

# Factors of Anticipatory Nausea and Vomiting in Cancer Patients

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**Purpose.** The purpose of this research is to identify factors influencing anticipatory nausea and vomiting in cancer patients.

**Methods.** The conceptual framework was derived from Roy's Adaptation Model. The subjects for this study were 66 adult patients with various types of cancers, who were scheduled for a third cycle of chemotherapy or above.

**Results.** 47% of the patients experienced anticipatory nausea and vomiting.

**Conclusion.** The study identified two factors, psychological symptoms ( $p=.002$ ) and severity of post-chemotherapy nausea and vomiting ( $p=.004$ ), which are directly related to anticipatory nausea and vomiting. These two factors accounted for 39.5% of the anticipatory nausea and vomiting. Identified environmental cues were awareness of hospital setting, sensory stimuli, and experience of chemotherapy which induced nausea and vomiting. Strategies for relieving anticipatory nausea and vomiting taken by cancer patients were religion, reminiscence, distracting imagery, positive thinking, relaxation and physical exercise.

**Key Words:** Anticipatory Nausea and Vomiting, Cancer Patient

## FACTORS OF ANTICIPATORY NAUSEA AND VOMITING IN CANCER PATIENTS

### A. Introduction

Cancer has been the number one cause of deaths in Korea since 1991 and accounts for 122% of the mortality rate from 1997 to 2000 (Ministry of Health and Welfare, 2002). There are many cancer treatments such as chemotherapy, radiotherapy, and immune-therapy. Among them, chemotherapy is known as the best one since it eliminates micro lesions most effectively. However, it may also trigger serious side effects by destroying non-cancer tissues as well as cancer tissues. Among those side effects, the most common and distressful ones are nausea and vomiting which are experi-

enced by more than 70% of the patients treated with chemotherapy (Nerenz, Leventhal, & Love, 1982; Jenns, 1994).

Nausea and vomiting can appear both before and after the chemotherapy, but physical mechanisms of the symptoms are different respectively. Post chemotherapy nausea and vomiting are generated by stimuli of the chemo-receptor zone and the vomiting center which is located in the cerebro-medulla pyramidal. Post chemotherapy symptoms are experienced by 71 - 87% of the patients treated with chemotherapy (Watson, Meyer, Thomson & Osofsky, 1998; Morrow, 1992). On the other hand, anticipatory nausea occurs when the vomiting center is motivated by perceptive stimuli which are originated by personal thought, feelings or sensory stimuli associated with the chemotherapy (Duigon,

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1986).

Anticipatory nausea and vomiting (ANV) is experienced by 20 - 50% of the patients treated with chemotherapy and usually appears during or after the 3-5th cycles and starts on the average 24 hours before the therapy (Watson, Meyer, Thomson & Osofsky, 1998; Morrow & Rosenthal, 1996). Fetting's research (1983) shows that the symptoms are detected in the morning of the therapy in the case of 70% of the patients. ANV happens less frequently than the post chemotherapy nausea and vomiting, but it is regarded more serious because it gives patients more discomfort.

In the past, this phenomenon has usually been treated only considering the mental or psychological aspects, but it has been revealed to be a physiological phenomenon which can happen to patients with cancer. The ANV has limited pharmaceutical solutions (Morrow et al, 1998) and there are few non-pharmaceutical solutions (Redd, Montgomery & Dutlame, 2002; King, 1997; Morrow & Hickok, 1993). In nursing, we have to know the influencing factors of ANV and in order to detect the ANV symptoms.

Many studies have been conducted abroad concerning ANV and many factors influencing ANV have been revealed. Therefore, it seems meaningful to study if the factors identified in other studies can be applied to Korean cancer patients. These factors can be categorized as demographic characteristics, clinical factors, physical symptoms, emotional status, post-chemotherapy nausea and vomiting, therapy experience, environmental factors and conditioning process.

First, demographic characteristics include age (Pickett, 1991; Coons et al, 1987; Love et al, 1983; De Mulder, 1992; Fetting et al, 1983; Blasco, 1994; Sandra et al, 1992; Morrow, 1992; Alba et al, 1989; Ingle et al, 1984; Andrykowski et al, 1985), gender (Blasco, 1994; Stefanek et al, 1988; Pickett, 1991; De Mulder, 1992; Fetting et al, 1983), marital status (Pickett, 1991; Fetting et al, 1983) and motion sickness (Matteson et al, 2002; Blasco, 1994; De Mulder, 1992; Morrow, 1992; Nesse et al, 1980). Second, clinical factors involve chemotherapy (Pickett, 1991; De Mulder, 1992; Fetting et al, 1983; Stockhorst et al, 1993; Blasco, 1994; Rhodes, 1986; Morrow, 1992; Alba et al, 1989; Andrykowski et al, 1985; Stefanek et al, 1988; Nesse et al, 1980), chemotherapy cycle (Watson et al, 1998; Morrow and Rosenthal, 1996; Blasco, 1994; Morrow, 1992; Coons et al, 1987; Alba et al, 1989; Andrykowski et al, 1985;

Love et al, 1983; Nesse et al, 1980), anti-emetic agents (Blasco, 1994) and stage of disease (Pickett, 1991; Love et al, 1983; Blasco, 1994; Love et al, 1983; Nesse et al, 1980). Third are physical symptoms (Morrow, 1992; Pickett, 1991; Nerenz et al, 1982; Rhodes, 1986; Sandra et al, 1992; Duigon, 1986). Fourth, emotional status such as anxiety (Chin et al, 1992; Boakes, et al, 1993; Coons et al, 1987; Altmaier et al, 1982; Watson et al, 1998; Blasco, 1994; Love et al, 1983; Rhodes, 1986; Sandra et al, 1992; Ingle et al, 1984; Andrykowski et al, 1985; Nesse et al, 1980; Duigon, 1986), depression (Blasco, 1994; Ingle et al, 1984; Altmaier et al, 1982), emotional disorder (Nerenz et al, 1982), stress and coping (Altmaier et al, 1982; Pickett, 1991; Blasco, 1994; Ingle et al, 1984). Fifth, post-chemotherapy nausea and vomiting (Chin et al, 1992; Matteson et al, 2002; Burish and Carey, 1986; Stockhorst et al, 1993; Blasco, 1993; Sandra et al, 1992; Morrow, 1992; Alba et al, 1989; Ingle et al, 1984; Andrykowski et al, 1985; Stefanek et al, 1988) and therapy experience (Watson et al, 1998; Matteson et al, 2002; Morrow, 1992; Coons et al, 1987; De Mulder, 1992; Altmaier et al, 1982; Fetting et al, 1983; Blasco, 1994) be caused. Sixth, environmental factors are odor (Boakes et al, 1993), taste, smelling and seeing (Nerenz et al, 1982; Love et al, 1983; Blasco, 1994; Nesse et al, 1980), sensory stimuli (Fetting et al, 1983; Duigon, 1986; Stefanek et al, 1988), seeing the syringe (Nerenz et al, 1982) and difficulty of venipuncture (Coons et al, 1987). Finally, a lot of studies explained that ANV is conditioning process (Kvale et al, 1994; Stockhorst et al, 1993; Pickett, 1991; Coons et al, 1987; Blasco, 1994; Alba et al, 1989; Duigon, 1986; Stefanek et al, 1988).

Therefore, this research is based on Roy's Adaptation Model which views nausea and vomiting phenomena as responses to internal and external stimuli. After a literature review, stimuli can be classified by the studies' results. This research groups sources of the stimuli into focal stimuli occurring from the anxiety about chemotherapy, contextual stimuli, including severity of post-chemotherapy nausea and vomiting, physical and psychological symptoms, environmental factors, cancer type, and residual stimuli, which includes age and motion sickness.

Identification of the factors of ANV based on Roy's Adaptation Model not only makes possible a more systemic assessment and selection of the patients with a higher risk grounded on the principle of priority, and pre-

vention of such internal and external stimuli, but also can suggest some solutions for solution of the discomfort.

### B. Research Questions

- 1) What are the states of the ANV that cancer patients experienced?
- 2) What are the factors of the ANV in cancer patients?

### C. Conceptual Framework

The following is the conceptual framework based on Roy's Adaptation Model which explains that human-beings interact with their environment continuously. The environment is stimuli that can be classified as focal, contextual and residual stimuli. To adapt to these stimuli, human being's control mechanisms are activated. As a response, four adaptation modes can occur. The four adaptation modes are physical function, self-concept, role function and interdependence.

## RESEARCH METHOD

### A. Research Design

This study is a survey which identifies the factors which influence the occurrence of ANV in cancer patients.

### B. Sample

This study sample was selected from patients hospital-

ized in the Cancer Center of Yonsei Medical Center, 66 patients who met the following criteria were selected by a random sampling method. Those who had been diagnosed with cancer and were scheduled to receive chemotherapy of a third cycle or above. Those who were being treated with one or more kinds of agents among complex chemotherapy agents which contains Cisplatin(DDP), Adriamycin, 5-fluorouracil, Bleomycin, Mitomycin, Cytosan, Methotrexate, Vincristine etc., and were causing moderate and above levels of nausea and vomiting as a side effect of chemotherapy agents. Those who were adults of age eighteen and above and who were capable of communication, and orientation. Those who did not have metastasis of the central nervous system, and did not have uremia, septicemia or any infections. Those who were not presently receiving radio-therapy.

### C. Instrument

The instruments used in this study were General Characteristics Chart, the Morrow Assessment of Nausea and Emesis (MANE), Spielberger State-Trait Anxiety Inventory (STAI), Rotterdam Symptom Checklist (RSCL), & Environmental Cues. The MANE is a self-report instrument, and is comprised of sixteen items. It assesses the severity, duration and frequency of pre and post chemotherapy, and its content validity and concurrent validity have been supported. The test-retest

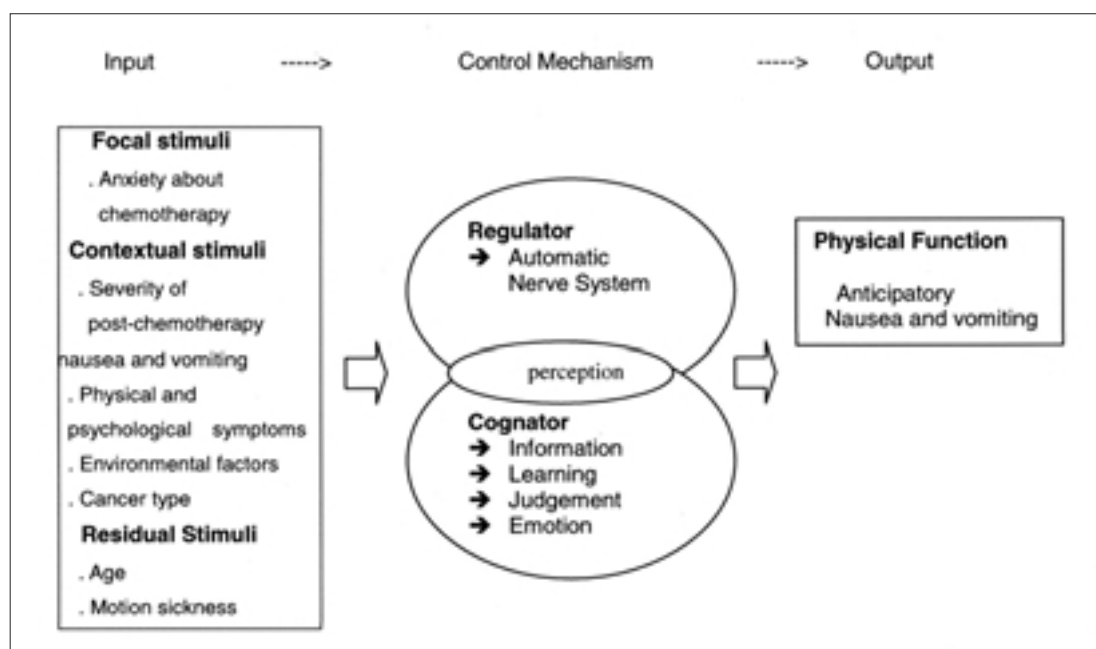


Figure 1. Conceptual framework of the study

reliabilities were Cronbach's  $\alpha = .76$  for severity of anticipatory nausea, Cronbach's  $\alpha = .96$  for duration, Cronbach's  $\alpha = .93$  for severity of anticipatory vomiting, Cronbach's  $\alpha = .91$  for duration, Cronbach's  $\alpha = .72$  for severity of nausea post-chemotherapy, Cronbach's  $\alpha = .81$  for duration, Cronbach's  $\alpha = .95$  for severity of vomiting post-chemotherapy, Cronbach's  $\alpha = .96$  for duration. The STAI is a self-report instrument, and a four-point Likert scale consisted of twenty state anxiety items, showing higher anxiety as the point is higher. The reliability of the test revealed by domestic studies was Cronbach's  $\alpha = .87$  for state anxiety. The RSCL is a self-report instrument that measures physical and psychological symptoms experienced by cancer patients. It is comprised of twenty-two items for physical symptoms which are hair loss, decreased sexual drive, appetite loss, fatigue, nausea, vomiting, weakness, sleep disorder, tingling of arms and legs, back pain, constipation, muscle-ache, dryness of mouth, headache, dizziness, abdominal pain, tremor, sore-throat, chest-pain, burning sensation and eye pain, rapid respiration and diarrhea. It also includes eight items for psychological symptoms which are apprehension, tension, anxiety, nervousness, irritability, depression, hopelessness and attention difficulty. Each item is in four-point Likert scale. The reliabilities were .82 for physical symptoms, and .89 for psychological symptoms. The Environmental Cues was an open-ended questionnaire about the environmental factors recognized by the patient as stimulants of ANV, and what methods were used to decreased ANV.

#### **D. Data Collection Method**

First, a request was sent to the Cancer Center of Yonsei Medical Center to obtain approval for data collection. A list of patients who met the selection criteria, and who were presently receiving chemotherapy was obtained from Yonsei Medical Center. Patients were visited on the morning of their scheduled of chemotherapy and the purpose of study was explained to them. After obtaining agreement from the patients, all the subjects filled out the STAI, MANE, RSCL, and General Characteristic Chart. After preparing the questionnaire, the subjects were interviewed according to the Environmental Cues. It took about 15 to 20 minutes to answer the questionnaires and interview each patient. Clinical information regarding the chemotherapy and disease was collected from the Medical Information Chart.

#### **E. Data Analysis Method**

1. General characteristics and clinical information were analyzed using percentages and mean (standard deviation).
2. Multiple regression analysis was used to examine the factors that had influences on ANV.
3. The content analysis was used to examine environmental factors causing ANV.

#### **F. Limitations of the Study**

In collection of data, the subjects answered the questions based on their recollections of past experiences, and since the subjects had difficulty remembering some experiences uncertainty to the results of responses is suggested. Also, since the data collection was performed in a limited venue, it contains a limitation for generating the results of the study.

## **RESULTS**

#### **A. The Characteristics of the Subject**

The subjects ranged from 18 to 72 years old. 60.6% of them were between 41 to 60 years old. 59.1% answered that they did not drink alcohol, and 63.6% answered they did not smoke at all. The subjects who answered that they smoked remarked that they presently had stopped smoking to protect their health or due to the illness. They slept 7.2 hours on average, and 98.5% of the subjects slept 5 to 10 hours. They responded that due to the change of living environment, that of a hospital, and psychological tension, they were having difficulties in attaining sound sleep, and were experiencing shortened sleeping hours. 72.7% reported that they had not experienced motion sickness, and 27.3% had. The subjects had been diagnosed with cancer from 2 to 192 months before the study, 65.2% had been diagnosed within 12 months. The portion of different types of cancer subjects diagnosed were 22.7% for gastric cancer, 13.6% for lung cancer, 12.1% for bowel cancer, 10.6% for breast cancer, 9.1% for bone cancer, 7.6% for oral cancer, and 6.1% for lymphoma. The subjects were in their 3rd to 12th chemotherapy cycle, and 57.6% were in their 5th cycle. 36.4% had previously received radiotherapy. 60.6% had a metastasis, and 45.5% of them were receiving chemotherapy after recurrence. 90.9% were scheduled to receive anti-emetic agents to prevent nausea and vomiting prior starting the chemotherapy (Table 1).

**Table 1.** General and Clinical Characteristics

N = 66

Variables	Categories	No (%)
Age(years)	Under 30	9 (13.6)
	31 - 40	6 (9.1)
	41 - 50	19 (28.8)
	51 - 60	21 (31.8)
	61 - 70	9 (13.7)
	Above71	2 (3.0)
Gender	Male	35 (53.0)
	Female	31 (47.0)
Marital status	Married	51 (77.3)
	Single	10 (15.2)
	Other	5 (7.6)
Education	Elementary school	14 (21.2)
	Middle school	12 (18.2)
	High school	22 (33.3)
	Under-graduate degree	14 (21.2)
	Graduate degree	1 (1.5)
Religion	Protestant	23 (34.8)
	Catholic	14 (21.2)
	Buddhist	15 (22.7)
	Other	14 (21.2)
Employment status	Yes	19 (28.8)
	No	47 (71.2)
Drinking habits	Yes	27 (40.9)
	No	39 (59.1)
Smoking	Yes	24 (36.4)
	No	42 (63.6)
Sleeping (hours)	Under 5	10 (15.2)
	5 - 10	55 (83.5)
	Above 11	1 (1.5)
	Average	7.2(SD= 1.8)
Motion sickness	Yes	18 (27.3)
	No	48 (72.7)
Time of diagnosis (months)	Within 12	43 (65.2)
	13 - 24	6 (9.0)
	25 - 36	4 (6.2)
	37 - 48	1 (1.5)
	49 - 60	3 (4.5)
	Over 61	9 (13.6)
Diagnosis	Gastric cancer	15 (22.7)
	Lymphoma	4 (6.1)
	Intestinal cancer	8 (12.1)
	Oral cancer	5 (7.6)
	Lung cancer	9 (13.6)
	Ovarian cancer	3 (4.5)
	Uterine cancer	2 (3.0)
	Breast cancer	7 (10.6)
	Esophageal cancer	2 (3.0)
	Hepatoma	1 (1.5)
Chemo-cycle (number of times)	Bone cancer	6 (9.1)
	Other	4 (6.1)
	Within 5	38 (57.6)
	6 - 10	24 (36.3)
Previous treatment	11 - 15	4 (6.0)
	Radiation therapy	
	Yes	24 (36.4)
	No	42 (63.6)
Metastasis	Yes	40 (60.6)
	No	26 (39.4)
Recurrence of cancer	Yes	30 (45.5)
	No	36 (54.5)

**B. Factors of Anticipatory Nausea and Vomiting****1) The states of ANV that cancer patients experienced**

The ANV in cancer patients manifested in 31 of the total 66 subjects (47%), 47% experienced anticipatory nausea, and 74.2% of them experienced nausea 13 to 24 hours before the administration of chemotherapy. Anticipatory vomiting manifested in 6.1%, and most of patients experienced nausea, excessive salivation (Table 2). As contrasted with ANV, the rate of post-chemotherapy nausea and vomiting was 86.4%, and it was within the range of 71 - 87%, which had been suggested in the previous studies. 86.4% experienced post-chemotherapy nausea lasting from 2 to 15 days, and 86.0% experienced nausea for under 10 days. 57.6% experienced post-chemotherapy vomiting recording lower frequency than nausea. Subjects answered that after the chemotherapy, they experienced excessive salivation, nausea and dry vomiting, but the condition did not progress into vomiting. The frequency of vomiting was 78.9% for under 10 times, and the time period in which the vomiting occurred at its worst was 24 hours after chemotherapy and within 0 - 4 hours of starting chemotherapy (Table 4).

**2) The factors of the ANV in cancer patients**

The psychological symptoms and severity post-chemotherapy nausea and vomiting appeared prominent as the influencing factors on ANV in cancer patients (Table 3) by 39.5%. Other factors did not appear as significant factors to the ANV. Anxiety and physical symp-

**Table 2.** Anticipatory Nausea and Vomiting

N = 66

Variables	Categories	No(%)
Anticipatory nausea severity		31(47.0)
	Very mild	1(3.2)
	Mild	7(22.6)
	Moderate	11(35.5)
	Severe	10(32.3)
	Very severe	2(6.5)
Occurrence time of nausea (hours)	Within 12	2(6.4)
	13 - 24	23(74.2)
	25 - 48	3(9.7)
	No response	3(9.7)
Anticipatory vomiting severity		4(6.1)
	Very mild	0(0)
	Mild	1(25.0)
	Moderate	2(25.0)
	Severe	1(25.0)
Occurrence time of vomiting (hours)	Within 12	1(25.0)
	13 - 24	3(75.0)

toms appear prominent as presupposed factors explaining psychological symptoms and explained 64.6%. Smoking, drinking habits and state of metastasis explained 23% as a grounds for speculation on physical symptoms, and the time of diagnosis explained 7.6% of as a grounds for speculation anxiety.

As a focal stimuli, anxiety about chemotherapy was not discovered to be a significant factor for ANV, on the other side, it had been discovered to influence on manifestation of ANV ( $r = .583, p = .000$ ) which has influence on psychological symptoms. The average score of anxiety experienced by cancer patients before the administration of chemotherapy was 2.26 (SE .086), with the lowest score being 2.15. When the moments in which the subjects felt most anxious was scored as 4 points, and least anxious as 1 point, the average was 2.26, it can be speculated that patients experienced moderate anxiety. The time of diagnosis showed a relationship as a predicting factor ( $r = .276, p = .025$ ), and females showed higher anxiety level ( $t = -2.07, p = .043$ )

As a contextual stimuli, first, the previous experiences in chemotherapy, the post-chemotherapy nausea and vomiting appeared to be a major factor with which the ANV can be pre-assumed. Second, the physical symptoms experienced were in the order of hair loss, decreased sexual drive, appetite loss, fatigue, nausea, weakness, and sleep disorder. The physical symptoms did not appear to influence the manifestation of ANV. As predicting factors of physical symptoms, state of metastasis ( $r = .284, p = .023$ ), drinking habits ( $r = -.456, p = .022$ ), and smoking ( $r = .424, p = .027$ ) accounted for 23% of variance in ANV. Apprehension was the highest

in psychological symptoms and the symptoms experienced by patients were, in order, apprehension, tension, anxiety, nervousness, irritability, and depression. Psychological symptoms was significant influencing factors of ANV ( $r = .319, p = .004$ ). Third, in environmental cues, most of the subjects who experienced ANV stated that they experienced depression, nervousness, loss of appetite, indigestion, and nausea upon receiving a notice from the hospital for the chemotherapy. Most of them had received such notices unexpectedly. They also stated that on the way to the hospital, they started having headaches, become more nervous, and after being hospitalized, they experience further loss of appetite, con-

**Table 4.** Post-chemotherapy Nausea and Vomiting N = 66

Variables	Categories	No (%)
Post-chemotherapy nausea severity		57(86.4)
Mild	7(12.3)	
Moderate	13(35.5)	
Severe	15(26.3)	
Very severe	20(35.1)	
Intolerable	2(3.5)	
Duration (days)	Within 5	25(43.9)
6-10	24(42.1)	
11-15	4(7.0)	
No response	4(7.0)	
Post-chemotherapy vomiting severity		38(57.6)
Mild	1(2.6)	
Moderate	6(15.8)	
Severe	14(36.8)	
Very severe	16(42.1)	
Intolerable	1(2.6)	
Frequency of vomiting (number of times)	Under 10	30(13.2)
Above 10	7(10.5)	
No response	2(2.6)	

**Table 3.** Factors of Anticipatory Nausea and vomiting

Dependent variables	(SE)	t-value (p-value)	R <sup>2</sup> (%)
Independent variables			
Anticipatory nausea / vomiting			39.5
Post-chemotherapy	.425	2.97 (.0002**)	
Psychological symptoms	.319	3.96 (.0041**)	
Psychological symptoms			64.6
Physical symptoms	.429	5.61 (.0000**)	
Anxiety	.583	7.630 (.0000**)	
Anxiety			7.6
Time of diagnosis	.276	2.29 (.025*)	
Physical symptoms			23.0
Smoking	.424	2.27 (.027*)	
Drinking	-.456	-2.35 (.022*)	
State of metastasis	.284	2.33 (.023*)	

tinuous nausea, and difficulty eating. During the interview, the environmental factor most often causing ANV were sensory stimuli, especially seeing and smelling specific foods (in 17 subjects). The cancer patients in chemotherapy complained the most about hospital meals. The smell of hospital meals or even sound of a freight elevator or cart bringing meals to the rooms caused them to become nausea and an aversion to meat increased after receiving chemotherapy. On the other hand, they found fruits, sour foods, Kimchi, and spicy liquids enhanced their appetites. They also stated that they did not eat again or even want to look at the food that they had eaten and vomited during the chemotherapy. Second, environmental cues were something related to anti-cancer agents experience, to think or talk about the feelings experienced during the dosage of anti-cancer agent (in 16 subjects). The nausea and vomiting was experienced when imagining the agony after receiving chemotherapy and regardless of location, nausea was experienced when seeing something reminding them of the hospital or the scene of treatment. For example, they would turn off TV when they saw or heard about anything a hospital, nurse, doctor, or cancer. They hated going to the hospital so much that they did not even pay visits to hospitalized friends or relatives. Thirdly, 12 subjects answered that they experienced nausea and vomiting in front of the hospital or as soon as entering the hospital, due to the recognition of the hospital settings or due to the unique smell of the hospital or smell of medicine. The methods to decrease ANV for 15 subjects (50%) were praying, reading the Bible, reminiscence, distracting imagery, positive thinking, relaxation and physical exercise, and 13 of them (43%) answered that they had done nothing. The patients who showed strong ANV had the following relative factors : in healthy condition, had trouble with digestive systems were sensitive to stimulation, sensitive to smell, were not strongly against alcohol, easily vomited after consuming alcohol, had severe nausea and vomiting when brushing their teeth, had severe motion sickness and easily vomited, had severe hyper-emesis and were extremely sensitive when pregnant and immediately vomited after eating something they did not like. Fourth, cancer type did not appear as a factor to ANV. The patterns and treatment of cancer, recurrence of cancer, and chemotherapy cycle or radiotherapy proved irrelevant to the manifestation of ANV. Also, the dosage of anti-emetic agents appeared to be irrelevant. 90.9% of the subjects answered that they

received anti-emetic agents along with chemotherapy in their previous treatments. According to their medical charts Zofran and Kytril were given to 90.9% of the subjects.

As a residual stimuli, age and motion sickness did not appear as an influencing factor of ANV. Additionally, females experienced ANV more than males ( $t = -1.95$ ,  $p = .055$ ).

## DISCUSSION

The study attempted to manipulate anxiety about chemotherapy as focal stimuli, severity of post-chemotherapy nausea and vomiting, physical and psychological symptoms, environmental factors and cancer type as contextual stimuli and age, motion sickness as residual stimuli, based on Roy's Adaptation Model.

The anxiety which was viewed as a focal stimuli did not appear as a significant influencing factor, whereas psychological symptoms and severity of post-chemotherapy nausea and vomiting appeared as a significant pre-assumption factors for 39.5% of variance in ANV. The focal, contextual, and residual stimuli divided by priority in Roy's Adaptation Model did not divide clearly and the results showed that each stimuli are related, influencing each. The ANV is a phenomenon which cannot be explained with a specified source of stimulation based on Roy's Adaptation Model. My study identified that the psychological symptoms have priority as a significant influencing factor, because ANV generation mechanism is relative to human mental recognition, but psychological factors also showed relativity to anxiety and physical symptoms, being relative to time of diagnosis, state of metastasis, drinking habits and smoking. The findings showed that cancer patients experienced severe changes in their emotional status, and they were more depressed than normal people, experiencing mood disorder and emotional distress which agreed with the findings from the studies of Nerenz et al. (1982), Coon et al. (1987), and Pickett (1991) and that the emotional disorder has correlation with ANV. The findings agreed with the facts from the studies of Altmaier et al (1982) and Ingle et al (1984), that depression and hostility are relative to the ANV. In the course of the interviews, most of the patients shed tears while making their statements, or even cried, complaining of sadness and depression. The anxiety viewed as a source of stimulation has been found to be an important influencing factor for ANV in



numerous studies (Chin et al, 1992; Boakes, et al, 1993; Coons et al, 1987; Altmaier et al, 1982; Watson et al, 1998; Blasco, 1994; Love et al, 1983; Rhodes, 1986; Sandra et al, 1992; Ingle et al, 1984; Andrykowski et al, 1985; Nesse et al, 1980; Duigon, 1986) but in this study, the anxiety did not carry as much weight as in the study of Coons et al (1987). The possible causes could be the fact that the state anxiety measured in this study showed psychological symptoms ( $=.58$ ), and it measured the anxiety as only state anxiety felt prior to chemotherapy. More comprehensive psychological symptoms such as apprehension, tension, anxiety, irritability, depression, attention difficulty, etc. to represent psychological state. It could also be considered that the trait anxiety as well as state anxiety combined and could have influenced the outcome. As in Watson et al (1998) 's study, if the trait anxiety as well as state anxiety have been measured and analyzed, the influences the anxiety caused could have been observed. The severity of post-chemotherapy nausea/vomiting viewed from contextual stimuli, had been suggested as a influencing factors that directly influences on ANV in previous studies (Chin et al, 1992; Matteson et al, 2002; Burish and Carey, 1986; Stockhorst et al, 1993; Blasco, 1993; Sandra et al, 1992; Morrow, 1992; Alba et al, 1989; Ingle et al, 1984; Andrykowski et al, 1985; Stefanek et al, 1988), and it also appeared as a significant influencing factors for ANV in this study. Since the nausea and vomiting before and after the chemotherapy showed a correlation, the need to provide a patient who experiences severe nausea and vomiting after the administration of chemotherapy with special attention and proper intervention and treatment beforehand has to be recognized, because the possibility of experiencing ANV is higher and it has a correlation with anxiety or psychological symptoms, creating a need for perceptual behavioral and psychological nursing intervention. Actually, Redd, Montgomery & Dutlame (2002), King (1997) and Morrow & Hickok (1993) 's studies showed that non-pharmacological intervention such as behavioral intervention can effectively control ANV. Suggestions are first, studies of the psychological variables such as anxiety, coping mechanism, characteristics patterns, attitude and belief toward the disease, condition of spiritual health, etc. are needed in larger populations. Second, qualitative studies are needed to grasp the psychological factors which will have effect on ANV. Third, studies of behavioral interventions that can solve ANV are needed.

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