun et al., (2017) that the content atsiri (gingerol) contains anti-emetics. This study is also supported by the research of Marx et al. (2017), that the content of gingerol has antiemetic content, which can reduce CINV and improve appetite and quality of life of cancer patients who receive chemotherapy.

The patient’s nauseous vomiting was reduced after the intervention of the aroma of ginger essential oil. The aroma of ginger essential oil is quite promising as an inexpensive non-invasive treatment for nausea and vomiting after chemotherapy. This study was supported by research by Ansari et al., (2016). Mild nausea and vomiting get ginger intervention for 15 minutes compared to those who did not get the intervention. The results of this study are also in line with the study of Lua et al., (2015), which found that the aroma of ginger essential oil (gingerol) is an antiemetic that can increase appetite and reduce anorexia.

Acupressure interventions can be influenced by the patient's chemotherapy cycle. The higher the chemotherapy cycle the less nausea the patient vomits. This study was supported by Dibble et al. (2007). There was an effect of acupressure on nausea and vomiting, due to

chemotherapy in cancer patients. This study was conducted on respondents in the second and third cycles of chemotherapy. The limitation of this study is that it is only carried out on the condition of a homogeneous chemotherapy cycle. Therefore, the results obtained are not influenced by the respondent's chemotherapy cycle, but the effect of the intervention given is; the chemotherapy cycle basically affects to reduce nausea and vomiting due to chemotherapy.

The pericardium point PC6 or Nei Guan comes from the word Nei be medial and Guan which means to pass. The PC6 point is a location in the forearm. The PC6 point stimulation is carried out in the palm-facing position. The PC6 point is at 5 cm distal from the pleated fold.

Conclusions

The combination of ginger essential oil aroma and PC6 meridian point acupressure relaxation technique is more effective for decreasing nausea, vomiting, increased comfort, decreased anorexia in cancer patients after chemotherapy, than the ginger essential oil aroma group, PC6 meridian point acupressure relaxation technique and control group. It can show that the combination intervention makes the patient feels comfortable after chemotherapy.

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