

Canadian Oncology Nursing Journal

Revue canadienne de soins infirmiers en oncologie

Volume 28, Issue 2 • Spring 2018
eISSN: 2368-8076



Canadian Association of Nurses in Oncology
Association canadienne des infirmières en oncologie

Effectiveness of acupressure on the experience of nausea and vomiting among patients receiving chemotherapy

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ABSTRACT

The study was conducted for a period of six weeks among 40 cancer patients selected by purposive sampling to explore the impact of acupressure on nausea and vomiting for patients receiving chemotherapy. Data were gathered using a semi-structured interview schedule, semi-structured questionnaire and Rhodes' index of nausea, vomiting and retching. The research design was a quasi-experimental 'post-test only, control group design'. Data analysis was done using descriptive and inferential statistics involving frequency, percentage, Chi square and independent 't' test. Results of the study showed that the subjects in the experimental group experienced mild (65%) to moderate (35%) nausea and vomiting, whereas the subjects in the control group experienced moderate (35%) to severe (65%) nausea and vomiting, $t(38) = 2.693, 8.270, 8.401$ respectively for days 1, 2 and 3; $p < 0.05$). The results point to the fact that acupressure is effective in reducing nausea and vomiting among patients receiving chemotherapy.

Cancer is the leading cause of death in economically developed countries and the second leading cause of death in the developing countries (Globocan, 2008). Globally, cancer accounts for 5.1% of the total disease burden and 12.5% of all deaths. In India, it accounts for 3.3% of the disease burden and 9.9% of all deaths. In total, 670,000 people were expected to die due to cancers in India in 2016. The overall cancer incidence is higher among women than in men in India.

Nausea and vomiting are common side effects that can be immediate or delayed after the administration of chemotherapy drugs. It is also reported that patients may also develop anticipatory nausea and vomiting following chemotherapy administration (Chintamani, 2011). Despite the use of

antiemetics, nausea and vomiting are not controlled effectively in our cancer setting. It is during this scenario that alternative therapies gained the attention of the healthcare providers, as well as the public. Complementary and alternative medicine (CAM), for reasons varying from cost to accessibility, have assumed significant importance in cancer therapy (Munshi, Hsueh, & Tiwana, 2008).

Acupressure has been found to have promising effect in reducing nausea and vomiting during chemotherapy. Various study results point to this effect (Genç, Can, & Aydiner, 2013; Kim, Shin, & Oh, 2004; Molassiotis, Helin, Dabbour, & Hummerston, 2012; Shin, Kim, Sook, & Soon, 2004), as acupressure is one of the well-investigated non-pharmacological methods for reducing the incidence of nausea and vomiting. Acupressure involves the practice of applying gentle but firm finger pressure for five to 15 minutes to specific points, called acupoints, located on the human body. The acupoints are located at specific places on imaginary lines called meridians throughout the body. Acupressure of the P6 point (located three finger breadths below the wrist joint) of the dominant arm has proven helpful to some patients in controlling nausea and vomiting and the effect lasted for six to eight hours (Hussein & Sadek, 2011).

Kim, Shin and Oh (2004) conducted a study to confirm the effect of acupressure on the emesis control and weight change among pediatric cancer patients receiving anti-cancer chemotherapy. Forty pediatric cancer patients, receiving the induction stage of chemotherapy with MTX and Vincristine, were divided into control ($n=20$) and intervention groups ($n=20$). Both of the groups received regular anti-emesis medication. The intervention group had an added acupressure manoeuvre for five minutes on P6 point three times a day for five days: before chemotherapy, lunch and dinner by the investigator during the hospitalization and by the mother at home. Significant differences in the degree of nausea and vomiting were observed between the control and the intervention group, as measured by INVR [$t(4.73), p=0.01$]. The acupressure manoeuvre was apparently effective in reducing the degree of chemotherapy-induced nausea and vomiting.

As per the clinical records, an average of 50 patients receive chemotherapy daily. Of these, 75% of the patients complain of nausea and vomiting despite receiving antiemetic therapy. It is in this situation that the effectiveness of the non-pharmacological method, acupressure, in controlling nausea and vomiting for patients receiving chemotherapy gains the attention

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DOI:10.5737/23688076282132138

of the health professionals. Nurses are in a better position to assess the causes of nausea and vomiting, administer appropriate antiemetic agents, evaluate the effects of the agents, and provide information regarding alternative methods to control nausea and vomiting (Chintamani, 2011).

Purpose of the Study

1. Identify the experience of nausea and vomiting among patients receiving chemotherapy.
2. Determine the type of nausea and vomiting experience among patients receiving chemotherapy.
3. Compare the experience of nausea and vomiting between the experimental and the control group after the intervention of acupressure.
4. Explore the association between the experience of nausea and vomiting and selected variables.

METHOD

Participants

A purposive sampling technique was used to select subjects for the experimental and control group. Subjects in either group were matched with respect to the chemotherapy drug received by the patients. An equal number of subjects with similar chemotherapy drug was included in either group to reduce the sample bias and maintained the homogeneity of groups. Sample size was estimated using the population estimation formula $4pq/d^2$. The minimum sample size requirement for comparing the means of a quantitative variable between the experimental and control group was calculated as 44. Based on this, the researcher fixed the sample size as 40 out of which 20 were included in the control group and 20 in the experimental group. Inclusion criteria used were the following.

- Patients between 18–60 years.
- Patients who completed at least one complete cycle of chemotherapy.
- Patients who were receiving anthracycline antibiotics, anti-tumour antibiotics, alkylating agents and platinum-containing group of drugs.
- Patients receiving one complete cycle (four days) of chemotherapy.

Materials

Tool I was a semi-structured interview schedule with socio-demographic (Section A) and clinical data (Section B) sections developed by the investigator for the purposes of this study. Section A contains socio-demographic variables like age, sex, marital status, religion, educational status, occupation, income, social support, family history of cancer, dietary habits, alcohol consumption, and history of smoking. Section B includes clinical variables like diagnosis, duration since diagnosis, stage of the disease, cycle of chemotherapy, name of chemotherapeutic regimen, type of chemotherapeutic infusion, name of antiemetics, presence of other co-morbidities, use of other medications, body mass index, and triggers of anticipatory nausea and vomiting.

Tool II was an Anticipatory Nausea and Vomiting (ANV) Incidence Questionnaire, developed by the investigator, to determine the incidence of anticipatory nausea and vomiting.

This questionnaire includes nine closed-ended dichotomous type questions. Each question was assigned a score of one for the 'yes' answers. The total score was divided into four to classify the anticipatory nausea and vomiting incidence. The Classification of ANV incidence based on the score is as follows: 0 = No ANV, 1 to 3 = Mild ANV, 4 to 6 = Moderate ANV, 7 to 9 = Severe ANV.

Tool III was Rhodes' Index of Nausea, Vomiting and Retching. This is a standardized tool developed by Verna Adwell Rhodes from whom the researcher obtained permission to reuse. The Index of Nausea, Vomiting and Retching (INVR) is an eight-item, five-point Likert-type self-report pencil and paper instrument. It measures the patient's perceived (a) duration of nausea, (b) frequency of nausea, (c) distress from nausea, (d) frequency of vomiting, (e) amount of vomiting, (f) distress from vomiting, (g) frequency of dry heaves, and (h) distress from dry heaves. Total scores for nausea, vomiting and dry heaves, as well as subscale scores for each can be derived from the INVR. The INVR has a concise format and tested reliability (Cronbach's alpha = 0.897) and validity. Subjects were instructed to underline the sentence in each row that most clearly corresponds to their experience or describes how they feel. In order to score the INVR items 1, 3, 6, and 7 were reversed and a numeric value was assigned to each response (0 = the least amount of distress to 4 = the most distress). Total symptom experience from nausea and vomiting was calculated by summing up the patient's responses to each of the 8 items on the INVR. The potential range of scores was from 0 to 32 and total scores were classified into five divisions. A score of zero indicated no experience of nausea and vomiting; a score above 24 indicated severe experience of nausea and vomiting. The score classification is as given below.

- 0 – No experience of nausea and vomiting.
- 1–8 – Mild experience of nausea and vomiting.
- 9–12 – Moderate experience of nausea and vomiting.
- 13–24 – Great experience of nausea and vomiting.
- 25– 32 – Severe experience of nausea and vomiting.

An informational booklet on acupressure was developed by the investigator after gaining knowledge from a training program on acupressure. The purpose of the booklet was to provide clear knowledge to the patients about acupressure points and application of acupressure for controlling nausea and vomiting. It was provided to the subjects on the first day of chemotherapy.

Procedure

Data collection was carried out for a period of six weeks from 12th November, 2012, to 8th December, 2012. First, the data were collected from the control group to avoid contamination. The patients were told about the purpose of the study and informed consent was taken from each of the patients. Data about socio-demographic variables and clinical variables were collected using the semi-structured interview schedule followed by assessment of anticipatory nausea and vomiting using a semi-structured questionnaire. Assessment of the intensity, duration and frequency of nausea and vomiting was done daily for three days using the Rhodes' index.

After completing the assessment of the control group, the subjects for the experimental group were selected. Socio-demographic and clinical data and incidence of anticipatory nausea and vomiting were collected using the semi-structured interview schedule and semi-structured questionnaire from the patients in the experimental group. Then the patients were individually shown the procedure of applying acupressure at P6 point before starting the chemotherapy and given an informational booklet on acupressure for nausea and vomiting. The patients gave a return demonstration to ensure understanding. The researcher applied pressure at the P6 point of the patient's dominant hand the first time before chemotherapy and the second time before lunch. The subjects were asked to apply the acupressure for the third one before dinner, the details of which were entered in a log book provided by the researcher. Assessment of the intensity, duration and frequency of nausea and vomiting was done daily for 3 days using Rhodes' index.

RESULTS

Frequency and percentage distributions of subjects in the experimental and control group were calculated using descriptive statistics. The analysis of sociodemographic and clinical variables are shown in Table 1 and Table 2 respectively. Anticipatory nausea and vomiting were assessed by a semi-structured questionnaire, the results of which are shown in Figure 1.

Experience of nausea and vomiting was assessed using the Index of Nausea, Vomiting and Retching. Results show that 85% of the subjects in the experimental group had mild nausea and vomiting on Day 1 followed by 90% on Day 2, and 65% on Day 3. In the control group a majority had a moderate or great experience of nausea and vomiting.

In order to evaluate the effectiveness of the intervention, acupressure, a comparison of the experience of nausea and vomiting was done on the 1st, 2nd and 3rd days. The analysis shows that there was a statistically significant difference in the experience of nausea and vomiting between the two groups on all the three days, $t(38) = 2.693, 8.270, 8.401; p < 0.05$.

The association between the experience of nausea and vomiting and selected variables was computed using Chi-square. Since there were only 3 subjects who experienced great nausea and vomiting, the "moderate experience" and "great experience" categories were combined and labelled "moderate experience" for the sake of this statistical analysis. Also, the classification of the cycles of chemotherapy was grouped such that 3rd included 3rd and 4th, and 5th included 5th and 6th. However, association could not be computed between variables such as social support and dietary habits, since there were many categories with zero scores. The data analysis depicts that the experience of nausea and vomiting is not associated with any of the variables in our sample.

DISCUSSION

The first objective of the study was to identify the experience of nausea and vomiting among patients receiving chemotherapy. It was observed that nausea and vomiting was experienced by all the subjects in varying degrees irrespective of whether they received an antiemetic intervention or not. In

the control group, the number of patients experiencing 'great' nausea and vomiting increased with each session of chemotherapy. Among the patients receiving chemotherapy, 'great' experience of nausea and vomiting was present in 65% of the subjects on the third day of chemotherapy. In the experimental group that received acupressure, the number of subjects experiencing moderate and mild nausea and vomiting decreased with each session of acupressure.

The present study finding is consistent with the study conducted by Grunberg, Lohr and Webster (2010) who reported that 70%–80% of subjects experienced chemotherapy-induced nausea and vomiting although they were receiving antiemetics. Additionally Bender, McDaniel, Ende, Pickett, Rittenberg and Rogers (2002) reported that as many as 60% of patients who receive cancer chemotherapy experience some degree of nausea and vomiting. In the light of the findings from this study, as well as other related studies, it can be concluded that nausea and vomiting continues to be a major side effect of chemotherapy irrespective of the use of antiemetics and complementary and alternative therapies. This could partially be due to the emetogenic potential of the chemotherapeutic drugs received by the subjects. However, the findings may also show differences if the acupressure intervention was given for a long duration or if the sample size was higher.

The second objective of this study was to determine the type of nausea and vomiting experience among patients receiving chemotherapy. Among 20 subjects who received chemotherapy, acute nausea and vomiting was experienced by three (15%) of subjects while seven to 12 (35–65%) of subjects experienced delayed nausea and vomiting. Grunberg et al. (2010) reported that more than 90% of patients experienced acute and delayed nausea and vomiting after chemotherapy. In the present study, anticipatory nausea and vomiting was experienced by five (25%) of the subjects. A study conducted by Moseley, Pierre, Roscoe, Ryan, Kohli and Palesh (2007) on the effect of behavioural interventions on anticipatory nausea and vomiting reported that 29% of patients experienced anticipatory nausea and vomiting. This is consistent with the present study findings.

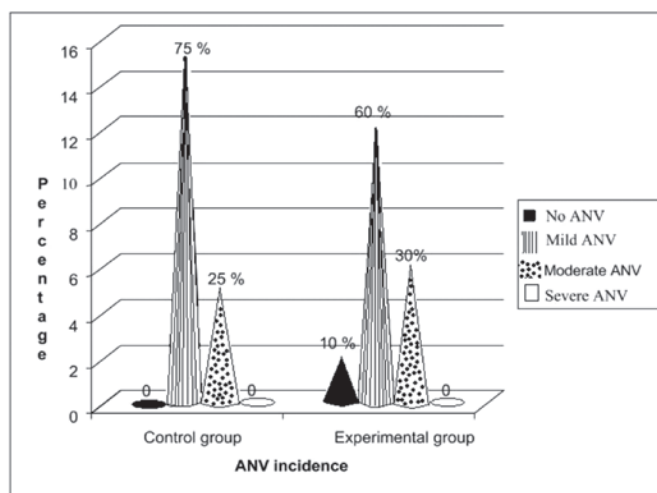


Figure 1: Pyramidal chart showing anticipatory nausea and vomiting

SI.No	Socio-demographic Variables	G1 (n=20)		G2 (n=20)		Total (n=40)	
		f	(%)	f	(%)	f	(%)
1.	Age (in years)						
	31-40	1	5	1	5	2	5
	41-50	9	45	5	25	14	35
	51-60	10	50	14	70	24	60
2.	Sex						
	Male	14	70	16	80	30	75
	Female	6	30	4	20	10	25
3.	Marital status						
	Single	0	0	3	15	3	7.5
	Married	17	85	14	70	31	77.5
	Widow/Widower	3	15	3	15	6	15
4.	Religion						
	Hindu	17	85	13	65	30	75
	Christian	1	5	5	25	6	15
	Muslim	2	10	2	10	4	10
5.	Educational status						
	Primary	1	5	4	20	5	12.5
	Secondary	9	45	7	35	16	40
	Higher secondary	9	45	5	25	14	35
	Graduate	1	5	2	10	3	7.5
	Postgraduate	0	0	2	10	2	5
6.	Occupation						
	Unemployed	7	35	7	35	14	35
	Employed Professional	2	10	4	20	6	15
	Employed Non-professional	11	55	9	45	20	50
7.	Income per month (in rupees)						
	< 10001	8	40	8	40	16	40
	10001-25000	5	25	6	30	11	27.5
	25001-40000	6	30	4	20	10	25
	> 40000	1	5	2	10	3	7.5
8.	Social support						
	Lives with family	19	95	20	100	39	97.5
	Lives with relatives/friends	1	5	0	0	1	2.5
9.	Family history of cancer						
	Yes	8	40	7	35	15	37.5
	No	12	60	13	65	25	62.5
10.	Dietary habits						
	Vegetarian	3	15	0	0	3	7.5
	Non-vegetarian	17	85	20	100	37	92.5
11.	Alcohol consumption						
	Yes	5	25	8	40	13	32.5
	No	15	75	12	60	27	67.5
12.	Smoking						
	Yes	5	25	13	65	18	45
	No	15	75	7	35	22	55

Table 2: Distribution of Subjects Based on Clinical Variables

Sl.No.	Clinical Variables	G1 (n=20)		G2 (n=20)		Total (n=40)	
		f	(%)	f	(%)	f	(%)
1	Diagnosis (Type of cancer)						
	Adenocarcinoma	2	10	2	10	4	10
	Bladder	1	5	1	5	2	5
	Breast	1	5	0	0	1	2.5
	Cervix	1	5	0	0	1	2.5
	Nasopharynx	1	5	1	5	2	5
	Ovary	2	10	1	5	3	7.5
	Tongue	2	10	2	10	4	10
	Tonsil	1	5	0	0	1	2.5
	Cholangiocarcinoma	1	5	0	0	1	2.5
	Multiple Myeloma	1	5	0	0	1	2.5
	Neuroblastoma	1	5	0	0	1	2.5
	Non Hodgkins Lymphoma	1	5	0	0	1	2.5
	Lung	3	15	45	45	12	30
Squamous cell carcinoma oral cavity	2	10	15	15	5	12.5	
Rectum	0	0	5	5	1	2.5	
2	Duration of diagnosis						
	< 6 months	7	35	13	65	20	50
	6 months to 1 year	4	20	5	25	9	22.5
	> 1 year	9	45	2	10	11	27.5
3	Stage of disease						
	Stage I	2	10	5	25	7	17.5
	Stage II	5	25	8	40	13	32.5
	Stage III	7	35	4	20	11	27.5
	Stage IV	6	30	3	15	9	22.5
4	Cycle of chemotherapy						
	2nd	13	65	10	50	23	57.5
	3rd	4	20	5	25	9	22.5
	4th	1	5	1	5	2	5
	5th	1	5	3	15	4	10
	6th	1	5	1	5	2	5
5	Chemoregimen						
	Cisplatin, Adriamycin	2	10	1	5	3	7.5
	Cisplatin	2	10	6	30	9	22.5
	Cisplatin, Etoposide	11	55	10	50	21	52.5
	Cisplatin, Epirubicin	2	10	1	5	3	7.5
	Cisplatin, 5FU	1	5	2	10	3	7.5
	Cisplatin, Cytogem	2	10	0	0	2	5
6	Chemotherapy infusion						
	Bolus	1	5	20	100	21	52.5
	Continuous	19	95	0	0	19	47.5
7	Antiemetic						
	Aprepitant, Domperidon	3	15	2	0	5	12.5
	Aprepitant, Ondansetron	9	45	0	0	9	22.5
	Ondansetron, Domperidon	3	15	1	25	4	10
	Ondansetron, Perinorm	1	5	1	25	2	5
	Ondansetron, Palonosetron	1	5	2	25	3	7.5
	Domperidon, Aprepitant, Ondansetron	1	5	1	25	2	5
	Aprepitant, Ondansetron, Palonosetron	2	10	0	0	2	5
8	Comorbidities						
	Yes	6	30	6	30	12	30
	No	14	70	14	70	28	70
9	Use of other drugs						
	Yes	5	25	5	25	10	25
	No	15	75	15	75	30	75
10	Body mass index						
	Underweight (<18)	3	15	1	5	4	10
	Normal weight (18-25)	12	60	18	90	30	75
	Over weight (>25)	5	25	1	5	6	15

The third objective was to compare the experience of nausea and vomiting between the experimental and the control groups. It is evident that the experimental group had experienced mild to moderate level of nausea and vomiting. Even though the number of subjects with moderate nausea and vomiting increased from two to seven in the experimental group, none experienced the great level of nausea and vomiting. Whereas in the control group, there were 13 (65%) subjects who experienced 'great' nausea and vomiting by the third day. The mean score for the experience of nausea and vomiting in the control group and experimental group was 2.65 versus 2.15 on Day 1, 3.30 versus 2.10 on Day 2, and 3.65 versus 2.35 on Day 3 of the chemotherapy cycle. Hence, it is clear that the mean experience of nausea and vomiting in the control group gradually increased from 2.65 to 3.65 from Day 1 to Day 3, whereas in the experimental group the increment was very low (i.e., from 2.15 to 2.35). The study finding shows that even though all the subjects who received chemotherapy experienced nausea and vomiting and the severity in both the groups increased, there was a statistically significant difference in the experience of nausea and vomiting between the subjects who received acupressure and those who did not. The subjects who received acupressure experienced significantly lower levels of nausea and vomiting than those who had not practised acupressure. The hypothesis H1: "There is significant difference in the experience of nausea and vomiting between the experimental and control group after the intervention" was tested by independent sample 't' test and indicated that there is a statistically significant difference in the experience of nausea and vomiting between the experimental and the control group. Hence, hypothesis H1 is accepted.

In a similar study by Shin, Kim, Sook and Soon (2004), which examined the effect of acupressure on emesis control in postoperative gastric cancer patients undergoing chemotherapy, the average frequency of vomiting in the control group was 0.63 times per day, while that of the intervention group was 0.20 times per day. The difference was statistically significant ($t = 3.65, p < 0.01$). A randomized control trial conducted by Molassiotis, Helin, Dabbour and Hummerston (2012) evaluated the effectiveness of using acupressure in the Pericardium six acupoint in managing chemotherapy-induced nausea and vomiting. These authors reported that the nausea and retching experience, as well as the nausea, vomiting, retching and distress occurrence were all significantly lower in the experimental group compared to the control group, $p < 0.05$. The study reveals that acupressure is effective in controlling nausea and vomiting in chemotherapy patients.

Another study by Kim et al. (2004), to confirm the effect of acupressure on the emesis control and weight change among pediatric cancer patients receiving anti-cancer chemotherapy, revealed that significant differences in the degree of nausea and vomiting were observed between the control and the intervention group as measured by INVR, $t = 4.73; p = 0.01$. The acupressure manoeuvre was effective in reducing the degree of chemotherapy-induced nausea and vomiting. On comparing the present study findings with the above-mentioned

studies it is clear that acupressure is a very effective intervention in reducing the experience of nausea and vomiting among patients receiving chemotherapy.

A single blinded randomized trial was conducted by Genç, Can and Aydiner (2013) on the efficiency of acupressure in the prevention of chemotherapy-induced nausea and vomiting. One hundred and twenty patients, diagnosed with breast, gynecological, or lung cancer and treated by doxorubicin-based or cisplatin-based treatment were divided into experimental ($n=67$) and control groups ($n=53$). It was determined that there was no statistically significant difference between the groups. A similar result has been observed when the impact of acupressure on the subgroups defined by socio-demographic features and conditions were examined. It was also concluded that the real acupressure application cannot increase the quality of life; CINV is directly related to the treatment, and the acupressure wristband was not an effective approach in preventing CINV. This is contradictory to the present study finding, which showed that acupressure was effective in controlling nausea and vomiting in patients receiving chemotherapy. This difference could be due to the variation in sample size, diagnosis of cancer and socio-cultural differences.

The fourth objective was to find an association between the experience of nausea and vomiting and selected variables by testing the hypothesis H2: "There is significant association between the experience of nausea and vomiting and selected variables" using Chi square. The results show that the experience of nausea and vomiting had no significant association with any of the selected variables. Hence, the hypothesis H2 is rejected.

A multicentre, longitudinal, randomized clinical trial conducted by Dibble, Luce, Cooper, Israel, Cohen, Nussey and Rugo (2007) to compare differences in chemotherapy-induced nausea and vomiting among three groups of women (acupressure, placebo acupressure, and usual care) undergoing chemotherapy for breast cancer, showed that no significant differences existed in the demographic, disease, or treatment variables among the treatment groups. This is supporting the present study finding in that there is no association between experience of nausea and vomiting and selected variables. Perdue (2005) has reported that females are more prone to chemotherapy-induced nausea and vomiting and that high alcohol intake reduces the incidence of chemotherapy-induced nausea and vomiting. This is contradictory to the findings of this study which may be due to the smaller sample size of the present study.

Implications

This study has implications in the field of nursing practice, education, administration and research. Nurses are able to make significant contributions in reducing nausea and vomiting among cancer patients. However, a similar study should be replicated in a larger sample size using probability sampling technique for establishing better generalizations. A comparative study on the experience of nausea and vomiting in patients receiving chemotherapy and radiation therapy should also be done.

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