

**EFFICACY OF ACUPRESSURE TREATMENT AT NEIGUAN POINT WITH  
ACUPRESSURE BANDS FOR CHEMOTHERAPY-INDUCED NAUSEA,  
VOMITING, AND RETCHING**

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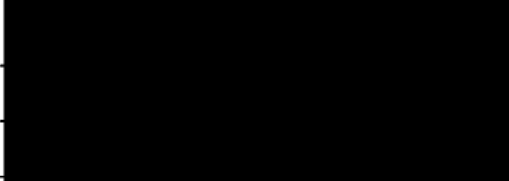
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ii

## **ABSTRACT**

### **EFFICACY OF ACUPRESSURE TREATMENT AT NEIGUAN POINT WITH ACUPRESSURE BANDS FOR CHEMOTHERAPY-INDUCED NAUSEA, VOMITING, AND RETCHING**

**Christine D. Meyer, PhD**

**Duquesne University, 2001**

Patients who receive chemotherapy perceive nausea and vomiting (N&V) to be one of the most problematic outcomes of chemotherapy. Even with the administration of a prophylactic antiemetic protocol, up to 33% of the patients experience emesis in the first 24 hours after receiving strong chemotherapy agents. The primary purpose of this study was to examine the effect of acupressure on the Neiguan Point (P6) on the incidence, frequency, duration and intensity of nausea, vomiting, and retching associated with chemotherapy in chemotherapy-naïve patients. The methodology was a single blind, randomized treatment and no treatment control, repeated measures design. The sample of patients (N=25), ages 39 to 71, were selected from two outpatient oncology clinics and a women's cancer center located in a large northeastern, metropolitan hospital. The Rhodes Index of Nausea, Vomiting, and Retching was used to measure N&V before treatment and four times after chemotherapy was received. Chi Square analysis and sample t-tests revealed no significant differences between the two groups. However, the mean for each item on the Rhodes Index for the experimental group was often times lower than the mean for the control group suggesting that acupressure may assist in the

**controlling N&V associated with chemotherapy. Further data will be collected with the goal of achieving a sample large enough to derive statistically significant results.**

**Dissertation Advisor: Gladys L. Husted, RN, PhD**

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Special recognition of appreciation is also given to my husband and confidant, Bob, for his continual encouragement, understanding support, and patience, as we struggled to balance the needs of our family, work, school, and personal lives. My children, Michael and Sara, deserve mention for their love and support.

I also want to thank Mindy Bartel, President of the BioBand Company, who graciously supplied the acupressure bands for this study, free of charge. Numerous other players also contributed to this endeavor. Jill Tauch, RN, Adam Brufsky, MD, Sirisha Mahankali, MD, and Darrell Lis, RN, as well as the physicians and nurses at the outpatient oncology clinics deserve recognition for their zeal in recruiting the participants and their dedicated participation in this study.

While my passage through graduate school has taught me much about the art and the science of nursing, it has also inspired and strengthened a belief in the possibility that there *are* many ways of “knowing,” many of which are not yet recognized and embraced

by the scientific and academic communities. It was only recently that I became aware that this formal education created the atmosphere in which to explore other ways of “knowing,” the intrinsic healing energy of the body’s consciousness as it relates to others, the universe, and myself.

## LIST OF TABLES

	Page
Table 1. Emetogenic Potential of Single Chemotherapy Agent.....	39
Table 2. Predictive Factors for Determining Which Patients Are More Likely to Experience Nausea and Vomiting after Receiving Chemotherapy.....	42
Table 3. Antiemetic Agents and Adjuncts.....	45
Table 4. Commercial Acupressure Wrist Bands.....	48
Table 5. Algorithm for Predicting Antiemetic Outcome Using Hesketh's Model for Emetogenic Potential of Selected Chemotherapy Agents.....	67
Table 6. Demographic Data by Group.....	74
Table 7. Beck's Anxiety and Depression Total Scores by Group at Time of entry into the Study.....	75
Table 8-A. Rhodes Index of Nausea, Vomiting, and Retching (INVR) by Group Prior to Chemotherapy (T <sub>1</sub> ).....	77
Table 8-B. Rhodes Index of Nausea, Vomiting, and Retching (INVR) by Group the Evening of Chemotherapy (T <sub>2</sub> ).....	78
Table 8-C. Rhodes Index of Nausea, Vomiting, and Retching (INVR) by Group First Evening After Chemotherapy (T <sub>3</sub> ).....	79
Table 8-D. Rhodes Index of Nausea, Vomiting, and Retching (INVR) by Group the Second Evening After Chemotherapy (T <sub>4</sub> ).....	80
Table 8-E. Rhodes Index of Nausea, Vomiting, and Retching (INVR) by Group the Third Evening After Chemotherapy (T <sub>5</sub> ) .....	81
Table 9. Sample Mean Total Score for Nausea <sup>1</sup> , Vomiting <sup>2</sup> and Retching <sup>3</sup> , by Group and Time.....	82
Table 10. Log Entries By Group.....	84



## TABLE OF FIGURES

	Page
Figure 1. Measuring One Chinese Inch or “Cun”.....	7
Figure 2. Randomized, Treatment and No Treatment Control, Repeated Measures Design.....	53

## TABLE OF CONTENTS

	Page
List of Tables.....	vii
List of Figures.....	viii
<b>I. STATEMENT OF THE PROBLEM</b>	
A. Purpose of the Study.....	4
B. Research Questions.....	4
C. Definition of Terms.....	6
D. Assumptions.....	9
E. Limitations.....	9
F. Significance to Nursing.....	9
<b>II. REVIEW OF LITERATURE</b>	
A. Conceptual Framework.....	11
B. Current and Predicted Incidence Rates for Cancer.....	13
C. History of Acupressure.....	14
D. Acupressure as Complementary or Alternative Medicine.....	17
E. How Does Acupuncture/Acupressure Work?.....	21
F. Acupressure/Acupuncture Studies.....	22
G. History of Management of Chemotherapy-Induced Nausea, Vomiting, and Retching.....	27
H. Pathophysiology of Nausea, Vomiting, and Retching.....	28
I. Different Types of Nausea and Vomiting.....	31
J. Incidence of Chemotherapy-Induced Nausea and Vomiting.....	35
K. Emetic Potential of Commonly Used Chemotherapy Agents.....	37

## TABLE OF CONTENTS

	Page
L. Characteristics of Patients Who Are More Likely to Experience Nausea and Vomiting.....	40
M. Types of Antiemetics and Adjuncts to Antiemetics.....	43
N. Different Types of Commercially Available Acupressure Bands.....	46
O. Ancillary Interventions to Enhance Antiemetic Protocol.....	49
P. Summary.....	50
<b>III. METHODS</b>	
A. Design.....	52
B. Setting.....	54
C. Sample.....	54
D. Instruments.....	55
1. Demographic Questionnaire.....	55
2. Medical Information Questionnaire.....	56
3. Beck's Anxiety Inventory.....	57
4. Beck's Depression Inventory.....	58
5. Rhodes Index of Nausea, Vomiting, and Retching.....	59
6. Home Log.....	60
E. Treatments.....	61
Experimental Group.....	61
Control Group.....	61
F. Procedure for Data Collection.....	62
G. Procedures for Protection of Human Subjects.....	67
H. Strengths and Weaknesses.....	68

I. Procedures for Data Analysis.....	70
<b>IV. RESULTS AND DISCUSSION</b>	
A. Introduction.....	71
B. Description of the Sample.....	71
C. Findings.....	75
D. Discussion.....	85
<b>V. SUMMARY AND RECOMMENDATIONS</b>	
A. Summary.....	88
B. Recommendations.....	88
C. Conclusions.....	90
APPENDIX A. Permission Letter to Reproduce Figure 1 Definition of One Chinese Inch or "Cun.".....	92
APPENDIX B. Permission Letter to Reproduce Table 1 Emetogenic Potential of Single Chemotherapy Agents.....	93
APPENDIX C. Demographic Questionnaire.....	94
APPENDIX D. Medical Information Questionnaire.....	95
APPENDIX E. Beck's Anxiety Inventory.....	96
APPENDIX F. Revised Beck's Depression Inventory.....	97
APPENDIX G. Rhodes Index of Nausea, Vomiting, and Retching.....	98
APPENDIX H. Letter of Permission to Use Rhodes Index of Nausea, Vomiting, and Retching.....	99
APPENDIX I. Home Log for the Experimental Group.....	100
APPENDIX J. Home Log for the Control Group.....	101
APPENDIX K. Confidentiality Statement.....	102

## TABLE OF CONTENTS

	Page
APPENDIX L. Screening Tool to Determine Eligibility for Inclusion into Study.....	103
APPENDIX M. Record of All Eligible Patients Asked to Participate in the Study.....	104
APPENDIX N. Subject Consent Form.....	105
APPENDIX O. Directions for Placement of Acupressure Band at P6 for Experimental Group.....	106
APPENDIX P. Directions for Placement of Acupressure Band at P6 for the Control Group.....	107
APPENDIX Q. Letters of Permission Duquesne University IRB, Participating Hospital IRB and the Participating Hospital Cancer Institute.....	108
APPENDIX R. Letter to Patients in the Control Group at the Completion of the Study.....	109
REFERENCES.....	145

## I. STATEMENT OF THE PROBLEM

Nausea, vomiting, and retching (NVR) have long been associated with the administration of chemotherapy, and continues to be a significant problem in the treatment and outcome of patients with cancer. Patients who receive chemotherapy perceive nausea and vomiting (N&V) as one of the most problematic outcomes of chemotherapy (Coates, et al., 1983). Besides being an unpleasant experience, recurrent N&V frequently precipitates additional complications in the patient with cancer such as dehydration, loss of appetite, weight loss, malnutrition, fluid and electrolyte imbalance, as well as, anxiety, and clinical depression (Durant, 1984; Fitch, 1992; Jacobsen, Bovbjerg, & Redd, 1993; Laszlo, 1983; McDonald, et al., 1999; Schell, 1999). Fluid and electrolyte imbalance, and its resultant metabolic acidosis, along with dehydration with decreased renal elimination, may contribute to the development of nephrotoxicity commonly associated with the administration of chemotherapy (Jenns, 1994; Lindley & Hirsch, 1992). Repeated N&V may also place patients at risk for uncommon, but severe, complications such as Mallory-Weiss Syndrome, which is the development of esophageal tears secondary to severe retching; skeletal fractures; aspiration pneumonia; and wound dehiscence (Abbott Lab, 1999; Fishman, Thirlwell, & Daly, 1983; Lindley & Hirsch, 1992).

Chemotherapy-induced N&V, and its associated symptomatology, negatively affect the quality of life for patients receiving chemotherapy and for their families (Bliss, Robertson, & Selby, 1992; Brinkley, 1985; Cella, 1994; Grant, 1997; Lindley, Hirsch, &

O'Neil, et al., 1992, Rusthoven, Osoba, Butts, Yelle, Findlay and Grenville, 1998).

Problems due to severe or uncontrolled NVR are often identified as the primary reasons that patients will modify the chemotherapy schedule and dose, or both, and thus decrease the efficacy of sometimes potentially curative therapy (Graves, 1992). A study by Cooper and Georgiou (1992) revealed that patients perceive nausea to be one of the five most bothersome side effects of chemotherapy that most affect their quality of life. In fact, Laszlo and Lucas (1981) reported that up to 50% of patients refuse or delay their treatments due to severe N&V.

The most common intervention to control NVR is the administration of a myriad of antiemetic and adjunct medications, which frequently cause unpleasant side effects of their own. However, Morrow (1992a) reported that even after receiving an antiemetic medicine, 62% to 72% of 2,499 patients in his study still experienced N&V post-chemotherapy. Even though extensive research with known pharmacological antiemetics continues to be conducted, some investigations suggest the need to evaluate other non-pharmacological strategies as a supplementary tool in the management of chemotherapy-induced N&V (Frytak & Moertel, 1981; Kessler, Alberts, & Plezia, 1986; Morrow, 1989; National Institutes of Health, 1994). Numerous studies to evaluate various types of non-pharmacological approaches in the management of N&V have been done on various populations, with inconsistent results. Much of what has been learned comes from clinical trials that have examined N&V commonly associated with specific conditions such as pregnancy-induced "morning sickness" and hyperemesis gravidarum (Christer, et al., 1998; Dundee, Sourial, Ghaly, & Bell, 1988; Evans, Samuels, Marshall, & Bertolucci, 1993; Ho, Hseu, Tsai, & Lee, 1996; Stainton & Neff, 1994; Stone 1993), post-operative

N&V (Fan, Tanhui, Joshi, Trivedi, Hong, & Shevde, 1997; Fassoulaki, Papilas, Sarantopoulos, & Zotou, 1993; Fry, 1986; Hare, 1988; Hoo, 1997; Hyde, 1989), and motion sickness (Warwick-Evans, Masters, & Redstone, 1991).

Barrie Cassileth, chief of the integrative medical services at Memorial Sloan-Kettering Cancer Center, estimates that 85% to 90% of patients at major cancer centers use some type of complementary intervention along with their prescribed treatment protocol (McCann, 2000). The most common nonpharmacological interventions that have been studied for chemotherapy-induced N&V include the following: acupressure (Dundee & Yang, 1990; Price, Lewith, & Williams, 1991; Sadler, 1989; Stannard, 1989), acupuncture (Cadwell, 1998; Ceniceros & Brown, 1998; Chow, 1998; Dundee, Chestnutt, Ghaly, & Lynas, 1986a; 1986b; Dundee, Fitzpatrick, & Ghaly, 1987; Dundee & Milligan, 1988; Dundee, Milligan & McKay, 1988; Ghaly, Fitzpatrick, & Dundee, 1987; Ho, Jawan, Fung, Cheung, & Lee, 1989; Schulte, 1996; Weightman, Zacharias, & Herbison, 1987), biofeedback, distraction, relaxation response (Morrow & Hickok, 1993; Scott, Donahue, Mastrovito, & Hakes, 1986; Wallace, 1997), hypnosis, music therapy (Ezzone, Baker, Rosselet, & Terepka, 1998), systematic desensitization, and visual imagery (Burish, Carey, Krozely, & Greco, 1987; Morrow, Asbury, et al., 1992; Morrow & Hickok, 1993; Morrow & Morrell, 1982; Troesch, Rodehaver, Delaney, & Yanes, 1993).

Many authors attribute the apparent success of many of the nonpharmacological interventions to the placebo effect, and tend to minimize or ignore other rationale for their success (Yasko, 1985). In spite of these criticisms, it is clear that supplemental strategies are needed. Current management of the deleterious effects of chemotherapy offers only one solution: the administration of more medications despite their associated



side effects and less than optimal effectiveness. The focus of this study was to examine the efficacy of acupressure on selected acupoints on the internal aspects of the wrists, precisely indicated points that have been identified by experts in Chinese Medicine to be appropriate in the treatment of nausea.

#### A. Purpose of the Study

The purpose of this study was to examine the effect of acupressure on the Neiguan Point on the incidence, frequency, duration, and intensity of NVR associated with chemotherapy in patients diagnosed with cancer (See page 6, Definition of Terms). Additionally, the relationship between selected background variables and chemotherapy-associated NVR was examined. These variables included gender, the current use of antiemetics, an assessment of the patient's susceptibility to N&V via the patient's history of prior episodes of N&V linked with pregnancy, motion sickness, and post-operative events, and the patient's pre-chemotherapy level of anxiety and depression (Gralla, Tyson, Kris, & Clark, 1987; Morrow, 1984a, 1984b, 1985, 1992a; Rhodes, Watson, Johnson, 1986). The latter two characteristics have been strongly associated with conditioned N&V (Burish & Tope, 1992). The relationship between age, current use of alcohol, and a history of heavy alcohol and chemotherapy-associated NVR was also examined.

#### B. Research Questions

The primary research question was "What is the effect of acupressure applied unilaterally with an acupressure band to the Neiguan Point on the incidence, frequency,

duration, and intensity of nausea, vomiting, and retching associated with chemotherapy in patients with cancer?” Specific aims of the research were to investigate the following:

- the relationship between selected background variables (age, gender, the current use of antiemetics, history of alcohol intake, an assessment of the patient’s susceptibility to NVR via a history of prior episodes of NVR linked with pregnancy, motion sickness, and post-operative events, and the patient’s pre-chemotherapy level of anxiety and depression) and the incidence, frequency, duration, and intensity of nausea.
- the relationship between selected background variables (age, gender, the current use of antiemetics, history of alcohol intake, an assessment of the patient’s susceptibility to NVR via a history of prior episodes of NVR linked with pregnancy, motion sickness, and post-operative events, and the patient’s pre-chemotherapy level of anxiety and depression) and the incidence, frequency, duration, and intensity of vomiting.
- the relationship between selected background variables (age, gender, the current use of antiemetics, history of alcohol intake, an assessment of the patient’s susceptibility to NVR via a history of prior episodes of NVR linked with pregnancy, motion sickness, and post-operative events, and the patient’s pre-chemotherapy level of anxiety and depression) and the incidence, frequency, duration, and intensity of retching.

Three research hypotheses were developed for this study:

1. The incidence, frequency, duration, and intensity of nausea for the experimental group using an acupressure band will be significantly less than for the control group.
2. The incidence, frequency, duration, and intensity of vomiting for the experimental group using an acupressure band will be significantly less than for the control group.
3. The incidence, frequency, duration, and intensity of retching for the experimental group using an acupressure band will be significantly less than for the control group.

### C. Definition of Terms

Definitions for terms used in this study follow.

1. **Acupressure**: the administration of a constant pressure to a specific point on the body to promote the circulation of Qi or life force as described by Pomeranz (1996) and Ulett, Han, and Han (1998a, 1998b).
2. **Neiguan Point**: also referred to as Nei Kuan or the Pericardium 6 point or P6. It is located on the anterior surface of the forearm, approximately 2 Chinese inches (4-5 cm) or “cun” proximal to the wrist crease, and lies between the tendons of the *Medial palmaris longis* and *Flexor carpi radialis* (Bruce, Golding, Hockenull, & Pethybridge, 1990; Ho, Hseu, Tsai, & Lee, 1996; Hoo, 1997). The exact length of a “cun,” a Chinese inch, varies from person to person. Figure 1 illustrates how it is determined by measuring the “width of the interphalangeal joint of the patient’s thumb” or the “width of the two radial ends of the flexor creases of a flexed middle finger” (Appendix A) (Hoo, 1997). The P5 acupoint is a second antiemetic but less

strong acupressure point. It resides close to P6 at approximately three “cun” from the wrist crease (Hoo, 1997). While pressure to either point may produce an antiemetic effect, with pressure to P6 being preferable, pressure to any place between the two points would be ineffective (Hoo, 1997).

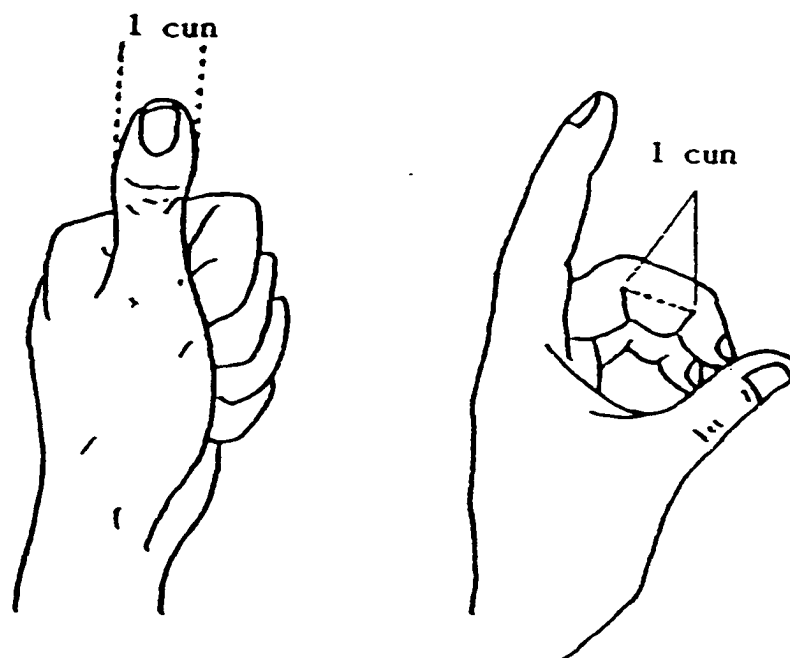


Figure 1 *Measuring One Chinese inch or “cun.”*

3. **Incidence**: the occurrence of NVR episodes that occur within a time span between the time of administration of chemotherapy and the fourth evening after the administration of chemotherapy.
4. **Frequency**: the rate of occurrences of NVR episodes that occur between the time of administration of chemotherapy and the fourth evening after the administration of chemotherapy.

5. **Duration**: Duration is calculated as the time between the beginning of chemotherapy administration and the last episode of NVR.
6. **Intensity**: the strength of the NVR determined by the patient on a scale of 0-4.
7. **Nausea**: a subjective event in which the patient experiences, in the epigastrium or back of the throat, an unpleasant sensation that may or may not result in vomiting, may or may not be accompanied with anorexia (Rhodes, 1990), and is often accompanied with decreased skin temperature, pallor, salivation, swallowing, and tachycardia (Hogan & Grant, 1997; Morrow, Angel & Dubeshter, 1992).
8. **Vomiting**: a powerful and purging ejection of the contents of the stomach, duodenum, or jejunum through the mouth (Rhodes, 1990).
9. **Retching**: attempting to vomit without bringing anything up; also called “dry heaves” (Rhodes, Johnson, & McDaniel, 1995).
10. **Chemotherapy**: the administration of cytotoxic pharmacological agents for the treatment of cancer.
11. **Patients with cancer**: individuals who receive their chemotherapy treatment in the clinics; are screened according to the exclusion criteria listed in the Methods Chapter, and agree to participate in this study.
12. **Chemotherapy Naïve**: individuals who have never received chemotherapy.
13. **Experimental Group**: usual antiemetic protocol plus acupressure band intervention.
14. **Control Group**: usual antiemetic protocol plus a placebo acupressure band intervention.

#### D. Assumptions

There were three assumptions for this study:

1. Patients who agreed to participate in this study and who experienced chemotherapy-induced NVR wanted to reduce or eliminate these symptoms.
2. Patients who agreed to participate in this study wore the acupressure band as instructed.
3. Patients who agreed to participate in this study completed the instruments truthfully.

#### E. Limitations

The major limitations of the study were the following: (1) only one geographical area was used; (2) the sample size was small; (3) the evaluation of the effects of the acupressure bands was confined to a short period of time that spanned from the time of chemotherapy to the fourth evening after chemotherapy, and, (4) most of the patients were females with a diagnosis of breast cancer

#### F. Significance to Nursing

Persons with a chronic or fatal disease such as cancer often feel hopeless, helpless, and out of control, and thus may develop a negative perception of their health. Research indicates that gaining even a small amount of control over one's situation helps the person to feel less stress. Research suggests that high stress levels impair the immune system and healing. Furthermore, Lindley and Hirsch (1992) and Schmoll (1992) noted that patients who experienced severe side effects due either to the treatment regimen or to the antiemetic therapy frequently experienced a measurably, diminished quality of life.

Lindley and Hirsch (1992) referred to one of their own unpublished studies on the impact of chemotherapy-related N&V on quality of life. Patients who experienced N&V scored a greater decline in quality of life than patients who did not suffer N&V. The decrease in quality of life was related to the patients' inability to maintain their normal daily activities such as going to work, preparing meals, and taking prescribed medications. Bliss, Robertson, and Selby (1992) concurred with these findings.

Information learned from this study will contribute to the body of knowledge in nursing. The nursing profession has traditionally embraced holistic care, which subscribes to the mind-body connection in health and healing. A cornerstone of holistic nursing is the establishment of the nurse-patient relationship, in which the patient is perceived as a self-actualizing individual, and an equal partner in the health care enterprise, and, thus, has an active voice in the health care received. The multifaceted roles of nurses, as well as their presence with patients 24 hours a day, places the nurses in a unique position to provide this type of care. One of the roles of the nurse who administers care to patients receiving chemotherapy is to provide patient education on effective strategies to manage chemotherapy-induced NVR.

The use of acupressure to the wrist is a simple, inexpensive, non-invasive alternative therapy for patients to use in order to increase well-being and quality of life, restore a sense of control, and promote healing. Acupressure to the P6 acupoint can also be used in the management of nausea induced by variables other than chemotherapy.

## II. REVIEW OF LITERATURE

### A. Conceptual Framework

Martha Rogers' Science of Unitary Human Beings is proposed as an appropriate nursing framework for this study on the use of acupressure to manage NVR. Her model incorporates multiple abstract and complex concepts such as energy fields, universe of open systems, patterns, diversity, and pandimensionality (Bramlett & Chen, 1994). Rogers hypothesized that the universe, which comprises the earth, space, and beyond, consists of open energy fields, and she explicitly stated that both human beings and the environment, as energy fields, are mutually inclusive. This outer space not only includes the black void that exists outside the boundaries of the planet Earth, but also encompasses the space beyond our physical bodies, sometimes known as one's aura.

Each energy field, perceived as a single wave pattern that extends to infinity, is an open system in continuous modulation with another. Rogers espoused a "pandimensional" world, a universe unrestricted by spatial or linear barriers, which is continuously evolving in an acausal and nonlinear fashion. The universe has infinite dimensions constantly interacting with one another. Rogers maintained that the human being does not merely possess an energy field, but is an energy field, and that this energy field intersects and influences other energy fields (Falco & Lobo, 1995, 231; Rogers, 1994).

Throughout the development of her theory, Rogers advanced four major assumptions which relate to the use of acupressure bands.



1. “The human being is a unified whole possessing his own integrity, and manifesting characteristics that are more than and different from the sum of its parts” (Falco & Lobo, 1995, 231; Rogers, 1994). The use of acupressure bands corresponds nicely with this assumption in that the acupressure band allows the person to interact dynamically with the environment in a positive way.
2. The individual and the environment are open systems continuously exchanging matter and energy with each other. There are no borders and thus they are not separate entities (Falco & Lobo, 1995, 231; Phillips, 1994). Although wave patterns distinguish the human energy field and environmental field, there is no separation of one field from the other (Phillips, 1994). A major principle of holistic healing is that a positive environment facilitates a positive mind-set and healing. Introducing acupressure bands at the first chemotherapy in order to minimize nausea and vomiting is one way to create a positive environment. The use of acupressure bands gives the patient a sense of some control of a potentially unpleasant situation, by making the first chemotherapy a less negative experience, and thus future treatments more acceptable or tolerable experiences.
3. “The life process of human beings evolves irreversibly and unidirectionally along a space-time continuum.” This means that Rogers saw life as a dynamic, changing pattern of variables that is “continuous, creative, evolutionary, and uncertain” (Falco & Lobo, 1995, 231). She stated that human beings cannot return to the past, or become what they once were. One of the major goals of chemotherapy is to prevent, or, at least, to minimize acute and delayed N&V as much as possible in order to prevent the onset of anticipatory N&V. Anticipatory

N&V is resistant to treatment, so it is important to prevent N&V before it becomes established.

4. “The individual is characterized by the capacity for abstraction and imagery, language and thought, sensation and emotion.” The individual is a sentient, thinking being. (Daily, et al., 1994; Falco & Lobo, 1995, 231). A person’s thoughts, feelings, and personal interpretation of the chemotherapy being received influence the healing process and, ultimately, the outcome of that therapy.

These assumptions are relevant to this study because they address the concept of an individual as energy, an energy that reflects the total person, and functions as an integrating matrix for one’s existence within himself, with others, and with the environment. Rogers' perspective of the individual and the environment as parallel and interdependent energy fields corresponds to the "qi" or energy channels that are described in Traditional Chinese Medicine.

#### B. Current and Predicted Incidence Rates for Cancer

The Surveillance, Epidemiology, and End Results (SEER) program of the National Cancer Institutes reported that the incidence rates for all cancers in the United States according to site, race, sex, and age had risen dramatically from 1973 to 1996 (American Cancer Society, 1998; Ries, et al., 1996). In short, these increases were as follows: 23% for white males, 15% for white females, 33% for black males, and 17% for black females (Ries, et al., 1999). In general, the incidence rate for cancer increased proportionately with age from childhood to the middle 80s, but the increase became more

prominent in the older people. Approximately 60% of all cases of cancer were diagnosed in persons who were over 65 years of age, designating the older population with the highest rate of a newly diagnosed cancer (Ries, et al., 1996, 1999; Wrotny, 1993). The American Cancer Society estimated that there would be 1,221,800 new cases of cancer in 1999 (American Cancer Society, Surveillance Research, 1999). Predictions for the incidence of new cancers beyond 1999 are not provided.

The United States Census Bureau reported that the number of Americans 65 years and older had steadily increased from 31,082,000 in 1990 to 34,517,000 in May, 1999, and projected the number would be 39,408,000 in 2010 (Byerly & Deardorff, 1995; Day, 1996; U.S. Bureau of the Census, 1996). Between 1990 and 1994, the population over age 65 grew 11-fold, with an even more dramatic growth predicted between 2010 and 2030 when the “Baby Boom” generation reaches this age (Day, 1996). Given this data and the significance of this research, the problem of chemotherapy-associated NVR is also expected to grow, along with the increasing proportion of the over-65 cohort, which has the highest rate of newly diagnosed cancers in the United States.

### C. History of Acupressure

Traditional Chinese Medicine, which dates back between 2,500 and 3,000 years, comprises three core intervention modalities: herbal medicine, Qi Gong, and acupuncture (Bareta, 1998; Beal, 1992a; Beinfield & Korngold, 1995; Helms, 1998; Hsu & Diehl, 1998; Pomeranz, 1996; Rubik, 1995; Ulett, Han, & Han, 1998b). Acupressure is considered a non-invasive variation of acupuncture and, thus, is classified under Traditional Chinese Medicine (Oumeish, 1998). Therefore, much of the theory and practice of acupuncture also applies to acupressure.

Acupuncture and acupressure are based on the belief that wellness is maintained when a vital life energy, called Qi or Chi (pronounced chee), which exists in all living organisms, remains balanced, and flows effortlessly along 12 major meridians or energy pathways in the body (Maxwell, 1997; Wax & White, 2000). It is believed that each meridian courses longitudinally along the body surface and through the internal organs, and, thus, is named for the principal organ through which it travels. Each meridian is associated with specific organs or body systems (Millman, 1977; Plawecki & Plawecki, 1998). The major twelve channels are pulmonary, colonic, gastric, splenic, pericardiac, small intestinal, vesicular, renal, greater vascular, endocrine, biliary, and hepatic (Lu, 1983). Sutherland (2000) speaks of two other meridians called the “governing vessel” and the “conception vessel.” To the observer schooled exclusively in the sciences of the Western Hemisphere, interventions such as acupuncture or acupressure resemble quackery or a strong placebo. References to concepts like Qi and the meridians do not correlate with the typical anatomy charts commonly known in Western Medicine. However, according to Traditional Chinese Medicine, illness or disease may result if Qi becomes depleted, blocked, or congested in an area (Beal, 1992a; Beinfield & Korngold, 1995).

Qi is divided into two complementary and interdependent forces, Yin and Yang. Yin is defined as a feminine force, and is considered to possess a negative charge. In contrast, Yang is believed to possess masculine characteristics, with a positive charge (Beal, 1992a). Acupuncture points, sometimes called *tsubos* (Japanese term) are found in small indentations in the skin along the meridians, and are manipulated in order to achieve an energy balance (Beinfield & Korngold, 1995; Pomeranz, 1996; Steiner,

1983a, 1983b). Ulett, Han, and Han (1998a, 1998b) and Rosenfeld (1996) believe that there are 365 specific acupuncture points along the meridians, but other experts suspect that there may be well over 1000 points (Burton Goldberg, 1997; Rubik, 1995; Weaver, 1985). Studies also indicate that acupoints tend to be more sensitive and tender than the surrounding tissue and to possess a greater electrical resistance (Oleson & Flocco, 1993; Steiner, 1983a). The goal of acupuncture or acupressure is to stimulate the acupoints to enhance the flow of Qi.

Acupoints can be stimulated by a variety of methods. Among these is stimulation either by finger pressure (acupressure) or by the insertion of very fine, sterile, disposable, solid, stainless steel needles (acupuncture) until the patient feels a minor ache. Applying pressure with the thumbs or needles to specific points serves to stimulate the movement of Qi (Helms, 1998; King, 1997). When stimulated appropriately, the patient can generally detect a change in sensation and may report feeling a mild charge similar to static electricity or a mild aching sensation (Dibble, Chapman, Mack & Shih, 2000).

Even though practically all of the studies on acupuncture and acupressure in the management of N&V refer to the P6 acupoint, there is mention of at least three other acupoints that may be used to control N&V. Schlager, Bochler, and Puhlinger (2000) examined the effectiveness of Korean hand acupuncture on postoperative vomiting in children after strabismus surgery. One acupoint, called K9 is located in the center of the distal, middle phalanx of the fourth finger (ring finger) on each hand. The incidence of vomiting in the Korean hand acupressure group was significantly less than that in the placebo group. Dibble's et al. (2000) study used two acupressure points, one the familiar P6, and the other the ST36 (Stomach 36). The ST36 acupoint is located bilaterally on the

stomach meridian approximately four fingerwidths below the anterior knee and one fingerwidth lateral to the tibia. Gottlieb (2000) recommends an acupoint called GV26 that is located centrally in an indentation above the upper lip. It is recommended that one press this area consistently for 30 seconds at a time every few minutes to help relieve travel sickness.

There are minimal contraindications for P6 acupressure. For patients who have a mastectomy, acupressure wristbands should not be applied to the wrist on the same side as the surgery. They should also be used cautiously in patients with peripheral neuropathy and neurological or cardiovascular deficits. Additionally, acupressure should not be used in areas with an open sore or ulcer, burn, varicose vein, or recent injury (Gottlieb, 2000). Side effects of acupressure are negligible. One-size elasticized bands may promote distal edema if the bands are too restrictive. A study by Felhendler and Lisander (1999) on the effects of acupressure on the cardiovascular system revealed a significant decrease in the systolic arterial pressure, diastolic arterial pressure, means arterial pressure, heart rate, and skin blood flow.

#### D. Acupressure as Complementary or Alternative Medicine

Acupressure is commonly categorized as one of the many healing interventions under the designation of Complementary or Alternative Medicine (CAM). The number of Americans using different types of CAM and its frequency of use have increased dramatically in the past ten years, with a subsequent increase in research of its efficacy and safety. In 1990, it was estimated that there were more than 425 million visits to practitioners of CAM (Fontanarosa & Lundberg, 1997). A national survey done by Eisenberg et al. (1998) of 2,055 adults revealed that the rate of use of those who have

used at least 1 of 16 complementary modalities grew from 33.8% in 1990 to 42.1% in 1997 ( $p < .001$ ). Other surveys and studies corroborated these findings. For instance, researchers of *The Landmark Report on Public Perceptions of Alternative Care* (1998), interviewed 1,500 Americans in 1997, and obtained similar results, that is, 42% used some type of complementary intervention in that year. The Landmark Report also showed that 42% of Americans were either very likely or somewhat likely to use acupuncture, and that 67% had a similar regard towards acupressure. Further support was provided by another random survey of 1,000 Americans by the Stanford Center for Research in Disease Prevention (SCRDP, 1998). This survey showed that 69% had used some type of complementary intervention. In a study by Burg, Hatch, and Neims (1998), 62% of 1,012 Florida residents reported that they had used one or more of 11 CAM modalities.

Other studies on the personal use of CAM therapy, which were done in Israel, Belgium, and other European countries, indicated that women in general tended to employ integrative treatments more frequently than men do. These studies also found that women tended to use CAM interventions in conjunction with contemporary medical practices (Beal, 1998). Similar findings were obtained in a study in which over 3,000 adults in Australia were questioned on their use of CAM treatments. It revealed that perimenopausal women, in particular, tended to employ integrative modalities at a higher rate than did men (MacLennan, Wilson, & Taylor, 1996).

In general, persons who tend to use more CAM therapies were women, nonblack, between the ages of 25 and 40 years, relatively more educated and with a higher income, unmarried, with a regular health care provider, and suffering with a chronic health

problem (Burg, Hatch, & Neims, 1998; Eisenberg, 1993; Landmark Report, 1998; Milton 1998a, 1998b). The study by Burg, Hatch, and Neims (1998) also indicated that typical users of CAM therapies tended to rate their health as poor. Consideration of these data suggests that the anticipated surge of Baby Boomers reaching the age of 65 years in the early Twenty-first century, and a corresponding spike in the incidence of cancer will precipitate a consumer-driven demand for optimal control of NVR. Their established familiarity and comfort level with CAM therapies will beckon a more integrated approach to the problem, with pharmacological solutions serving as only a part of the answer.

In November 1997, the National Institutes of Health (NIH) created a 12-member panel to evaluate the scientific documentation on various aspects of acupuncture. Experts in acupuncture presented reports over a three-day period (Marwick, 1997; National Institutes of Health, 1997; National Institutes of Health Consensus Development Panel on Acupuncture, 1998). After all the presentations were completed, the panel created a consensus statement for each topic (Villaire, 1998). Overall, studies indicated that acupuncture appeared to be effective for numerous health related problems: the management of N&V related to pregnancy, surgery, and chemotherapy; the pain of migraine headaches, surgical wounds, dental surgery, dysmenorrhea, and back pain; the addiction to alcohol, drugs, and tobacco; help with Carpal Tunnel Syndrome, stroke rehabilitation, labor induction, and the conversion of a breech to a vertex presentation (Beal, 1992b; Bullock, Culliton, & Oleander, 1989; Cardini & Weixin, 1998; Dundee & McMillan, 1991; Hsu & Diehl, 1998; Landmark Report, 1998; Marwick, 1997; NIH Consensus Conference, 1998; Rempp & Bigler, 1991; Schulte, 1996).



Even though findings from the NIH Consensus Conference supported the legitimacy of acupuncture for many health related problems, many of its conclusions are applicable to acupressure, which is viewed as a variation of acupuncture. Dundee and McMillan (1992) showed that different methods of stimulation were able to produce various outcomes. In general, acupuncture was longer acting and more effective than acupressure (Dundee & Ghaly, 1989b; Dundee, Ghaly, & McKinney, 1989; Dundee & McMillan, 1990; Dundee, Yang, & McMillan, 1991). When the N&V was due to high emetogenic medications, acupuncture with electrical stimulation or manual rotation of the needle was more effective than an indirect approach such as transcutaneous electrical stimulation (TENS) or manual pressure (Chestnutt & Dundee, 1985; Dundee, Ghaly, Bill, et al., 1989; Dundee, Ghaly, Fitzpatrick, Abram, & Lynch, 1989; Dundee & McMillan, 1992; Fitzpatrick, Dundee and Ghaly, 1987; McMillan & Dundee, 1991). A study by Aglietti et al. (1990) of 26 women receiving cisplatin therapy suggested that acupuncture reduced the intensity and duration of N&V.

Bertolucci and DiDario's study on the effectiveness of a TENS unit on a watchband applied to P6 for seasickness concluded that the Relief Band® may be helpful in controlling N&V. However, I question the study for two reasons. First, these bands are quite expensive costing approximately \$100.00 each for a disposable band, and almost \$200.00 for a reusable one. Secondly, the authors of this study are directors and officers of Maven Labs, Inc, the company that manufactures the band and sponsored the research.

### E. How Does Acupuncture/Acupressure Work?

The predominant theory to explain the dynamics of acupuncture or acupressure is that the stimulation of an acupoint promotes the release of endogenous endorphins: meta-enkephalins, beta-endorphins, and dynorphins (NIH, 1997; Pomeranz, 1996). Endorphins are amino acid peptides that are chemically similar to opiate or morphine, and, therefore, bind to opiate receptor sites in the Central Nervous System and block the pain pathways. This release of endorphins also helps to produce a state of relaxation. At least 24 years ago, Costello and Borison (1977) proposed this same hypothesis as an explanation for the antiemetic effect of acupuncture in that the release of beta-endorphins may increase antiemetic tone. In addition, another study found that acupuncture increases gastric motility, which may contribute to its antiemetic action (Lin, et al., 1997).

Endorphins have been found to occur naturally in the brain (pituitary, midbrain, and hypothalamus) and in the spinal cord (Beal, 1992a; Pomeranz, 1996; Rubik, 1995; Ulett, 1996). Clement-Jones, et al. (1980) reported increased levels of beta endorphins in human cerebral spinal fluid after acupuncture. Ulett et al. (1998a) did an experiment that confirmed this finding. Ulett et al. (1998a) believed that neurotransmitters such as serotonin and endorphins were the primary factors in acupuncture analgesia. After they performed acupuncture analgesia in a rabbit and transferred a portion of the rabbit's cerebrospinal fluid (CSF) into the third ventricle of a naïve rabbit, the second rabbit experienced the analgesic effect.

Some studies have suggested that an intact and functioning central nervous system is necessary in order for acupuncture and acupressure to be effective. For instance, Weightman, Zacharias, and Herbison (1987) learned that P6 stimulation was

ineffective in patients who received a general anesthetic, whereas Dundee and Ghaly (1991) found that a local anesthesia injected into the P6 pressure point before acupuncture would block the antiemetic effect of P6.

#### F. Acupressure/Acupuncture Studies

A study on 60 pregnant women between 7 and 12 weeks gestation on the effectiveness of Neiguan Point acupressure revealed that the women in the treatment group experienced more than a 60% reduction in morning sickness frequency when compared to the control group ( $p < .05$ ) (deAloysio & Penacchioni, 1992). Additionally, there were no statistically significant differences whether the acupressure was unilateral or bilateral.

Another clinical trial of 27 women between 5 and 22 weeks' gestation found that acupressure bands decreased N&V by 50% (Stainton & Neff, 1994). The authors also listed specific directions in the use of acupressure bands, instructions that were not found anywhere else:

- Correctly position the bands
- Place the acupressure bands bilaterally
- Apply acupressure band on right wrist first, then left (according to Yin-Yang principles)
- Apply additional pressure to the button for five minutes with episodes of increased nausea and/or vomiting (Stainton & Neff, 1994).

Belluomini, Litt, Lee, and Katz (1994) obtained similar results in the use of acupressure wristbands for pregnancy-associated N&V. Their findings revealed that acupressure at the P6 acupoint significantly decreased the nausea ( $p = .002$ ) but had no

effect on the frequency of vomiting. Hyde's (1989) study supported the above findings in that the use of acupressure wristbands significantly reduced nausea in pregnancy ( $p < .025$ ).

In contrast to the studies discussed above, a clinical trial to investigate the efficacy of pressure on the P6 anatomical site in the management of pregnancy-induced N&V found no relief with the use of P6 acupressure (O'Brien, Relyea, & Taerum, 1996). Hoo (1997) responded to this study in a letter to the editor in the American Journal of Obstetrics and Gynecology. He questioned whether the patients in the O'Brien, Relyea, and Taerum study applied the acupressure wristband to the correct acupoint. Likewise, a study that examined the effects of acupressure wristbands on postoperative N&V after urological endoscopic surgery suggested that the bands were not helpful (Agarwal, Pathak, and Gaur, 2000). Another study by Allen, Kitching, and Nagle (1994) which examined the effectiveness of P6 acupressure for N&V associated with gynecological surgery involving a Pfannenstiel incision, showed decreased requests for antiemetic medication but no significant differences in the incidence of N&V. Additionally, Yentis and Bissonnette's (1991) study on postoperative vomiting in children after a tonsillectomy was not favorable.

Barsoum, Perry, and Fraser (1990) randomized 162 surgical patients into three groups: (1) an acupressure group using an elasticized band with a button that exerted continuous pressure into the P6 acupoint, (2) a control group using buttonless bands, and, (3) a group receiving prochlorperazine, an antiemetic, with each administered opiate. The degree of nausea as perceived by the patient was determined with a linear analog scale, and was found to be significantly ( $p = .002$ ) decreased on the first two

postoperative days when compared to the sham and antiemetic groups. Even though studies by Barsoum, Perry, and Fraser (1990) suggested that acupressure is more effective in reducing postoperative nausea than postoperative vomiting, a study by Lewis, Pryn, Reynolds, Pandit, and Wilton (1992) indicated that acupressure is equally effective for both.

Several studies have been done on the effectiveness of acupressure with gynecological procedures. Bill and Dundee (1988) found that acupressure significantly reduced postoperative N&V in their study of 31 women who had minor gynecological surgery, as well as Rogers' (1990) study on postoperative nausea in urology patients, and Alkaissi, Stalnert and Kalman's (1999) study. Harmon, Gardiner, Harrison, and Kelly (1999) reported that acupressure significantly reduced nausea and vomiting after laparoscopy. Further support is provided by Yang et al. (1993) who found that an injection of 0.2mL of 50% glucose in water into the P6 area could reduce the incidence of postoperative emesis after gynecological laparoscopy.

A study that examined acupressure in the prevention of N&V during and after spinal anaesthesia for cesarean section provided further evidence (Harmon, Ryan, Kelly, & Bowen, 2000). A study by Ferrara-Love, Sekeres, and Bircher (1996) partially supports these findings. Patients in both the treatment and placebo wristband groups experienced decreased postoperative nausea when compared to the control group, but the difference between the treatment and the placebo was not statistically significant. A similar investigation on 75 patients was done by Stein et al. (1997) on the effects of acupressure versus intravenous metoclopramide on N&V during spinal anesthesia for cesarean section. Group I received the authentic acupressure band and 2 mL of saline solution,

Group II received sham wristbands and 10 mg of metoclopramide IV, and Group III received the sham wristbands and 2 mL of saline solution. There was no difference in the incidence of nausea between patients who received only acupressure, and patients who received only metoclopramide ( $p > .05$ ). However, acupressure was not as effective as metoclopramide in controlling episodes of vomiting ( $p = .23$ ). Stein et al. (1997) concluded that pressure applied to the P6 acupoint was as effective as giving the patient metoclopramide 10 mg. intravenously to prevent intraoperative nausea during spinal anesthesia. A study done by Fan et al. (1997) further attested to these findings. Lynas, Chestnutt, Dundee, and Ghaly (1986) found similar results in their study on the effectiveness of acupuncture on the P6 acupoint in preventing emesis in 50 women who were medicated preoperatively with nalbuphine. They reported that the group who received acupuncture at the P6 acupoint had consistently less N&V than those who received a sham acupuncture intervention (Dundee, Ghaly & Lynas, 1987).

Findings from a study by Ho, Hseu, Tsai, and Lee (1996) provided additional corroboration. They examined the effect of P6 acupressure on the prevention of N&V in 60 parturients who were given epidural morphine for post-cesarean section pain relief. The incidence of nausea was 3% in the acupressure group versus 43% in the control group ( $p < .05$ ). The incidence of vomiting was 0% in the acupressure group, and 27% in the control group ( $p < .05$ ).

Studies done by Dundee, Ghaly, Fitzpatrick, Lynch and Abram (1987) and Dundee, Ghaly, Lynch, Fitzpatrick and Abram (1989) used P6 electroacupuncture on 10 patients who were receiving cisplatin. They found that the acupuncture group had a significant decrease in vomiting compared to the group that received acupuncture to a dummy point.

In a similar study, Dundee, Ghaly and Fitzpatrick (1987) obtained similar findings.

Likewise, Dibble et al., (2000) who did a pilot study using finger acupressure to manage chemotherapy-induced nausea in women diagnosed with breast cancer stated a significant difference in both the nausea experience ( $p < .01$ ) and nausea intensity ( $p < .04$ ).

Although Price, Lewith, and Williams (1991) also found that acupressure is effective for patients receiving chemotherapy, other studies clearly indicated that acupressure alone is ineffective in decreasing N&V induced by cisplatin-like drugs (Dundee, Yang, & McMillan, 1991).

Another study by Brown, North, Marvel and Fons (1992) found that acupressure wristbands were not effective in relieving N&V in hospice patients. However, only six subjects were enrolled in the study, one of whom died early in the data collection phase. Likewise, a study done by Bruce et al. (1990) showed that acupressure bands were not effective in reducing or preventing motion-induced N&V. Subjects were exposed to a motion-challenge test in which they rotated on a vertical axis with increasing speeds up to 28 rpm for 31 minutes. Two possible explanations for this failure are that the nauseogenic stimulus was too extreme, and that there was inadequate movement of the upper extremities to maintain satisfactory pressure to the acupoints. However, other studies showed that acupressure was capable of reducing N&V in patients who were anesthetized and whose wrists did not move. I suspect that the neuropeptides released by acupressure were not specific for the neurotransmitter receptor that was responsible for the motion-induced N&V. Dundee and McMillan (1991) corroborated this finding by showing acupressure not to be helpful for motion sickness. Possible explanations for contradictory findings in acupuncture and acupressure studies are methodological

inconsistencies such as timing of the intervention, technique, length of study, and validity of the controls (Petry, 2000).

#### G. History of Management of Chemotherapy-Induced Nausea, Vomiting, and Retching

The perception and treatment of chemotherapy-induced N&V, especially by the professional health community has drastically changed over the last three decades. In the 1970s, the consensus among medical professionals was that N&V associated with chemotherapy was an inevitable, but minor problem or inconvenience in exchange for a possible cure. In addition, many health care providers were not convinced that the antiemetics available at that time, such as metoclopramide, corticosteroids, prochlorperazine, and haloperidol, were effective or beneficial for this problem. Consequently, oncologists did not routinely consider the use of antiemetics in the treatment protocol, and, consequently, approximately 75% of the patients routinely endured severe posttreatment N&V (Martin, 1992; Yasko, 1985).

When the highly emetogenic cisplatin was introduced in the early 1980s, it was the first drug to cause such severe vomiting, and studies on chemotherapy-induced N&V greatly increased (Martin, 1992). Gradually, the combined use of high dosages of metoclopramide with dexamethasone was employed to produce a complete control rate of 66% for patients receiving cisplatin on the day of infusion (Kris, Gralla, Tyson, et al., 1985).

In the latter half of the 1980s, 5-hydroxytryptamine (5-HT<sub>3</sub>) was identified as another possible cause of N&V. Consequently, new antiemetic drugs classified as highly selective Type-3-serotonin receptor antagonists (5-HT<sub>3</sub>) were developed, and discovered to be 50-70% effective in the control of emesis, with minimal adverse effects. Examples



of Type-3-serotonin antagonists are ondansetron (Zofran, Glaxo Wellcome), granisetron (Kytril, SmithKline Beecham Pharmaceuticals), and tropisetron and dolasetron (Abbott Laboratories, 1999; Perez, 1995). These developments led researchers to rethink the possibility of using the older drugs in higher dosages to achieve improved results, and to introduce the prophylactic employment of the 5-HT<sub>3</sub> antagonists and other antiemetics (Martin, 1992). Currently, all of these measures have greatly improved the control of N&V (Fessele, 1996).

#### H. Pathophysiology of Nausea, Vomiting, and Retching

The vomiting center, located in the dorsal lateral reticular formation adjacent to the medulla, plays an integral role in the development of N&V. Vomiting occurs when the vomiting center receives information from several identified areas: cerebral cortex, vestibulocerebellar afferents, pharynx, vagal visceral afferents, spinal visceral afferents, and the chemoreceptor trigger zone (CTZ), which is situated in the fourth ventricle (Abbot, 1999; Button, 1990; Eyre & Ward, 1984; Grunberg & Hesketh, 1993; Wickham, 1989). Due to its location, the CTZ is exposed to circulating blood and cerebrospinal fluid allowing it also to detect nauseogenic substances in both body fluids. The CTZ can also precipitate N&V via stimulation of its dopamine receptor sites.

Researchers have identified several neurotransmitter receptors in the brain and gastrointestinal tract that are responsible for N&V. These receptors are dopamine, histamine, acetylcholine, serotonin, norepinephrine, prostaglandins, and glutamine (Hogan & Grant, 1997; Rhodes, 1990, Rhodes, Johnson, & McDaniel, 1995). Serotonin (5-hydroxytryptamine [5-HT]) receptors are sub-categorized into four types, numbered 1 through 4. The third one, often referred to as a 5-HT<sub>3</sub> receptor, causes vomiting. This

particular type of receptor is abundantly found in the central and peripheral nervous systems, terminal nerve endings of the vagus nerve, and in the afferent enterochromaffin cells that line the gastrointestinal tract, especially in the duodenal mucosa (Cunningham, 1997; Rhodes, Johnson, & McDaniel, 1995).

Cubeddu (1992) proposed that the emetogenicity of two of the most powerful antineoplastics, cisplatin and cyclophosphamide-based agents, is primarily due to elevated serotonin plasma levels, which most often occur within the first 24 hours after chemotherapy administration. He theorized that these drugs directly stimulate the gastrointestinal mucosa to release serotonin, and discovered that the initiation, peak, and duration of N&V associated with the chemotherapy correspond to the rise and fall of plasma serotonin. For example, in patients receiving high dose cisplatin without antiemetic protection, severe vomiting would begin approximately two to three hours after chemotherapy, with an average of 10 to 12 occurrences over a period of approximately eight hours. In contrast, cyclophosphamide-based agents produced a milder type of N&V that would generally begin between 9 and 12 hours after chemotherapy, and would last 12 to 24 hours (Cubeddu, 1992; Fetting, Wilcox, Iwata, Criswell, & Bosmajian, 1983; Laszlo, Gralla, Einhorn, & Wampler, 1983).

After the serotonin is released, it binds to the terminal endings of the vagal afferent 5-HT<sub>3</sub> receptors in the gastrointestinal tract, which transmits impulses to the chemoreceptor trigger zone in the brain, which signals the vomiting center. The vomiting center in turn sends the message to the Cranial Nerves VIII and X, which initiates vomiting (Cunningham, 1997).

It is theorized that chemotherapy-induced N&V is due to more than one emetogenic mechanism. For instance, the stimulation of the cerebral cortex by one's senses such as sights, sounds, smells, and memories, which in turn activates the vomiting center, may explain the development of anticipatory N&V (Neese, Carli, Curtis & Kleinman, 1980). Other mechanisms responsible for chemotherapy-induced N&V are vagal-visceral stimulation secondary to delayed gastric emptying and gastrointestinal distension (Wickham, 1989). Harris (1982) proposed that chemotherapy-induced N&V may be caused by the inability of certain enzymes to break down specific neurotransmitters in the brain. It is believed that stimulation of the vestibulocellular system plays a minor role in chemotherapy-induced N&V, but is probably responsible for N&V associated with motion.

Sullivan, Leyden, and Bill (1983) theorized that long-term alcoholic exposure “burns out the chemoreceptor trigger zone.” This speculation may in part explain why a study by D’Acquisto et al. (1986) revealed that patients with a history of chronic high alcohol intake suffered significantly less nausea ( $p = .05$ ) than patients with a history of low intake of alcohol. A high intake of alcohol for this study was defined as 5 mixed drinks or ounces of hard liquor per day for several years. Even though individuals with a history of chronic high alcohol intake tended to experience milder bouts of N&V, the administration of a complete antiemetic protocol was recommended, and this usually provided excellent control of the symptoms (D’Acquisto, et al., 1986; Morrow, 1992b).

In short, since chemotherapy-induced N&V is precipitated by multiple mechanisms at different times of the chemotherapy administration cycle, certain antiemetics are correspondingly more effective at these times. It is believed that acute N&V is mostly

caused by the release of serotonin by the vagal-visceral afferents, due to damage to the enterochromaffin cells of the duodenum. Therefore, the administration of serotonin antagonists, along with prokinetic antiemetics, such as metoclopramide, are often used immediately before and during the first 24 hours after chemotherapy. It seems that delayed N&V is due to neurotransmitters other than serotonin. Recent studies show that the administration of serotonin antagonists did not decrease delayed N&V, but steroids such as dexamethasone combined with a benzodiazepine are quite beneficial (Hogan & Grant, 1997; Kris & Pisters, 1994). An understanding of the different emetogenic mechanisms explains why a combination of antiemetic medications is more successful than single drug approaches (Peroutka & Snyder, 1982).

Morrow, Angel, and Dubeshter (1992) examined autonomic changes in heart rate, blood volume, pulse, skin temperature, and pallor during chemotherapy-induced N&V. They found that while the heart rate and blood volume pulse decreased from baseline during nausea, it increased during vomiting. Pallor increased from baseline to the time of nausea, and continued to increase with vomiting. As pallor increased, skin temperature decreased. These findings corroborate with cancer patients' reports of feeling cold during the chemotherapy administration. They purport that chemotherapy-induced N&V may be due more so to a "rebound of parasympathetic activity than a slow decrease of sympathetic activity."

### I. Different Types of Nausea and Vomiting

Most studies in the literature refer to three predominant types of N&V: anticipatory, acute, and delayed. Anticipatory N&V, by definition, occurs before the administration of chemotherapy (Duigon, 1986). The onset of anticipatory vomiting commonly begins

about 11 hours before the expected treatment (Duigon, 1986). Most researchers theorize that anticipatory N&V is a learned response to a repeated association of unpleasant side effects with normally neutral environmental cues. Acute N&V, that which occurs within the first 24 hours after the administration of chemotherapy, is believed to be more related to the emetogenicity of the chemotherapeutic agent, prior experience to chemotherapy, and the implementation of an antiemetic protocol (Hogan & Grant, 1997; Lindley, Bernard, & Fields, 1989). Unfortunately, the length of time between the administration of the chemotherapy, and the first episode of emesis steadily decreases with continuing treatment (Laszlo, Gralla, Einhorn, & Wampler, 1983). Delayed N&V, by definition, occurs after 24 hours and up to seven days after chemotherapy administration, and is usually not as severe as that experienced during the first 24 hours after highly emetogenic chemotherapy such as cisplatin, cyclophosphamide, Carboplatin, and doxorubicin (Kris, Gralla, Clark, et al., 1985; Lindley, Bernard, & Fields, 1989; NCCN Proceedings, 1997). Morrow and Hickok (1993) identified a fourth type of N&V called persistent; which begins during or soon after the antineoplastic drug is administered, and continues for more than 24 hours. Retching may occur with or without nausea or vomiting, and has been defined by Morrow (1994) as a synchronized movement of the diaphragm, chest wall, and abdominal muscles.

In its 1997 proceedings, The National Comprehensive Cancer Network (NCCN) identified two additional types of emesis, breakthrough and refractory emesis. Breakthrough emesis is characterized as vomiting that occurs even though prophylactic antiemetic measures were instituted, requires a “rescue,” or both. Refractory emesis is

described as vomiting that occurs during subsequent treatments after prophylactic antiemetics and/or rescue have failed during previous treatments (NCCN, 1997).

Burish and Tope (1992) proposed that much of the N&V associated with chemotherapy may, in fact, be what they called “psychological N&V,” a type of conditioned response to the unpleasant chemotherapy experience. Based on this learning model, the patient unconsciously associates the unconditioned responses of N&V to the unconditioned stimulus of the chemotherapy with neutral environmental cues. With repeated exposures, the sights (hospital), sounds (the beep on the IV pump), smells (rubbing alcohol), tastes (recent intake of food or drink), thoughts, and touch in the chemotherapy setting would become conditioned stimuli capable of initiating N&V without the chemotherapy (Wickham, 1989; Wickham, et al., 1999). This type of learned association is seen to be primarily responsible for anticipatory N&V, and probably partially responsible for some of the acute and delayed types too (Burish & Tope, 1992; Duigon, 1986; Morrow, 1989).

It seems that at least some of the dynamics involved in anticipatory N&V are similar to the development of learned food aversions (Fallowfield, 1992; Morrow 1985). Mattes, Arnold, and Boraas (1987) discovered that approximately 55% of patients developed new food aversions for foods ingested even 48 hours prior to their first chemotherapy treatment. That is, the association window was bigger than the recommended standard time of plus or minus 24 hours of treatment. Furthermore, Mattes, Arnold, and Boraas (1987) found that even though patients who had nausea or vomiting were more likely to acquire a food aversion, 46% of the patients who developed food aversions experienced

no emetic events. The researchers also learned that nausea was not a strong predictive factor.

Pickett (1991) subdivided chemotherapy N&V into two categories, pharmacologic and conditional. Pharmacologic N&V referred to N&V caused by the inherent biochemical properties of the antineoplastic agents. Conditional N&V was synonymous with anticipatory or psychological N&V.

Studies looking at a relationship between the different phases of the menstrual cycle and the incidence of N&V after surgery provided contradictory findings. Honkavaara, Lehtinen, Horvorka and Korttila (1991) and Honkavaara, Pyykko, and Rutanen (1996) found that the incidence of N&V was greater for women who had surgery during their periovulatory phase (menstrual days 11-24), than for women who had surgery during the perimenstrual period (menstrual days 25-10). In contrast, Beattie et al. (1991, 1993) reported that postoperative N&V occurred more frequently if the woman had surgery during menstruation and the first 8 days of her cycle. It is surprising that there are no studies that examine the relationship between the frequency, intensity, or duration of chemotherapy-induced N&V and the phase of a woman's menstrual cycle during which chemotherapy is administered.

Some researchers are looking at the effect of circadian rhythms on the emetogenic potential of chemotherapy. Hrushesky's (1983) found that the frequency and severity of chemotherapy-induced vomiting was less severe when the same dose of chemotherapy was administered at 6:00 PM, than chemotherapy that was administered at 6:00 AM. A similar study suggested that the time of the chemotherapy was administered may be a

more important factor on chemotherapy-induced vomiting than the time that the antiemetic medication was administered (Roemeling, Christiansen & Hrushesky, 1985).

#### J. Incidence of Chemotherapy-Induced Nausea and Vomiting

Morrow and Hickok (1993) estimated that, even with antiemetic protection, 60% of patients would develop nausea, and 50% would experience vomiting after receiving antineoplastic agents. Similarly, other studies found that, even with the administration of antiemetic standards, which typically include dexamethasone combined with a 5-HT<sub>3</sub> receptor antagonist to control acute emesis, and dexamethasone with either a 5-HT<sub>3</sub> receptor antagonist or metoclopramide to control delayed emesis, up to 33% of patients experienced emesis in the first 24 hours after high-dose cisplatin (Antiemetic Subcommittee of the Multinational Association of Supportive Care in Cancer, 1998; Hesketh, 1994; Kris, et al., 1996), and that 50% of patients still suffered delayed emesis (Morrow, Asbury, et al., 1992; Tavorath & Hesketh, 1996).

Multiple factors such as the emetogenicity of the drug therapy, gender, previous experience with chemotherapy, the patient's history of nausea, and the patient's history of alcohol intake greatly influenced the incidence rate for chemotherapy-induced N&V (Hesketh, 1999). The literature supplied a range of estimations for these phenomena. For example, by the fourth chemotherapy session, approximately 33% of patients would develop anticipatory nausea, and 10% would endure anticipatory vomiting (Morrow & Hickok, 1993; Redd, 1981). Furthermore, antiemetic drugs were not an effective treatment for the one in three cancer patients on chemotherapy who experience anticipatory nausea and vomiting (Morrow, Asbury, et al., 1992). Wickham (1989)



provided similar findings. She reported that anticipatory emesis would occur in 25-67% of patients within four treatments.

Even though most of the literature suggested that anticipatory N&V is a psychologically induced event, many studies clearly stated that its prevalence was significantly correlated with the incidence, intensity, and duration of postchemotherapy-associated N&V. The single most predictive factor for a patient to develop anticipatory N&V was simply experiencing severe post-treatment N&V (Burish & Tope, 1992; Morrow, 1982). Anticipatory N&V did not occur unless the patient had already experienced postchemotherapy N&V (Chin, Kucuk, Peterson, and Ezdinli, 1992; Morrow, 1982; Morrow, 1989; Morrow, Lindke, & Black, 1991; Nerenz, Levanthal, Easterling, & Love, 1986). Therefore, it is important that every measure be used to prevent N&V with the very first treatment in order to prevent or minimize the development of anticipatory N&V.

Being anxious, depressed, less than 50 years of age, and female are additional strong factors in the development of chemotherapy-induced N&V (Rhodes, Watson, & Johnson, 1986; Zook & Yasko, 1983). Other possible predictive peculiarities associated with anticipatory N&V were developing strong taste sensations during the administration of the chemotherapy (Morrow, 1982; Nerenz, Levanthal, & Easterling, 1986; Wickham, et al., 1999), receiving treatment in the presence of other patients (Van Komen & Redd, 1985), perspiring, feeling dizzy or lightheaded, or experiencing an intense, pervasive warmth after treatment (Chin, et al., 1992; Morrow, 1992a), and enduring postchemotherapy N&V that occurs later than usual (Chin, et al., 1992; Morrow, 1982).

While the intrinsic emetogenic potential of the chemotherapeutic agent is considered the primary predictive factor for chemotherapy-induced N&V, other aspects of the treatment regimen can increase the risk of emesis. Intravenous solutions containing the chemotherapy agents which are infused in a shorter period of time tend to provoke more emesis than prolonged infusions or chemotherapy administration via the oral route (Hesketh, 1999).

#### K. Emetic Potential of Commonly Used Chemotherapy Agents

The most predictive factor for chemotherapy-induced N&V is the intrinsic emetogenic strength of the drugs (Hesketh, et al., 1997; Hesketh, 1999). Different chemotherapeutic agents can produce a wide variation of side effects, ranging from mild to severe N&V. For example, drugs such as cisplatin, dacarbazine, mechlorethamine, and streptozotocin are known to consistently precipitate more severe N&V than others (Olver, 1992a). In fact, Lindley and Hirsch (1992) stated that cisplatin is the most emetogenic agent, and is the standard by which antiemetic regimens are evaluated. In light of this, it is important that studies on the effectiveness of antiemetic protocols compare groups in which the patients receive chemotherapy agents with a comparable potential for causing N&V.

Lindley, Bernard, and Fields (1989) developed the first classification system to standardize the emetogenicity potential of single antineoplastic agents at specific dosages. They established an emetogenic scale from 1, the least emetogenic, to 5, the most emetogenic. The numeric value assigned to a drug was based on the percentage of patients who vomited one or more times during the 24-hour period after the administration of the chemotherapy drug. Later in 1997, Hesketh et al., using Lindley's

early schema, submitted a similar classification system that was based on the frequency of acute N&V that occurred within a 24-hour period after chemotherapy without antiemetic prophylaxis. Hesketh et al. (1997) then developed guidelines to evaluate the emetogenic impact of the other drugs in a multi-chemotherapy regimen. In 1999, these guidelines were revised (Hesketh, 1999):

1. Identify the most emetogenic agent in the multi-chemotherapy combination.
2. Determine the degree of emetogenic influence of the other chemotherapy agents using the following rules:
  - A. Level 1 agents do not alter the emetogenic potential of a prescribed protocol.
  - B. Adding one or more drugs in Level 2 raises the emetogenic potential of the combination protocol by one level greater than the most emetogenic agent in the regimen does. For example, if the emetogenic potentials of the individual drugs are 3 + 2 + 2, the combined emetogenic potential is 4.
  - C. Adding one or more drugs in Levels 3 or 4 increases the emetogenic potential of the combination protocol by one level per agent. For instance, if the emetogenic potentials of the individual agents are 3 + 3 + 3, the combined emetogenic potential is 5.

Table 1 lists the emetogenic potential of single, common chemotherapy agents in patients in absence of standard antiemetic prophylaxis (Hesketh, 1999).

Table 1

*Emetogenic Potential of Single Chemotherapy Agents* ‡

Level	Frequency of Emesis (%) *	Agent
5 – High	> 90%	Carmustine > 250 mg/m <sup>2</sup> Cisplatin ≥ 50 mg/m <sup>2</sup> Cyclophosphamide > 1,500 mg/m <sup>2</sup> Dacarbazine Methotrexate Streptozocin
4 – Moderately High	60-90%	Carboplatin Carmustine ≤ 250 mg/m <sup>2</sup> Cisplatin < 50 mg/m <sup>2</sup> Cyclophosphamide > 750 mg/m <sup>2</sup> ≤ 1,500 mg/m <sup>2</sup> Cytarabine > 1,000 mg/m <sup>2</sup> Doxorubicin > 60 mg/m <sup>2</sup> Methotrexate > 1,000 mg/m <sup>2</sup> Procarbazine (oral)
3 – Moderate	30-60%	Cyclophosphamide ≤ 750 mg/m <sup>2</sup> Cyclophosphamide (oral) Doxorubicin 20-60 mg/m <sup>2</sup> Epirubicin ≤ 90 mg/m <sup>2</sup> Hexamethylmelamine (oral) Idarubicin Ifosfamide Irinotecan Methotrexate 250 – 1,000 mg/m <sup>2</sup> Mitoxantrone < 15 mg/m <sup>2</sup>
2 – Moderately Low	10-30 %	Capecitabine Docetaxel Etoposide 5-Fluorouracil < 1,000 mg/m <sup>2</sup> Gemcitabine Methotrexate > 50 mg/m <sup>2</sup> < 250 mg/m <sup>2</sup> Mitomycin Paclitaxel Topotecan
1 – Low	< 10 %	Bleomycin Busulfan Chlorambucil (oral) 2-Chlorodeoxyadenosine Fludarabine Hydroxyurea Methotrexate ≤ 50 mg/m <sup>2</sup> L-phenylalanine mustard (oral) Thioguanine (oral) Vinblastine Vincristine Vinorelbine

‡ Proportion of patients who experience emesis in the absence of effective antiemetic prophylaxis.

From “Defining the Emetogenicity of Cancer Chemotherapy Regimens: Relevance to Clinical Practice” by P. J. Hesketh. (1999). *Oncologist*, 4(3), 191-196. Reprinted with permission. (Appendix B).

#### L. Characteristics of Patients Who Are More Likely to Experience Nausea and Vomiting

- Even though N&V in patients with cancer is frequently due to the type of chemotherapy and its administration, nausea can also be triggered by other concurrent conditions in cancer patients. These include: anxiety, fluid and electrolyte imbalances (hypercalcemia and volume depletion), gastrointestinal obstruction such as an ileus, increased intracranial pressure, peritonitis, metastasis to the brain, meninges or hepatic system, uremia, and radiation therapy especially to the abdomen (Fallowfield, 1992; Gralla, 1993; Lindley & Hirsch, 1992; Morrow & Dobkin, 1988; Redd & Andrykowski, 1982).

Other factors that place patients with cancer at higher risk for experiencing N&V independent of chemotherapy are a diagnosis of cancer of the stomach or breast, being female, and being younger than 65 years of age (Hesketh, 1999; Roila, et al., 1987). Age is inversely related to the frequency of chemotherapy-induced N&V episodes (Hesketh, 1999; McMillan, 1989; Morrow, 1992b; Osoba, et al., 1997; Pollera & Giannarelli, 1989; Tonato, Roila, & Del Favero, 1991). Similar characteristics were found in persons who were susceptible to motion sickness and postoperative nausea and vomiting and those who have expectations of being sick (Cohen, Duncan, DeBoer, & Tweed, 1994; Fallowfield, 1992; Morrow, 1984a, 1984b, 1985; Turner & Griffin, 1999). Additionally, persons who have history of allergies are at greater risk for the development of chemotherapy-induced N&V (Fallowfield, 1992).

A study by Shoji et al. (1999) indicates that the use of oral morphine will reduce the effectiveness of 5HT<sub>3</sub> receptor antagonists in patients who are receiving chemotherapy. Thus, the administration of oral morphine may also contribute to the

development of chemotherapy-induced N&V. Table 2 summarizes the predictive factors for nausea and vomiting after receiving chemotherapy. (Dodd, Onishi, Dible, & Larson, 1996; Lindley & Hirsch, 1992). Other medications that promote N&V are opiates, long-acting bronchodilators, and antibiotics (Dover, 1996; Gralla, 1993).

Morrow (1992b) questioned why women were more prone to experience N&V than men. After reviewing several studies, Morrow (1992b) found that predisposing factors for N&V were not equivalent between men and women. He discovered that women tended to consume less alcohol than men do, and more often received chemotherapy agents that precipitate debilitating N&V, such as cisplatin and cyclophosphamide.

Table 2

*Predictive Factors for Determining Which Patients Are More Likely to Experience Nausea and Vomiting after Receiving Chemotherapy*

- 
- **Chemotherapy emetogenicity** (Hesketh, et al., 1997; Heskth, 1999) (Considered the most significant factor)
  - **Presence of high trait anxiety** (Chin, et al., 1992; Fallowfield, 1992; Morrow & Dobkin, 1988; Redd & Andrykowski, 1982)
  - **History of motion sickness** (Fallowfield, 1992; Morrow, 1985)
  - **History of postoperative nausea and vomiting** (Cohen, Duncan, DeBoer, & Tweed, 1994; Morrow, 1984a, 1984b; Turner & Griffin, 1999)
  - **Expectations of being sick** (Fallowfield, 1992)
  - **Development of food aversions** (Fallowfield, 1992; Mattes, Arnold, and Boraas (1987); Morrow 1985)
  - **High incidence of allergies** (Fallowfield, 1992)
  - **Age of < 65 years for nausea, vomiting, and retching** (Dodd, Onishi, Dibble & Larson, 1996; Fallowfield, 1992)
  - **Age of < 50 years for anticipatory and delayed N&V** (Morrow, 1992a; Morrow & Dobkin, 1988; Morrow, Lindke, & Black, 1991; Tonato, Roila & Del Favero, 1991)
  - **History of chronic alcohol intake < 80-100g/day or approximately five mixed drinks per day** (D'Acquisto, et al., 1986; Sullivan, Leyden, Bill, 1983)
  - **Being female** (Hesketh, 1999; Roila, et al., 1987)
  - **Use of oral morphine or other opiates** (Shoji et al., 1999)
  - **Diagnosis of stomach cancer** (Gralla, 1993; Lindley & Hirsch, 1992)
  - **Metastasis to the brain** (Gralla, 1993; Lindley & Hirsch, 1992)
-

### M. Types of Antiemetics and Adjuncts to Antiemetics

Antiemetics work by blocking one or more of the neurotransmitter receptors in the brain that are responsible for N&V. These receptors are: dopamine, histamine, acetylcholine, serotonin, norepinephrine, glutamine, and gamma aminobutyric acid (GABA) (Button, 1990; Rhodes, 1990). Substance P, a neuropeptide, found in the gut and the Central Nervous System, has recently been identified as an emetogenic substance. It is believed that it stimulates N&V by binding to a neurokinin 1 (NK<sub>1</sub>) receptor (Hesketh, Gralla, et al., 1999).

Sedation, dystonic reactions, and dry mouth are the most common side effects of most antiemetics (Kessler, et al., 1985). Recent studies indicate that a combination of different antiemetics, each blocking a different receptor, significantly decreases the incidence and frequency of chemotherapy-induced N&V, and thus, is often more effective than a single agent (Ettinger, 1995; Goodman, 1997; Kessler, et al., 1986; Kris, et al., 1997; Peroutkra & Snyder, 1982; Pisters & Kris, 1992). Johnson, Moroney and Gay (1997) propose a treatment algorithm to assist in the choice of antiemetic therapy for various kinds of chemotherapy schedules. Delayed and persistent N&V responds well to steroids (Hogan & Grant, 1997).

After completing a thorough review of the literature, and with feedback from a panel of nationally renowned experts, the American Society of Clinical Oncology (ASCO) assembled evidence-based clinical-practice guidelines in the use of antiemetics in the management of chemotherapy- and radiation-induced N&V (Gralla, et al., 1999). The general consensus is that a serotonin antagonist is highly effective for acute N&V, but its use for delayed N&V is questionable (Kris, Pendergrass, et al., 1997; Parsad, 1998).



The ASCO classified the most common types of antiemetics according to their recommended use with specific chemotherapy agents. Table 3 provides an overview of the antiemetics by their classification with examples, by their proposed action, and by their side effects, with the addition of a new antiemetic classification, NK1 antagonist (Hesketh, Gralla, et al., 1999; Kris, Radford, et al., 1997; Navari, et al., 1999).

**Table 3**  
**Antiemetic Agents and Adjuncts**

Type/Example	Action	Side Effects/Comments
<b>Anti-Emetics</b>		
<b>Serotonin receptor antagonists</b> <b>5-HT<sub>3</sub></b> (5-hydroxytryptamine type 3) Dolasetron – Anzemet Granisetron – Kytril Ondansetron – Zofran	Blocks the effects of serotonin at 5-HT <sub>3</sub> receptor sites at vagal nerve terminals and in the chemoreceptor trigger zone (CTZ) in the brain (Button, 1990; Cunningham, 1997; Ettinger, 1995; Goodman, 1997; Pisters & Kris, 1992).	Headache, diarrhea, constipation, dry mouth, extrapyramidal reactions such as involuntary movements, facial grimacing, rigidity, shuffling walk, trembling of hands; transient increase in liver enzymes (Dover, 1996; Gralla, 1993; Rhodes, Johnson & McDaniel, 1995)
<b>Neurokinin Type 1 [NK-1] antagonists</b> CJ-11, 974	Blocks the binding of Substance P to neurokinin 1 neuroreceptors (Hesketh, Gralla, et al., 1999; Kris, et al., 1997; Navari, et al., 1999).	Taste perversion, dizziness, pharyngitis, tinnitus
<b>Butyrophenones</b> Haloperidol – Haldol Droperidol – Inapsine	Blocks dopamine receptors in the CTZ.	Dystonia, pseudo-parkinsonism, akathisia, drowsiness, dry mouth, constipation, hypotension, anemia, urinary retention, blurred vision (Brown, North, Marvel, & Fons, 1992) (Dystonic reactions associated with dopamine antagonists are more prevalent with decreasing age, Morrow, 1992b)
<b>Phenothiazines</b> Prochlorperazine – Compazine Promethazine – Phenergan	Blocks dopamine receptors in the CTZ.	Akathisia, postural hypotension, extra pyramidal signs, drowsiness, dry mouth, constipation, hypotension, anemia, urinary retention, blurred vision (Brown, North, Marvel, & Fons, 1992; Seigel & Longo, 1981)
<b>Cannabinoids</b> Dronabinol – Marinol	Blocks dopamine receptors in CTZ; blocks opiate receptors in the chemoreceptor trigger zone in the brain.	Drowsiness, heightened awareness, dizziness, concentration difficulty, perceptual difficulty, coordination impairment, hypotension and tachycardia; anxiety and paranoia in older adults; greater response in younger patients and patients without prior exposure to chemotherapy or marijuana (Laszlo, et al., 1983)
<b>Adjuncts</b>		
<b>Corticosteroids</b> Dexamethasone – Decadron	Inhibits prostaglandin synthesis in glial cells.	Hyperglycemia, hypertension, decreased wound healing, petechiae, ecchymosis, fragility hirsutism, acne, adrenal suppression, muscle wasting, osteoporosis, cushingoid appearance
<b>Minor Tranquilizer and Anti-anxiety Agents</b> Lorazepam – Ativan	Depresses the CNS by potentiating gamma-aminobutyric acid (GABA) to promote amnesia and reduce recall of experience (Grunberg & Hesketh, 1992; Wickham, 1989).	Dizziness, drowsiness, amnesia, lethargy, psychological & physical dependence
<b>Antihistamines</b> Diphenhydramine – Benadryl [used to counteract extra pyramidal signs of other drugs]	Antagonizes the effects of histamine such as increased GI secretions.	Drowsiness, dry mouth, anorexia, constipation
<b>Benzamides</b> Metoclopramide – Reglan Trimethobenzamide – Tigan	Blocks dopamine receptors in CTZ; stimulates motility of upper GI tract thus increasing gastric emptying and small bowel transit time; with high doses acts as serotonin antagonist on the GI mucosa.	Restlessness, drowsiness, fatigue, extrapyramidal reactions, dry mouth, constipation

#### N. Different Types of Commercially Available Acupressure Bands

There are several different types of acupressure bands that can be bought over the counter without a prescription by the interested consumer. Most of the bands are similar in that they are designed to apply continuous pressure to the P6 acupoint on the inside wrist with a blunted button or nipple-like device. The most cited brands in the literature are AcuBands™, BioBands™, and SeaBands™. AcuBands™ have adjustable straps that fasten with Velcro and are available from Lifestyle Enterprises, Inc., [REDACTED], Little Silver, NJ, or from Marine Products at <http://www.marineproducts.com.au/Default.asp>. BioBands are not elasticized but are adjustable with a Velcro mechanism. They contain a small bead that is sewn inside the band. They are distributed by BioBands Distributors, Inc., [REDACTED] New York, NY 10010. Resembling sweat bands, SeaBands™ are closed elasticized bands covered with a soft material, and a small protruding plastic nipple. SeaBands™ are manufactured by Sea Band UK Ltd., Leicestershire, UK, and are available from Kinakin International Holdings, Inc., [REDACTED] [REDACTED] Bellingham, WA 98226 or LandFall Navigation (e-mail: [REDACTED]). Their web page advertises that the British Royal Fleet Auxiliary uses the Sea Band.

The history of the development of the bands is interesting. Originally, they were called Choy straps, after the person who initially conceived the idea of using a band to exert continuous pressure to the P6 area. Dr. Choy created a strap to apply to the P6 acupoint to manage the nausea of seasickness so he could use both hands to steer his boat while he competed in the Newport-Bermuda boat race in 1980 (Choy, 1982; Dundee & McMillan, 1991).

Differences among acupuncture bands in construction, directions for use, and cost are summarized in Table 4. In addition, a band that delivers a low voltage electrical current via a battery, similar to transcutaneous electrical nerve stimulation (TENS), is included in the table.

**Table 4**  
*Commercial Acupressure Wrist Bands*

Company	Construction	Directions for Use Citations	Cost
<b>Acuband</b> 1-800- <a href="http://ahn.com/Com/Products/AcuBan/AcuBand.htm">http://ahn.com/Com/Products/AcuBan/AcuBand.htm</a>	Uses hook and loop strap with a disc	Wear on both wrists; center the disc over P6.	\$14.94 for 2 pairs
<b>BioBands</b> 1-800- <a href="http://www.biobands.com">www.biobands.com</a>	Developed by Robert Giarrantano, MD; sturdy hook & loop closure with Velcro strap to adjust pressure on P6	Wear on one wrist only; apply built-in bead to P6 point.	Order via web. \$10.95 each; \$3.95 S&H for first band; \$1.00 for each additional band
<b>Motion Relief Bands</b> <a href="http://www.aunlimit.com/fx010028.htm">www.aunlimit.com/fx010028.htm</a>	Not provided	Not provided	Two bands for \$7.95
<b>Relief Bands</b> Maven Laboratories, Inc 6560 Greenback Lane, Suite 300 Citrus Hts, CA 95621 Aeromedix.com	TENS unit inside a watch-like band worn on one wrist only	Wear on inside of wrist; contraindicated with cardiac pacemaker.	Price varies for 2 kinds: Disposable and Reusable Disposable 144 hr. device: \$74.99; 79.89; 97.95 Reusable: \$189.95
<b>Sea-Bands</b> Leicestershire, England <a href="http://www.Viaweb.com/landfallnav/-sms01.html">www.Viaweb.com/landfallnav/-sms01.html</a>	Band is applied on right wrist first, then the other to the left wrist according to Yin-and-Yang principles. Additional pressure to the button with episodes of increased nausea and/or vomiting is encouraged (Stainton & Neff, 1994)	Center the plastic button on each wrist at P6 acupoint. Barsoum, Perry & Fraser, 1990 Bill & Dundee, 1988. Bruce, Golding, Hockenhull, & Pethybridge, 1990 deAloysio & Penacchioni, 1992 Dundee, Ghaly, Lynch, et. al. 1989 Dundee, Sourial, Gahly, & Bell, 1988 Dundee, Yang, & McMillan, 1991 Ho, Hseu, Tsai, & Lee, 1996 Hyde, 1989 Price, Lewith, & Williams, 1991 Rogers, 1990. Stainton & Neff, 1994 Stannard, 1989 Stone, 1993	\$9.95 a pair

## O. Ancillary Interventions to Enhance Antiemetic Protocol

There are several measures that the patient and family can do to maximize the effectiveness of the antiemetics in order to decrease or eliminate N&V associated with chemotherapy:

- Use prophylactic antiemetics and continue to use them for 72 hours after treatment (Peters, 1989).
- Avoid consumption of favorite foods 48 hours before chemotherapy and 72 hours after chemotherapy to minimize the development of a conditioned aversion to them (Mattes, Arnold, & Boraas, 1987).
- Avoid caffeine, highly aromatic, spicy foods, as well as greasy, gas-forming foods, and rich, fatty foods 24 hours before chemotherapy and 72 hours after chemotherapy (Pervan, 1990; Peters, 1989).
- Do not force food or drink if the patient is nauseated.
- Avoid food preparation to decrease exposure to the sights, sounds, and odors associated with food.
- Eat small meals more frequently throughout the day versus three meals a day, to prevent feelings of being overly full or hungry (Weber, 1995).
- Avoid large amounts of fluid with meals; drink 15 minutes before the meal to prevent gastric distension.
- Eat food at room temperature or colder to minimize odors (Wickham, 1989).

- Eat colorless foods such as vanilla ice cream, cottage cheese, apple sauce, plain baked potato, white rice, and toast (Menashian, Flam, Douglas-Paxton, & Raymond, 1992).
- If nausea bothers the patient, he or she should eat saltine crackers, pretzels, gelatin desserts, popsicles, broth, nondiet ginger ale, or sugared decaffeinated or herbal teas, such as ginger, spearmint, peppermint, raspberry, or chamomile.

Assessment of the patient's and family's knowledge of chemotherapy and their expectations by the nurse may be another way to help decrease the incidence of chemotherapy-induced N&V. Rhodes, Watson, et al. (1995) reported that patients' expectations of symptom experience corresponded with their expectations of the distress that the symptom would cause.

#### P. Summary

Even with the use of a prophylactic antiemetic protocol, approximately half of all patients who received moderately to strongly emetogenic chemotherapeutic agents experienced acute N&V (Lindley & Hirsch, 1992; Martin, 1992). Only one study looked at retching as a separate phenomenon in patients receiving chemotherapy (Dodd, Onishi, Dibble & Larson, 1996). It is estimated that the failure rate for 5-HT<sub>3</sub> receptor antagonists to control acute emesis precipitated by the administration of cisplatin is approximately 20% (Shoji et al., 1999). In addition, most patients who received cisplatin experienced delayed emesis approximately 2 to 7 days after treatment despite the use of 5-HT<sub>3</sub> receptor antagonists (Shoji et al., 1999).

Recent research studies reported that the prevalence rate for anticipatory N&V in patients receiving chemotherapy for cancer ranged from 18.3% to 31%. Patients who experienced anticipatory N&V tended to have post-treatment N&V as well (Boakes,

Tarrier, Barnes & Tattersall, 1993; Craig & Powell, 1987; Fetting, et al., 1983; Nicholas, 1982). Current antiemetics are more effective at controlling vomiting than nausea, which, however, can be well managed with acupressure (Dundee and McMillan, 1990; Vickers, 1996).

Martha Rogers' nursing theory on the individual as an energy field that relates, interacts, and reacts to other energy fields in the environment provides the conceptual framework upon which this study was based. Her belief that energy fields are open systems that are in continuous interaction with other energy fields, capable of modifying one another, supports the underlying concept of acupressure bands. Using an acupressure band to continuously apply pressure to specific acupoints to minimize NVR associated with chemotherapy is non-invasive with no known adverse effects when used properly, inexpensive, and supportive of the patient by providing some sense of control of the situation.



### III. METHODS

#### A. Design

This study was a randomized, single blind, control-experimental group, repeated measures design. The experimental group received a treatment acupuncture band while the control group received a placebo acupuncture band. After the patient agreed to participate in the study and completed the preliminary instruments, the patient was then randomly assigned to either the treatment or control group using a table of random numbers (Olver, Simon, & Aisner, 1986; Polit & Hungler, 1995; Rosner, 1995). The respective acupuncture bands were stored in pre-assigned, sealed envelopes labeled with the appropriate coded numbers.

Recruitment of patients into the study and the actual collection of the preliminary data, such as demographic data, medical information, Beck's Anxiety Inventory, Beck's Depression Inventory, Rhodes Index of Nausea, Vomiting and Retching, and the initial entry into the Home Log was completed before the patient was randomly assigned to either the treatment group or control group. Research assistants were given detailed instructions on the collection data procedure.

The flowchart in Figure 2 illustrates the sequence of events for the study.

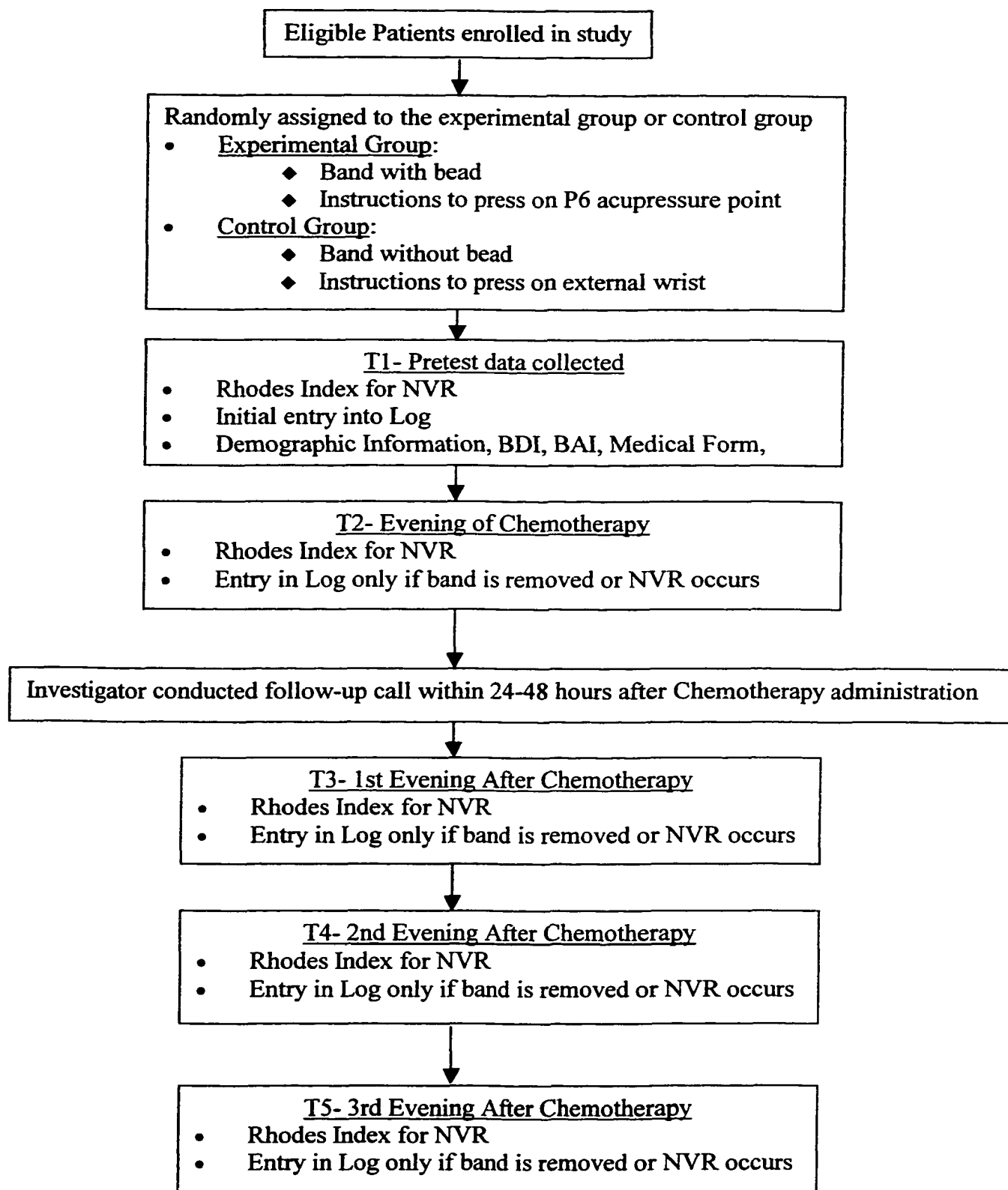


Figure 2. *Randomized, Treatment and No Treatment Control, Repeated Measures Design*

### B. Setting

The study was conducted in the out-patient oncology clinics affiliated with the private practice of two oncologists and in a women's cancer center in a large northeastern, metropolitan city.

### C. Sample

Twenty-five patients were randomly assigned to either the experimental group or the control group. Inclusion criteria for participation in the study were that patients

- be men or women who are 18 years of age or older
- have a histologically proven diagnosis such as breast cancer, lung cancer, or bladder cancer who tend to receive highly emetogenic chemotherapies
- understand, speak, and read English
- be chemotherapy-naïve
- receive chemotherapy drugs with an emetogenic potential of "4" or "5" according to Hesketh's classification system (Table 5) (There were no restrictions or attempts to standardize the chemotherapy agents or antiemetic regimen prescribed for the patients Lindley, Bernard, & Fields, 1989.)
- agree to participate in the study

Exclusion parameters for the study were that patients

- have used acupressure or acupuncture
- not be able to wear an acupressure band, because of, for example, the presence of bilateral lymphodema, generalized peripheral edema, or the lack of an arm
- have a sensory deficit affecting both arms, such as paralysis

- have an expected survival span of less than 4 months as determined by their oncologist or primary physician
- experience concomitant non-chemotherapy-induced emesis due to other conditions such as documented hypercalcemia, hyponatremia, hypokalemia, uremia, brain metastasis, bowel obstruction, ileus, or vestibular problem
- experience concomitant non-chemotherapy-induced emesis due to other concurrent treatments such as radiation therapy
- be diagnosed with cancer of the stomach or metastasis to the brain
- be diagnosed with AIDS, insulin-dependent diabetes or known psychoses (Baines, 1988; Hanna, 1997; Hogan, 1990)
- be receiving continuous infusion treatments (Lindley, Bernard, & Fields, 1989)

#### D. Instruments

Six data collecting instruments were used in the pretreatment phase of the study. These included a Demographic Questionnaire, a Medical Information Questionnaire, Beck's Anxiety Inventory, Beck's Depression Inventory, Rhodes Index of Nausea, Vomiting and Retching, and an initial entry into the Home Log. During the intra-treatment phase of the study, which lasted for seventy-two hours after the day of the administration of the chemotherapy, each patient completed the Rhodes Index of Nausea, Vomiting, and Retching, along with a formatted Home Log.

##### 1. Demographic Questionnaire

A demographic questionnaire, designed by the investigator was used in the pretreatment phase of the study to access specific characteristics of the subjects, such as

the patient's age, education level, occupation, dominant hand, allergies, previous experience with acupuncture, type of cancer, date of cancer diagnosis, and the number of chemotherapy cycles prescribed (Appendix C). Martin (1992) stated that 15-20% of patients who attained a large degree of control of emesis during the first course of a chemotherapy session, seldom maintained it. Patients who had previously received chemotherapy and had experienced severe N&V tended to become more refractory to antiemetics in subsequent courses (Martin, 1992; Olver, 1992b). This questionnaire included questions to assess each patient's history of alcohol use, as well as the history of N&V associated with pregnancy, travel, and anesthesia. All of these factors are highly correlated with chemotherapy-induced N&V (Morrow, 1992b).

## 2. Medical Information Questionnaire

The professional health care provider who administered the chemotherapy medications to each patient was asked to complete the Medical Information Questionnaire (Appendix D). It requested information on current chemotherapy agents and dosages, current antiemetic regimen and dosages, chronic medications and dosages, and episodic medications and dosages. It was necessary to access information on these medications in order to determine intervening variables. For instance, opioid-based pain medications notoriously induce N&V. In addition, a study by Shoji et al. (1999) showed that morphine can decrease the effectiveness of 5-HT<sub>3</sub> receptor antagonists in patients receiving chemotherapy that includes cisplatin.

It was also important to assess each patient's prescription for prophylactic antiemetic use at home, which can diminish the predicted N&V due to the chemotherapy. In addition, the side effects commonly associated with most antiemetics, such as

sedation, mood alteration, disorientation, and memory impairment, can affect self-reports (McMillan & Dundee, 1990; Morrow, 1992a).

### 3. Beck's Anxiety Inventory

Each patient was asked to complete the Beck's Anxiety Inventory (Appendix E) to assess for anxiety, because anxiety has been shown to be a major predictive factor in posttreatment N&V (Soukop, 1992). This inventory is a 5-minute self-administered tool that contains 21 statements that describe signs and symptoms normally associated with anxiety. Patients rated their anxiety on a scale ranging from 0 to 3. The reading level for this tool is not available. Each patient was asked to "indicate how much [he or she has] been bothered by each symptom during the past week" (Beck & Steer, 1993). If a patient was unable to use a pencil, directions for the oral administration of the test were used. Based on the results of the inventory, each patient was assigned to one of four categories: minimal level of anxiety (0-7), mild anxiety (8-15), moderate anxiety (16-25), or severe anxiety (26-63) (Beck & Steer, 1993).

Internal consistency reliability for the Beck's Anxiety Inventory is .92,  $p < .001$  based on Cronbach coefficient alpha. Test-retest reliability over one week is .75,  $p < .001$  (Beck, Epstein, Brown, & Steer, 1988). The inventory has high concurrent validity. Correlations with other recognized measures of anxiety, such as the Cognition Check List (CCL-Anxiety), Hamilton Anxiety Rating Scale - Revised, and the State-Trait Anxiety Inventory (STAI) range from .47 to .58,  $p < .001$  (Beck, Epstein et al., 1988; Beck & Steer, 1993). Many of the signs and symptoms of anxiety are related to the signs and symptoms of depression. Beck's Anxiety Inventory has high construct validity supported

by a  $r = .48$ ,  $p < .001$  correlation with Beck's Depression Inventory (Beck, Epstein, et al., 1988; Steer, et al., 1998).

#### 4. Beck's Depression Inventory

Beck's Depression Inventory was used to determine the severity of a depressive episode (Appendix F). The literature review reveals that depression is common in patients who experience postchemotherapy N&V. The inventory is a 5-minute self-administered tool that contains 21 statements that describe signs and symptoms normally associated with depression, which the patient rates on a scale ranging from 0 to 3. Even though this tool was originally developed to measure the severity of depression in psychiatrically diagnosed patients, Beck and Steer (1987) acknowledged that this instrument is commonly used as a screening tool to detect the presence of a depressive episode in normal adolescent and adult populations. The approximate reading level is at the fifth grade level (Kramer & Conoley, 1992).

Each patient was asked to "indicate how he or she has been bothered by each symptom during the past week, including today." If the patient responded with more than one option for any item, the higher value was calculated into the total score. After a final score was obtained by summing up the items, each patient was assigned to one of four categories: within normal range (0-9), mild-moderate depression (10-18), moderate-severe depression (19-29), or extremely severe depression ( $\geq 30$ ). Test-retest reliability for the Revised Beck's Depression Inventory ranges from .60 to .90 for non psychiatric samples, and from .48 to .86 for psychiatric patients (Beck & Steer, 1987; Beck, Steer, & Garbin, 1988). Evidence for construct and concurrent validity is strong in that there is a high correlation of the Revised Beck's Depression Inventory with the Hamilton

Psychiatric Rating Scale for Depression. In addition, the Beck's Depression Inventory is significantly related to the Symptom Check List (SCL-90-R), Depression Dejection Scale, and the Minnesota Multiphasic Personality Inventory (MMPI),  $p < .001$  (Beck, Steer, & Garbin, 1988).

5. Rhodes Index of Nausea, Vomiting, and Retching

Rhodes Index of Nausea, Vomiting, and Retching (Appendix G) was used to measure NVR at five different times: immediately before the administration of the chemotherapy, the evening of the day of chemotherapy, and then 24 hours, 48 hours, and 72 hours after the chemotherapy administration. This is an eight-item, five-point Likert-type, self-report instrument that measures the patient's perceived duration of nausea, frequency of nausea, distress from nausea, frequency of vomiting, amount of vomiting, distress from vomiting, frequency of dry heaves, and distress from dry heaves. The patient rates each item on a scale ranging from 0 to 4 (Rhodes, 1990, 1997; Rhodes & McDaniel, 1999; Rhodes, McDaniel, Simms, & Johnson, 1995).

In her review of available instruments to measure nausea and vomiting, Cotanch (1984) states that the Rhodes Index has been compared with an adapted version of McCorkel and Young Symptom Distress scale (ASDS). Rhodes reported the reliability of the Rhodes Index of Nausea, Vomiting, and Retching using the split-half correlation, to be .90; Cronbach's alpha, .98, and its concurrent validity (Spearman's correlation coefficient), .87 (Rhodes & McDaniel, 1999; Rhodes, Watson, & Johnson, 1983, 1984, 1985, 1986). Dr. Verna Rhodes provided permission to use her instrument for this study (Appendix H).



The patient was asked to complete the form before receiving the chemotherapy. Following the chemotherapy, the patient was instructed to complete the form each evening, for the next four evenings at approximately the same time beginning with the day of chemotherapy.

6. Home Log

The Home Log is a structured matrix in which the column headings provide short and clear directions for the patient or significant other to make entries (Appendix I). The Rhodes Index of Nausea, Vomiting, and Retching, which is completed at the end of the day, relies on the patient's memory. For the Home Log, each patient was instructed to record and evaluate every episode of NVR for three days after the day of chemotherapy, and then to mail the log to the investigator in a stamped, self-addressed envelope. The first entry was completed on the day of chemotherapy before the treatment began, to obtain a baseline, and to assess for possible anticipatory nausea or vomiting (Lindley, Bernard, and Fields, 1989). The patient then entered each consequent episode of nausea or vomiting as a separate event for 72 hours after the day of chemotherapy, as well as recorded the severity of the nausea or vomiting, and described the patient's strategy for managing the distress (Roila, et al., 1987).

The patient was also instructed to record any periods of time in which the acupressure band was removed for five minutes or longer. Patients in the treatment group received a home log with the additional instructions to press on the rectangular area of the acupressure band that contained the bead and was placed on the authentic P6 acupoint for 5 minutes if they begin to experience nausea, vomiting, or both (Appendix I). Patients in the control group received a home log with instructions to press on the

acupressure band on the posterior aspect of the wrist or the ulna bone for 5 minutes if they begin to experience nausea, vomiting, or both (Appendix J).

#### E. Treatments

There were two treatment groups: Experimental and Control.

##### Experimental Group.

After completing the Demographic Form, Beck's Anxiety Inventory, Beck's Depression Inventory, and Rhodes Index of Nausea, Vomiting, and Retching, patients in the experimental group were instructed to place the acupressure band on the P6 acupressure point of the dominant hand, which has been identified in the literature as an effective point in the management of N&V, before receiving chemotherapy (Dundee, Fitzpatrick, Ghaly, & Patterson, 1988; Fitzpatrick, Dundee, Ghaly & Patterson, 1988; Ulett, Han, & Han, 1998a). However, a different study suggests that there is no clinically significant difference in using the dominant versus the non-dominant hand in antiemesis studies using acupuncture (Fitzpatrick, Dundee, Ghaly & Patterson, 1988). The dominant hand was defined in this study as the hand that the patient used to write. In the event that a patient was ambidextrous, the plan was to ask the patient to look through a hole in a 3 X 5 index card. Whatever eye the patient would have selected to use to peer through the hole would have been considered the dominant side. However, no patients were regarded ambidextrous, and this plan was not used.

##### Control Group.

After completing the Demographic Form, Beck's Anxiety Inventory, Beck's Depression Inventory, and Rhodes Index of Nausea, Vomiting, and Retching, patients in

the control group were given instructions to place a placebo acupressure band on the P6 acupressure point of the dominant hand, at least 30 minutes before receiving chemotherapy. This acupressure band was a placebo because it did not have a bead sewn into the band.

Establishing a control group for acupressure studies is sometimes quite challenging. For instance, it is sometimes difficult to ensure that the patients, family members, or the health care providers are “blinded” to the research protocol because of their access to this information on the World Wide Web. Oncology patients and their families today tend to be more knowledgeable of the standard treatments, as well as “alternative” options, because they may have already explored these options for their situation. Consequently, they may be able to readily detect the incorrect placement and use of the band. Furthermore, critics state that any improvement in the condition being studied is easily attributable to the placebo effect (Aikens, 1998; Plawicki & Plawicki, 1998). Therefore, patients in the control group received an acupressure band from which the bead was removed and were instructed to use a sham acupoint on the posterior aspect of the wrist. Lastly, several studies have revealed that even the incorrect placement of pressure or needles may produce a therapeutic response (Vickers, 1996).

#### F. Procedure for Data Collection

Prior to data collection, approval for the study was obtained from the Duquesne University Institutional Review Board (IRB), the participating hospital IRB, the participating hospital’s cancer institute, and the clinical sites (Appendix Q). Research assistants were required to sign a Confidentiality Statement for the study (Appendix K). Data were collected from patients who were receiving chemotherapy treatment for the

first time at one of three outpatient clinics associated with the private practice or university affiliated oncologists. The primary investigator provided a one-hour session of detailed instructions on the protocol to selected medical professionals who would serve as a research assistant at each site.

The research assistant in the clinic reviewed all patients who were scheduled to receive chemotherapy for the first time and used a prepared check off list to determine eligibility for inclusion in the study (Appendix L). The names of all patients who were eligible for the study were recorded on a form that also recorded the number of agreements and refusals to participate in the study (Appendix M).

Patients who were eligible for the study were asked if they would like to participate in a research investigation to evaluate acupressure bands in the management of N&V that may occur with the administration of chemotherapy. Potential subjects were told that they would be asked to first complete a variety of paper-and-pencil forms, and then place an adjustable band on their dominant wrist for a minimum of 30 minutes before they receive their first chemotherapy at the clinic. Patients were advised that medications that their doctor may prescribe to control any nausea and vomiting were permitted. Enrolling a patient into the study (providing instructions and completing the paper forms) took approximately 15 minutes.

It was also explained to the patients that they would be asked to maintain a daily log of their experiences of NVR for 72 hours after the day of chemotherapy and to complete the Rhodes Index of Nausea, Vomiting, and Retching before the chemotherapy, and then each evening, starting the evening of the day of chemotherapy, and for the next three evenings. Each patient was instructed to then mail the completed diaries and the four

**copies of the Rhodes Index of Nausea, Vomiting, and Retching in a self-addressed, stamped envelope to the principal investigator.**

**After a thorough explanation and description of the study was given, patients who agreed to participate in the study were asked to sign two consent forms: one for the investigator's record, and one for the patient to keep (Appendix N). In short, each patient was asked to perform the following at the first chemotherapy visit:**

- Sign two consent forms**
- Complete a brief demographic form**
- Complete the 21-item Beck's Anxiety Inventory**
- Complete the 21-item Beck's Depression Inventory**
- Complete the first occurrence of the 8-item Rhodes Index of Nausea, Vomiting, and Retching prior to the administration of chemotherapy. The patient was instructed to complete the Rhodes Index of Nausea, Vomiting, and Retching at approximately the same time for four evenings beginning with the evening of the day of chemotherapy treatment.**
- Make an initial entry into the log before the administration of the chemotherapy. The patient was to continue to record all episodes of NVR in the Home Log at home for 72 hours.**
- Place the acupressure band on the dominant wrist, unless contraindicated, according to the provided directions 30 minutes before the administration of the chemotherapy.**

**The patient was instructed to keep the acupressure band on continuously until 72 hours after the day of chemotherapy and to record in the log if the band was removed for more than five minutes. During the initial contract with the patient, the research assistant**

who enrolled the patient into the study completed the Medical Information Questionnaire listing all medications that the patient was currently receiving, including antiemetics administered before chemotherapy and PRN medications. At this time, the patient was also given a packet to take home, which contained an assortment of forms. This packet contained all of the following:

- 4 copies of the Rhodes Index of Nausea, Vomiting, and Retching
- a Home Log to record all episodes of NVR, whether the acupressure band is removed for more than 5 minutes, and directions to complete the log from the day of chemotherapy until 72 hours postchemotherapy
- directions for the correct placement and use of the acupressure bands. Directions for the experimental group included a recommendation to apply continuous pressure to the bead that was positioned over the P6 acupoint for 5 minutes if nausea, vomiting or retching occurred (Appendix O), whereas directions for the control group instructed the patient to press on the outside of the band for 5 minutes if nausea, vomiting, or retching occurred (Appendix P).
- an extra experimental or placebo acupressure band
- a self-addressed, stamped envelope addressed to the principal investigator

Patients were encouraged to wear the acupressure band 24 hours a day, even while showering or bathing. Therefore, each patient received either two treatment acupressure bands or two placebo acupressure bands in order to apply a dry band if one became wet or soiled.

Patients whose wrist circumference at the P6 measured six inches or less were given a pediatric acupressure band. The patient was instructed to apply the band on the wrist of

the dominant hand (Dundee, Fitzpatrick, Ghaly, & Patterson, 1988). Dundee and Ghaly (1989a) reported that the acupressure bands were more effective if they were applied before an anticipated nauseogenic event than if they were delayed until the nausea occurred (Dundee, Ghaly, Bill, et al., 1989). Therefore, patients were advised to place the band on the wrist of the dominant hand at least 30 minutes before chemotherapy began because acupressure tends to have a slow but steady onset (Fitzpatrick, Dundee, Ghaly, & Patterson, 1988; Ulett, Han, & Han, 1998a).

The primary investigator conducted a follow-up telephone call 24 to 48 hours after the patient received chemotherapy to determine if the patient and his or her family, or both, had any questions, concerns, or comments. At this time, patients were reminded to mail the four Nausea, Vomiting and Retching forms, and the completed diaries in the provided self-addressed, stamped envelope on the fourth day after chemotherapy. The plan to request patients to return the daily log and the four copies of the Rhodes Index of Nausea, Vomiting, and Retching was economical and feasible. A study by Mullin, Fletcher, and Tyler (1998) obtained an 86% return rate for oncology outpatients who agreed to return a mail-in questionnaire for monitoring nausea and vomiting. Patients who did not return their forms by the seventh day were contacted by telephone to determine the reason for the delay and to encourage the participants to return the forms as soon as possible.

Based on Hesketh's Model for calculating the emetogenic potential of the most common chemotherapy agents, Table 5 was used to determine the emetogenicity of the chemotherapy schedule for each patient.

Table 5

*Algorithm for Predicting Antiemetic Outcome Using Hesketh's Model for Emetogenic Potential of Selected Chemotherapy Agents*

Emetogenic Levels of Individual Agents	Combination Level	Predicted Frequency of Emesis (%)
2 + 2	3	30-60
2 + 2 + 2	3	30-60
3 + 2	4	60-90
3 + 1 + 2	4	60-90
3 + 2 + 2	4	60-90
3 + 3 + 1	4	60-90
3 + 3 + 3	5	> 90
3 + 3 + 3	5	> 90
4 + 3 + 1	5	> 90
4 + 3 + 2	5	> 90

#### G. Procedures for Protection of Human Subjects

A proposal was submitted to Duquesne University's IRB, the participating hospital's IRB, and to the participating hospital's cancer institute for their review, recommendations, and approval (Appendix Q). Written, informed consent was obtained after the treatment regimen had been fully explained to each patient, and before any paper-and-pencil forms were completed by the patient, or by the research investigator or assistant, or both. Each patient was told that withdrawal from the study at any time was permitted, and would not influence the treatment plan. Each patient retained a signed, original consent form. Each participant was permitted to keep the acupressure bands.

Upon receiving the completed forms from the patient, the primary investigator mailed a treatment acupressure band and a letter to patients who were assigned to the control group with an explanation that preliminary findings suggested that another band may be more effective in the management of N&V (Appendix R). The letter instructed the



patients to use the enclosed acupressure band and to discard the bands that were given on the first day of chemotherapy.

#### H. Strengths and Weaknesses

One of the strengths of this design was its high internal validity in that it controlled for the effects of selection, interaction of selection and maturation, instrumentation, history, and extraneous interferences that may have occurred between the baseline assessment and the post-intervention assessments. However, within-session variations, such as differences in the clinic conditions, and differences in personalities of the research assistant and the oncology nurse who approached the patient at the first visit could introduce bias.

Requesting the patients to complete the Rhodes Index of Nausea, Vomiting, and Retching before the application of the acupressure band may have introduced an interaction of the pretest and treatment effect, thus compromising external validity. Another disadvantage of the randomized control-experimental group, repeated measures design was that chemotherapy naïve patients initially assigned to the control group were theoretically at increased risk for anticipatory N&V at their next chemotherapy, a situation that introduces an order effect (Maher, 1990). Even though the research assistants who participated in the investigation received detailed instructions on the protocol and design of the study from the primary investigator, employing the research assistants in the three outpatient clinics to screen and recruit appropriate subjects into the study was another limitation. That is, there is the possibility that the conditions of the

treatment and control groups were not identical in all of the oncology practices, introducing a variance that is difficult to access.

Scenarios that may prohibit the application of an adjustable band to the dominant hand include lymphodema, generalized peripheral edema, presence of an arterio-venous fistula, burns or wounds, casts, braces, or thick dressings, and IV placement. Patients with contraindications for the application of the acupressure band to the dominant hand were instructed to use the non-dominant hand.

It was recognized that some patients may have difficulties following the directions due to drowsiness induced by the prophylactic administration of antiemetics (McMillan & Dundee, 1990). Sometimes a disapproving opinion of a family or another significant person in the life of the patient may influence the patient to decline to use an acupressure band. For example, some persons believe that “discussing the possibility of nausea in advance is one way of making certain it will occur” (Levine, 1978) and, thus, they will thwart the discussion of this type of information with the patient. In her nursing model for Cancer Chemotherapy, Levine (1978) advocates an equal and active partnership between the patient and the medical professional, which includes providing complete and accurate information on the medications including their side effects and interventions to minimize them.

Another potential problem that may occur is that some patients, for different reasons, may be unwilling to wear a wristband, and thus refuse to participate in the study. Some patients may perceive the band as a “reminder” that they have cancer; others may not want to explain why they are wearing the acupressure band if they are asked, and a few may be fashion oriented and not like the “look.” Finally, some may perceive

participation in the study as an additional hardship to the patient and family in an already stressful situation.

### I. Procedures for Data Analysis

All subjects enrolled in the study were assigned an identification (ID) number for anonymity and the ID numbers were used to link files in the database with different types of information. The data for this study were maintained on an IBM compatible personal computer using Excel (Microsoft ®) database software). Data that were collected as textual information (for example, diagnoses, concomitant medications, laboratory abnormalities, medical comorbidities, etc.) were converted to a numerical format by assigning codes. Double entry of random forms was carried out periodically to verify the accuracy of data entry. Data were examined for completeness and for errors revealed during double entry were corrected. Missing values in the database were coded as “9999. Statistical analyses were done employing JMP software, which is the PC version of Statistical Analysis System (SAS), Version 3.1.4. Databases were created in Excel (Microsoft ®) and download to JMP.

## IV. RESULTS AND DISCUSSION

### A. Introduction

The primary research question was, “what is the effect of acupressure applied unilaterally with an acupressure band to the Neiguan Point on the incidence, frequency, duration and intensity of nausea , vomiting, and retching associated with chemotherapy in patients with cancer?” All patients who were approached to participate in the study agreed to be in the study. To date, twenty-five patients with a diagnosis of cancer who were scheduled to receive their first treatment of chemotherapy in an outpatient medical oncology clinic consented to participate in this study.

This study is ongoing and patients will continue to be recruited until the projected total sample of 60 patients is obtained, at which time the repeated measures analyses using a general linear model will be performed. For the purpose of this dissertation, since less than half of the required number has been recruited, an interim statistical analysis was done using descriptive and basic inferential statistical tests.

### B. Description of the Sample

Randomization yielded 12 patients to the control group and 13 patients to the experimental group. The demographic characteristics of the patients are shown in Table 6. The majority of the patients were married, white women. The mean age was 51.4 years, ranging from 39 to 71 with a Standard Deviation (SD) of 9.1. The majority of the patients reported a history of N&V associated with pregnancy, travel, or post anesthesia.

Baseline demographic characteristics between the experimental and the control group were statistically similar to one another except in their use of “episodic medication” ( $p = .003$ ) (See Table 6). Episodic medications were defined as medications that the patient used on an intermittent basis as needed. Where no one in the control group listed the use of episodic medications on their initial assessment at the clinic, 54% in the experimental group did list episodic medications. It was noted that 31% (4 of the 13 patients) listed a narcotic for pain such as Vicodin or Percocet, both of which are known for causing N&V for many people. Other episodic medications included acetaminophen, Slo-BID, birth control pills, and diuretics.

Chronic medications was defined as medications that the patient took on a regular schedule. The most common chronic medications that patients reported were multi-vitamins, specific vitamins such as Vitamin E, B and C, calcium supplements, and medications for the treatment of chronic conditions such as Glucophage, Synthroid, Prilosec, Pepcid, nitroglycerine preparations, potassium replacement medication, cholesterol lowering agents, and antidepressants. One patient listed an iron supplement, which can contribute to N&V.

All patients received cytotoxic chemotherapy with an emetogenic value of 4 or 5, whereas 72% received cytotoxic chemotherapy with an emetogenic value of 5, and 28% received cytotoxic chemotherapy with an emetogenic value of 4. Seventy-five percent of the patients received either an Adriamycin and Cytosan (A/C) regimen, or a Cytosan, Methotrexate, and 5-FU (CMF) schedule. Other chemotherapy agents used were Actinomycin, Carboplatin, Taxol, Taxotere, and Vepesid. All patients received an antiemetic protocol immediately before the administration of the chemotherapy. The

antiemetic protocols most often used immediately prior to the administration of the chemotherapy consisted of either Ativan 1 mg, Zofran 8 mg, and Decadron 10 mg IVP, or, Ativan 1 mg orally or IV push, Kytril 2 mg orally, and Decadron 12 mg orally. A prescription for an oral antiemetic to be taken at home was given to all patients. The most common ones were either Compazine 10 mg orally every six hours for three doses, and then every six hours as necessary, or Zofran 4 mg orally three times a day for three days.

None of the patients had prior experience with acupressure or acupuncture. Twenty-one patients were diagnosed with breast cancer, two with lung cancer, one with bladder cancer, and one with ovarian cancer. Forty seven percent had a history of allergies to food, drugs, or environmental stimuli. Drinking alcohol on a weekly basis was reported by 75% of the sample. Every patient who was asked to participate in the study agreed to wear the band. All patients completed the study.

Table 6

*Demographic Data by Group*

Characteristic	Group		p-value ‡
	Control (n=12)	Experimental (n=13)	
Gender (% female)	91.7	92.3	.952
Race (% white)	83.3	1.00	.125
Marital Status (% married)	83.3	84.6	.511
Age (mean years) (SD)	49.3 (9.3)	53.4 (9.2)	.284
Diagnosis (% breast cancer)	91.7	69.2	.366
Length of Time since Diagnosis (mean weeks) (SD)	7.3 (4.0)	10.9 (10.5)	.269
Emetogenic Score (% 5)	75.0	69.2	.748
Chronic Medication (% on Meds)	58.3	84.6	.144
Episodic Medication (% on Meds)	0	53.8	.003
<b>Education</b>			
% completed grade school	8.3	0.0	.248
% completed high school plus some college	75.0	46.2	
% completed college or more	12.5	53.8	
Allergies (% yes)	41.7	53.8	.395
Previous Experience with Acupressure (% no)	100	100	—
History of N&V Associated with Pregnancy (% yes)	66.6	53.8	.539
History of N&V Associated with Travel/Motion (% no)	58.3	53.8	.821
History of N&V Associated with Post Surgery (% no)	50.0	61.5	.184
<b>Current Number of ETOH drinks</b>			
% no drinks/week	25.0	25.0	.938
% 1-2 drinks/week	50.0	58.3	
% 3 or more drinks/week	25.0	16.7	
<b>Current Length of Time as Regular Drinker</b>			
% not drink at all	36.4	36.4	.856
% 1-2 years	45.5	36.4	
% ≥ 6 years	18.1	27.3	
<b>Past Length of Time as Regular Drinker</b>			
% not drink at all	36.4	25.0	.274
% 1-2 years	45.5	33.3	
% 2-3 years	18.2	41.7	

‡ p-value obtained from Chi-Square test or Two-Sample t-Test adjusted for inequality of variances where appropriate

Table 7 illustrates that there was no significant difference between the experimental and control groups in either anxiety or depression at time of entry into the study. Overall, 60% of the participants experienced minimal anxiety, 12 % had mild-moderate anxiety, 24% moderate-severe anxiety, and 4% (1 patient) reported severe anxiety. Approximately 68% tested normal for depression, whereas 28% reported a moderate level of depression. Only one patient scored a high enough number to be considered in the moderately severe depression area.

Table 7

*Beck's Anxiety and Depression Total Scores by Group at Time of entry into the Study*

Variable	Group		p-value ‡
	Control (n=12)	Experimental (n=13)	
Mean Anxiety (SD)	10.1 (mild) (9.0)	8.1 (mild) (7.3)	.544
Mean Depression (SD)	5.6 (normal) (5.0)	8.4 (normal) (6.8)	.258

‡ p-value obtained using Two-Sample t-Tests

### C. Findings

Descriptive statistics (mean, median, minimum and maximum scores) were obtained for each of the eight items on the Rhodes Index of Nausea, Vomiting, and Retching. Tables 8-A through 8-E show that there were no significant differences between the experimental and control groups for any of the items across time. Table 8A indicates that the responses were identical in most cases, but since Table 8A reflects the



pre-chemotherapy assessment of the patient's N&V experience, this finding would be expected. However, it was noted that except for Table 8A, the median scores for each item on the Rhodes Index of Nausea, Vomiting, and Retching – Form 2 for patients in the experimental group were often times lower than the control group for most of the items on the instrument. The mean for each item on the N&V Index revealed a similar pattern, in that the mean for the experimental group was often times lower than the mean for the control group, but no significance was obtained. The mean scores for nausea, vomiting and retching for the patients receiving acupressure suggest that acupressure may assist in controlling N&V associated with chemotherapy.

Table 8-A

*Rhodes Index of Nausea, Vomiting, and Retching (INVR) by Group Prior to Chemotherapy (T<sub>1</sub>)*

Question		Group		p-value ‡
		Control (n=12)	Experimental (n=13)	
1. In the last 12 hours, I threw up ___ times.	Median	0	0	--
	Range	(-)	(-)	
2. In the last 12 hours, from retching or dry heaves I have felt ___ distress.	Median	0	0	--
	Range	(-)	(-)	
3. In the last 12 hours, from vomiting or throwing up, I have felt ___ distress.	Median	0	0	--
	Range	(-)	(-)	
4. In the last 12 hours, I have felt nauseated or sick at my stomach.	Median	0	0	--
	Range	(0, 2)	(0, 2)	
5. In the last 12 hours, from nausea/sickness at my stomach, I have felt ___ distress.	Median	0	0	.975
	Range	(0, 1)	(0, 2)	
6. In the last 12 hours, each time I threw up I produced a ___ amount.	Median	0	0	--
	Range	(-)	(-)	
7. In the last 12 hours, I have felt nauseated or sick at my stomach ___ times.	Median	0	0	.975
	Range	(0, 1)	(0, 2)	
8. In the last 12 hours, I have had periods of retching or dry heaves without bringing anything up ___ times.	Median	0	0	--
	Range	(-)	(-)	

(-) No range

‡ p-value calculated using Mann-Whitney test

Table 8-B

*Rhodes Index of Nausea, Vomiting, and Retching (INVR) by Group the Evening of Chemotherapy (T<sub>2</sub>)*

Question		Group		p-value ‡
		Control (n=12)	Experimental (n=13)	
1. In the last 12 hours, I threw up ___ times.	Median Range	0 (0, 1)	0 (0, 2)	.728
2. In the last 12 hours, from retching or dry heaves I have felt ___ distress.	Median Range	0 (0, 1)	0 (0, 2)	.487
3. In the last 12 hours, from vomiting or throwing up, I have felt ___ distress.	Median Range	0 (0, 4)	0 (0, 3)	.685
4. In the last 12 hours, I have felt nauseated or sick at my stomach.	Median Range	0 (0, 4)	0 (0, 3)	.451
5. In the last 12 hours, from nausea/sickness at my stomach, I have felt ___ distress.	Median Range	0 (0, 2)	0 (0, 2)	.354
6. In the last 12 hours, each time I threw up I produced a ___ amount.	Median Range	0 (0, 3)	0 (0, 2)	.685
7. In the last 12 hours, I have felt nauseated or sick at my stomach ___ times.	Median Range	0 (0, 4)	0 (0, 3)	.451
8. In the last 12 hours, I have had periods of retching or dry heaves without bringing anything up ___ times.	Median Range	0 (0, 1)	0 (0, 0)	.469

‡ p-value calculated using Mann-Whitney test

Table 8-C

*Rhodes Index of Nausea, Vomiting, and Retching (INVR) by Group First Evening After Chemotherapy (T<sub>3</sub>)*

Question		Group		p-value ‡
		Control (n=12)	Experimental (n=13)	
1. In the last 12 hours, I threw up ___ times.	Median Range	0 (0, 1)	0 (0, 0)	.751
2. In the last 12 hours, from retching or dry heaves I have felt ___ distress.	Median Range	0 (0, 1)	0 (0, 0)	.751
3. In the last 12 hours, from vomiting or throwing up, I have felt ___ distress.	Median Range	0 (0, 1)	0 (0, 0)	.751
4. In the last 12 hours, I have felt nauseated or sick at my stomach.	Median Range	.5 (0, 3)	0 (0, 2)	.273
5. In the last 12 hours, from nausea/sickness at my stomach, I have felt ___ distress.	Median Range	.5 (0, 2)	0 (0, 2)	.544
6. In the last 12 hours, each time I threw up I produced a ___ amount.	Median Range	0 (0, 1)	0 (0, 0)	.751
7. In the last 12 hours, I have felt nauseated or sick at my stomach ___ times.	Median Range	0 (0, 2)	0 (0, 3)	.908
8. In the last 12 hours, I have had periods of retching or dry heaves without bringing anything up ___ times.	Median Range	0 (0, 2)	0 (0, 0)	.507

‡ p-value calculated using Mann-Whitney test

Table 8-D

*Rhodes Index of Nausea, Vomiting, and Retching (INVR) by Group the Second Evening After Chemotherapy (T<sub>4</sub>)*

Question		Group		p-value ‡
		Control (n=12)	Experimental (n=13)	
1. In the last 12 hours, I threw up ___ times.	Median	0	0	.703
	Range	(0, 3)	(0, 1)	
2. In the last 12 hours, from retching or dry heaves I have felt ___ distress.	Median	0	0	.978
	Range	(0, 4)	(0, 2)	
3. In the last 12 hours, from vomiting or throwing up, I have felt ___ distress.	Median	0	0	.724
	Range	(0, 4)	(0, 3)	
4. In the last 12 hours, I have felt nauseated or sick at my stomach.	Median	1.0	0	.586
	Range	(0, 4)	(0, 4)	
5. In the last 12 hours, from nausea/sickness at my stomach, I have felt ___ distress.	Median	1.0	0	.514
	Range	(0, 4)	(0, 2)	
6. In the last 12 hours, each time I threw up I produced a ___ amount.	Median	0	0	.724
	Range	(0, 1)	(0, 1)	
7. In the last 12 hours, I have felt nauseated or sick at my stomach ___ times.	Median	0.5	0	.978
	Range	(0, 3)	(0, 4)	
8. In the last 12 hours, I have had periods of retching or dry heaves without bringing anything up ___ times.	Median	0	0	.497
	Range	(0, 2)	(0, 2)	

‡ p-value calculated using Mann-Whitney test

Table 8-E

*Rhodes Index of Nausea, Vomiting, and Retching (INVR) by Group the Third Evening After Chemotherapy (T<sub>3</sub>)*

Question		Group		p-value ‡
		Control (n=12)	Experimental (n=13)	
1. In the last 12 hours, I threw up ___ times.	Median Range	0 (0, 1)	0 (0, 1)	.689
2. In the last 12 hours, from retching or dry heaves I have felt ___ distress.	Median Range	0 (0, 1)	0 (0, 1)	.689
3. In the last 12 hours, from vomiting or throwing up, I have felt ___ distress.	Median Range	0 (0, 3)	0 (0, 3)	.951
4. In the last 12 hours, I have felt nauseated or sick at my stomach.	Median Range	1.5 (0, 4)	0 (0, 4)	.479
5. In the last 12 hours, from nausea/sickness at my stomach, I have felt ___ distress.	Median Range	1.0 (0, 2)	0 (0, 3)	.666
6. In the last 12 hours, each time I threw up I produced a ___ amount.	Median Range	0 (0, 1)	0 (0, 2)	.877
7. In the last 12 hours, I have felt nauseated or sick at my stomach ___ times.	Median Range	0 (0, 3)	0 (0, 3)	.976
8. In the last 12 hours, I have had periods of retching or dry heaves without bringing anything up ___ times.	Median Range	0 (0, 2)	0 (0, 1)	.758

‡ p-value calculated using Mann-Whitney test

Specific items on the INVR were developed to assess nausea, vomiting and retching separately. For instance, items 4, 5, and 7 on the INVR are used to examine nausea, items 1, 3, and 6 are used to assess vomiting, and items 2 and 8 are used to gauge retching. There were no statistical differences in the mean scores between the two groups at any time (Table 9). At the T1 interval, which was done immediately before the administration of the chemotherapy, virtually no patient reported vomiting or retching. But a few patients did report some nausea, which could be attributed to the stress of visiting the clinic to receive their first chemotherapy.

Table 9

*Sample Mean Total Score for Nausea<sup>1</sup>, Vomiting<sup>2</sup> and Retching<sup>3</sup>, By Group and Time*

Time	Nausea		Vomiting		Retching	
	Experimental	Control	Experimental	Control	Experimental	Control
T <sub>1</sub>	0.5	0.3	0.0	0.0	0.0	0.0
T <sub>2</sub>	1.4	2.7	0.5	1.0	0.15	0.5
T <sub>3</sub>	1.3	2.2	0.0	0.25	0.0	0.33
T <sub>4</sub>	2.7	3.4	0.4	0.9	0.5	0.83
T <sub>5</sub>	2.6	3.3	1.1	0.6	0.5	0.5

1. Rhodes Items 4, 5, 7 (Minimum score = 0, Maximum score = 12)
2. Rhodes Items 1, 3, 6 (Minimum score = 0, Maximum score = 12)
3. Retching Items 2 and 8 (Minimum score = 0, Maximum score = 8)

A pattern was noted in which the incidence of NVR is hardly reported at all the first evening of chemotherapy (T2). However, the incidence of nausea and retching begins to increase at T3, the second evening after chemotherapy, and slightly decreases at T4 and T5 (third and fourth evenings after chemotherapy). In contrast, the incidence of vomiting peaked between T4 and T5, or the second evening and third evening after chemotherapy. The most likely explanation for this pattern is that the antiemetic protocol that the patient

received in the clinic just before receiving the chemotherapy is no longer effective and most patients probably had not begun to take the antiemetic that was prescribed.

In addition to completing the INVR, patients were asked to record all episodes of NVR in a log, along with other measures that they might have used to manage NVR. They were also instructed to make a notation in the log if the acupuncture band was removed for a time greater than five minutes. Table 10 summarizes the responses that the patients recorded on the log. Log entries revealed that all patients but two wore the acupuncture band continuously from the time of placement before the administration of chemotherapy until the fourth evening after chemotherapy. One patient in the Control Group misunderstood the length of time for the study and removed the band prematurely at exactly 72 hours after placement. However, suspecting that this was wrong, she called the PI to ask about it and reapplied the band immediately. She estimated that the band was off for about one hour. Another patient in the Experimental Group recorded in the log that she removed the band at bedtime the evening of chemotherapy because it was “itchy.” However, later entries indicated that the band was on until the fourth evening after chemotherapy was administered.



Table 10

*Log Entries By Group*

Log Entries	Experimental (n=13)		Control (n=12)	
Band Continuously On	12 <sup>(a)</sup>	92%	11 <sup>(b)</sup>	(92%)
Other Interventions Used to Manage N&V	Sleep		Sleep Crackers Tea	
No. of Patients Recording Zero NVR Events	(6)	(46%)	3	(25%)
No. of Patients Recording Nausea	7	(54%)	9	(75%)
No. of Patients Recording Vomiting	3	(23%)	2	(17%)
No. of Patients Recording Retching	2	(15%)	0	(0%)
No. of Patients Recording NO Post-Chemotherapy Use (Used Bands Only)	1 <sup>(c)</sup>	(0.8%)	0	(0%)
Comments	Very Tired		Very Tired Headache	

- (a) Band off at bedtime on the evening of chemotherapy due to complaints of it being “itchy”; reapplied later
- (b) Band off for approximately 1 hour
- (c) Patient denied using any post-chemotherapy antiemetic at any time during the study. She also reported zero NVR.

Every patient except one patient in the Experimental Group recorded that they took an oral antiemetic such as Compazine around the clock for at least 1-2 days as prescribed by their oncologist. The patient who recorded that she did not take any antiemetic during the post-chemotherapy phase of treatment stated that she only used the bands and never had any episodes of NVR.

It was noted that two patients mentioned that they used additional measures, such as consuming crackers and tea, and lying down for while, to help manage any N&V episode. The oncology nurse called the PI to say that one patient had forgotten their log and Rhodes Index for NVR forms at the oncology clinic. After contacting the patient, the patient agreed to permit the PI to call the patient each evening to read the items on the Rhodes Index form and record the patient's responses, as well as any comments on the log.

#### D. Discussion

The primary research question focused on the effect of acupressure on NVR associated with the first chemotherapy of cancer patients. It was hypothesized that patients who applied acupressure unilaterally with an acupressure band to the Neiguan Point would experience less NVR than patients in the control group. The data did not support these hypotheses as there were no significant differences between the two groups.

One contributing factor to these results was the effectiveness of the antiemetic medications that was administered to both groups. There was relatively little NVR in the control group making it difficult to show improvement with the addition of the acupressure band. It would not be ethical, however, to withhold the antiemetic medication to increase the likelihood that acupressure would be the determining variable. Furthermore, studies suggest that the single most predictive factor for a patient to develop anticipatory N&V is simply experiencing severe post-treatment N&V. Therefore, it is important that every measure is used to prevent N&V with the very first treatment to prevent or minimize N&V associated with the chemotherapy.

Another factor that contributed to the lack of statistical significance was the relatively small number of subjects. The primary investigator plans to continue to collect data to see if statistical significance can be achieved.

An unexpected phenomena arose during the data collection phase of the study. The primary investigator called each patient within 24 to 48 hours after the patient had started chemotherapy and had applied the acupuncture band to ask if there were any questions or concerns. The call was also used to reinforce the directions on the use of the band, to encourage the patient to complete the Home Log and the Rhodes Index of Nausea, Vomiting and Retching, and to remind the patient to mail the completed forms in the self-addressed, stamped envelope that was provided. Many patients were eager to discuss what their cancer meant to them and their perception of the treatment they had received. A few patients inquired about other possible strategies that they might use to help cope with their situation. The primary investigator found that her role as a researcher sometimes conflicted with her role as a nurse in providing information that the patient was seeking. The primary investigator recognized very quickly that the 24-hour period immediately after receiving their first chemotherapy seemed to be a sensitive point in time at which the patient yearned to speak philosophically about what happened to them. Themes revolved around spiritual growth, interpersonal relationships, life taking a new direction, life's goals, and one's future. Speaking with patients immediately after receiving chemotherapy for the first time to determine their perceptions and feelings could be another area of study.

It should also be noted that every patient (100%) who was approached to participate in the study agreed to be in the study, and every patient who entered the study

completed the entire protocol. This largely demonstrates the receptivity that people have to a non-invasive, complementary approach such as acupressure.

## V. SUMMARY AND RECOMMENDATIONS

### A. Summary

Nausea, vomiting, and retching are common adverse effects to the administration of chemotherapy, and are associated with many other conditions such as travel, pregnancy, anesthesia, and toxins. While pharmacologic antiemetics are effective for reducing or completely eradicating NVR for 66% of the people who receive chemotherapy, the value of simple, easy to learn, inexpensive, noninvasive, nonpharmacologic techniques that provide patients with additional tools or skills to improve their quality of life should be more emphasized (White 1997).

### B. Recommendations

This trial suggests that patients are very interested in integrating less traditional methods into their health care treatment plans. No patient refused to participate in the study and 100% completed the study. Even though the chemical antiemetics are very effective in significantly reducing the severity and frequency of chemotherapy-induced NVR, an acupuncture band provides patients with another “tool” to manage their health problems.

It is recommended that this study be repeated with patients with the same diagnosis, receiving the same chemotherapy schedule and antiemetic protocol, and that the assessment of the frequency, incidence, and intensity of NVR be extended at least one

more day. Based on the findings of this study, several questions for future research include the following:

- Are two acupressure bands more effective than one acupressure band?
- Are intermittent use acupressure bands more effective than continuous use bands?
- How effective are acupressure bands for various types of N&V associated with pregnancy, anesthesia, motion, and anticipatory nausea?
- Are acupressure bands less effective for patients who have developed anticipatory N&V than patients who are chemotherapy naïve?
- Are elasticized acupressure bands (SeaBands), BioBands, and ReliefBands™, which deliver a low voltage electrical current to the P6 acupoint more effective than a single wrist acupressure band?
- Can the use of acupressure bands or ReliefBands™ (TENS band) decrease the incidence of anticipatory N&V in chemotherapy naïve patients? Are they better than acupressure bands without TENS?
- Since acupressure is documented to reduce pain, due to the release of endorphins and enkephalins, can acupressure be effective in the treatment of anxiety disorders or other conditions exacerbated by stress?
- Can acupressure at the P6 acupoint decrease N&V related to AIDS, excessive alcohol intake, or influenza?
- Is there a relationship between the frequency, intensity, or duration of chemotherapy-induced N&V and the day of a woman's menstrual cycle when chemotherapy is administered?

- Is there a relationship between the frequency, intensity, or duration of chemotherapy-induced NVR and the time that the chemotherapy is administered to the patient?
- Can the use of an acupressure band that is constructed to provide an antiemetic aromatherapy scent such as ginger be more effective than a non-aromatherapy band?
- Is the GV26 acupoint located above the upper lip as effective as the P6 acupoint in reducing N&V?
- Is the ST36 acupoint located below the knee as effective as the P6 acupoint in reducing N&V?
- Can acupressure at the P6 acupoint decrease the incidence and severity of N&V that tends to increase with each chemotherapy cycle?

### C. Conclusions

Although the practice of prophylactic antiemetic protocols have significantly reduced the incidence and severity of chemotherapy-induced NVR, up to 33% of the patients experience emesis in the first 24 hours after receiving strong emetogenic agents (Antiemetic Subcommittee of the Multinational Association of Supportive Care in Cancer, 1998; Hesketh, 1994; Kris, et al., 1996; Morrow, Asbury, et al., 1992; Morrow & Hickok, 1993; Tavorath & Hesketh, 1996).

The findings of this study provides preliminary data regarding the effectiveness of acupressure bands in reliving NVR. Based on this interim analysis, further data will be collected with the goal of achieving a sample large enough to derive statistically significant results. Patients will continue to be enrolled into the study and the data will be evaluated at that time.

## **APPENDICES**



## APPENDIX A

Permission Letter to Reproduce Figure 1. Definition of one Chinese inch or “cun.”

August 17, 1999  
American Journal of Obstetrics and Gynecology  
Permissions Coordinator

[Redacted]

Hello,

My name is Christine Meyer and I am a student in the doctoral program in the Department of Nursing at Duquesne University in Pittsburgh. I am writing you to request permission to use a figure from the Letter to the editor by Joe J. Hoo, MD in my dissertation.

Below is the information that is required to obtain permission to reproduce a figure.

- My mailing address is [Redacted]
- American Journal of Obstetrics and Gynecology
- June, 1997; Volume 176, Issue 6.
- Title of the letter to the editor is: Acupressure for Hyperemesis Gravidarum
- Author: Joe J. Hoo, MD
- Page Numbers: 1395.
- Figure 1a 1b of a "cun"

I would like to request permission to use this figure in my dissertation. Your consent to use this figure would be greatly appreciated. Thank You.

Christine Meyer, RN, MSN  
Doctoral Candidate  
Email: [Redacted]

[Redacted]

WORK EMAIL =

[Redacted]

Permission is granted subject to your verification that the material in question is original to our journal. The permission, which is nonexclusive, is granted for print and electronic formats, for this and all subsequent editions of the book, in English and in all other languages, distributed throughout the world. The standard credit line must include: name of publication, name of author(s), article title, issue date, and volume and page numbers.

[Redacted]

Date: 8/24/99

CHIDI OKABAM, Illustrations and Permissions Coordinator  
Mosby, Inc., St. Louis, MO, USA

**APPENDIX B****Permission Letter to Reproduce Table 1****Emetogenic Potential of Single Chemotherapy Agents.**

From: "Lisa D. Tempalski" <[REDACTED]>  
To: <[REDACTED]>  
Subject: permission  
Date: Monday, January 29, 2001 9:03 AM

Dear Ms. Meyer:

Thank you for your request for permission to use Table 1 from Hesketh, "Defining the Emetogenicity of Cancer Chemotherapy Regimens: Relevance to Clinical Practice," published in The Oncologist 1999;4:191-196 ©AlphaMed Press 1083-7159.

AlphaMed Press grants permission for this usage in a dissertation on a study on the effects of acupressure bands on chemotherapy induced nausea and vomiting in patients with cancer. The granting of this permission is exclusively limited to the above-stated usage in this and all future versions of this work, provided that full credit to The Oncologist be given in the respective legend to Table 1.

Sincerely,

Lisa D. Tempalski  
Assistant Managing Editor  
The Oncologist

[REDACTED]

From: ROBERT J MEYER [REDACTED]

[REDACTED]@lippincott.com

Subject: RW: Request for Permission to reproduce table from an article  
Date: Saturday, August 14, 1999 2:30 PM

Lippincott Williams and Wilkins  
Permission Department

I just received a letter via Postal mail which says that you need to receive a letter of approval from the author of the article to proceed with my request for permission to use a table in my doctoral dissertation. I had sent him an email which is below. Will his permission that was granted on this email suffice? Or will I need to obtain his signed permission on a hard copy to fulfill this requirement?

I have cut and pasted a part of the original email to you to be certain that you have all of the information that you may need.

My name is Chris Meyer and I am a doctoral candidate at Duquesne University in Pittsburgh. I am in the process of writing the first 3 chapters of my dissertation which is a study on the effects of acupressure bands on chemotherapy induced nausea and vomiting in patients with cancer. I would like to request permission from you to reproduce the table called, "Emetogenic Potential of single Chemotherapy Agents" which is in the following citation:

Hesketh, P. J., Kris, M. G., Grunberg, S. M., Beck, T., Hainsworth, J. D., Harker, G., Aapro, M. S., Gandara, D., & Lindley, C. M. (1997). Proposal for classifying the acute emetogenicity of cancer chemotherapy. Journal of Clinical Oncology, 15 (1), 103-109.

This table would be most helpful and I would sincerely appreciate receiving permission to incorporate it into my thesis.

Thank You.  
Chris Meyer, RN MSN

----- Original Message -----

From: [REDACTED]

Sent: Tuesday, August 10, 1999 10:17 AM

Subject: Re: Request for Permission to reproduce table from an article

Dear Christine,

You have my permission to reproduce the indicated material. Please note that you need to obtain permission from the publishers of JCO as well. Good luck with your efforts.

Best regards,

Paul Hesketh

APPENDIX C

Demographic Questionnaire

ID NUMBER: \_\_\_\_\_

**CONFIDENTIAL INFORMATION**

**Demographic Questionnaire  
Acupressure Study**

Date: \_\_\_\_\_

1. Name: \_\_\_\_\_
2. Complete Address: \_\_\_\_\_
3. Telephone: \_\_\_\_\_  
(Area Code)
4. Birthdate: \_\_\_\_\_
5. Gender: (1) male (2) female
6. Race: (1) White (2) Black (3) Asian (4) Other: \_\_\_\_\_
7. Marital Status: (1) never married (2) married (3) separated (4) divorced (5) widowed
8. Attending MD: \_\_\_\_\_
9. Oncology MD: \_\_\_\_\_
10. Diagnosis: \_\_\_\_\_
11. Date of Diagnosis of Current Cancer: \_\_\_\_\_
12. Schooling: (1) some grade school (2) completed grade school (3) some high school (4) completed high school (5) some college (6) completed college (7) some graduate school (8) completed graduate school
13. Are you currently employed?  
(1) employed FT (2) employed PT (3) unemployed (4) laid off (5) on disability (6) retired (7) homemaker (8) other
14. Allergies: (1) none (2) food (3) drugs (4) environmental  
Please list your allergies: \_\_\_\_\_
15. Which hand do you use to write? (1) right hand (2) left hand

ID NUMBER: \_\_\_\_\_

**CONFIDENTIAL INFORMATION**

16. Previous Experience with Acupressure: (1) no (2) yes (3) don't know

17. Have you ever experienced nausea and vomiting with pregnancy?

(1) yes (2) no (3) never pregnant (4) NA

If yes, please provide details describing when nausea and vomiting began, such as how long it lasted and what you did to relieve it?

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18. Do you usually or have you ever experienced nausea and vomiting with travel or motion sickness? (1) yes (2) no

If yes, please provide details describing when nausea, vomiting or both began, such as how long it lasted and what you did to relieve it?

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19. Have you ever experienced nausea and vomiting after surgery?

(1) yes (2) no (3) never had surgery

If yes, please provide details describing when nausea, vomiting or both began, such as how long it lasted and what you did to relieve it?

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20. Had you ever been diagnosed with cancer before this current diagnosis? (1) yes (2) no

21. If you had been diagnosed with a previous cancer, did you receive chemotherapy?

(1) yes (2) no (3) no previous cancer

---

The following questions will ask you about your intake of alcohol. They may seem a bit sensitive, but please make every effort to be as accurate as possible.



ID NUMBER: \_\_\_\_\_

**CONFIDENTIAL INFORMATION**

22. Do you currently drink alcohol? (1) yes (2) no

23. If you currently drink alcohol, please identify the type of alcohol that you drink on a regular basis.

(1) don't drink alcohol (2) beer (3) wine (4) other: \_\_\_\_\_

24. If you currently drink alcohol, please indicate the number of drinks per day, or per week, per month.

- (0) 0 drinks/week
- (1) 1-2 drinks/week
- (2) 3-6 drinks/week
- (3)  $\geq 7$  drinks/week

25. If you currently drink alcohol on a regular basis, how many months or years have you been drinking alcohol?

- (0) 0 drinks/week
- (1) 1-2 drinks/week
- (2) 3-6 drinks/week
- (3)  $\geq 7$  drinks/week

26. Did you used to drink alcohol on a regular basis? (1) yes (2) no

27. If you used to drink alcohol on a regular basis, please identify the type of alcohol that you used to normally drink.

(1) don't drink alcohol (2) beer (3) wine (4) other: \_\_\_\_\_

28. If you used to drink alcohol on a regular basis, please indicate the number of drinks per day, or per week, per month.

- (0) 0 drinks/week
- (1) 1-2 drinks/week
- (2) 3-6 drinks/week
- (3)  $\geq 7$  drinks/week

29. If you used to drink alcohol on a regular basis, how many months or years did you drink alcohol?

- (0) 0 drinks/week
- (1) 1-2 drinks/week
- (2) 3-6 drinks/week
- (3) 7 drinks/week

APPENDIX D

Medical Information Questionnaire

ID NUMBER: \_\_\_\_\_

**CONFIDENTIAL INFORMATION**

**Medical Form  
Acupressure on Nausea and Vomiting**

The following will be completed by the research assistant who enrolls the patient into the study.

Date: \_\_\_\_\_ Name of Person Completing Form: \_\_\_\_\_

Name of Patient: \_\_\_\_\_

Time Acupressure Band is Placed on Patient: \_\_\_\_\_ Time Chemotherapy Started: \_\_\_\_\_

List of current allergies (food, drug, environmental) \_\_\_\_\_

**List of Chemotherapeutic Agents and Dosage Patient Is Currently Receiving:**

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Total Emetogenic Score: \_\_\_\_\_  
(to be completed by investigator)

**List of Antiemetic Agents and Dosage Patient Is Currently Receiving:**

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

***Please turn over to other side.***

**ID NUMBER:** \_\_\_\_\_

**CONFIDENTIAL INFORMATION**

**List of Other Chronic Medications and Dosage Patient Is Currently Receiving:**

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**List of Episodic Agents and Dosage Patient Is Currently Receiving:** For example, is patient receiving PRN meds for pain, diarrhea, constipation, etc?

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## APPENDIX E

Beck's Anxiety Inventory

**BECK ANXIETY INVENTORY**

**NAME:** \_\_\_\_\_ **DATE:** \_\_\_\_\_

Below is a list of common symptoms of anxiety. Please carefully read each item in the list. Indicate how much you have been bothered by each symptom during the PAST WEEK, INCLUDING TODAY, by placing an X in the corresponding space in the column next to each symptom.

	NOT AT ALL	MILDLY It did not bother me much.	MODERATELY It was very unpleasant, but I could stand it.	SEVERELY I could barely stand it.
1. Numbness or tingling.	_____	_____	_____	_____
2. Feeling hot.	_____	_____	_____	_____
3. Wobbliness in legs.	_____	_____	_____	_____
4. Unable to relax.	_____	_____	_____	_____
5. Fear of the worst happening.	_____	_____	_____	_____
6. Dizzy or lightheaded.	_____	_____	_____	_____
7. Heart pounding or racing.	_____	_____	_____	_____
8. Unsteady.	_____	_____	_____	_____
9. Terrified.	_____	_____	_____	_____
10. Nervous.	_____	_____	_____	_____
11. Feelings of choking.	_____	_____	_____	_____
12. Hands trembling.	_____	_____	_____	_____
13. Shaky.	_____	_____	_____	_____
14. Fear of losing control.	_____	_____	_____	_____
15. Difficulty breathing.	_____	_____	_____	_____
16. Fear of dying.	_____	_____	_____	_____
17. Scared.	_____	_____	_____	_____
18. Indigestion or discomfort in abdomen.	_____	_____	_____	_____
19. Faint.	_____	_____	_____	_____
20. Face flushed.	_____	_____	_____	_____
21. Sweating (not due to heat).	_____	_____	_____	_____
<b>TOTAL</b>	_____	_____	_____	_____

## APPENDIX F

Revised Beck's Depression Inventory

# BECK DEPRESSION INVENTORY

Name: \_\_\_\_\_ Date: \_\_\_\_\_

This questionnaire consists of 21 groups of statements. After reading each group of statements carefully, circle the number (0, 1, 2, or 3) next to the one statement in each group which best describes the way you have been feeling the past week, including today. If several statements within a group seem to apply equally well, circle each one. Be sure to read all the statements in each group before making your choice.

- |  |  |
|--|--|
| <p>1. 0 I do not feel sad.<br/>                     1 I feel sad.<br/>                     2 I am sad all the time, and I cannot snap out of it.<br/>                     3 I am so sad or unhappy that I cannot stand it.</p>   | <p>7. 0 I do not feel disappointed in myself.<br/>                     1 I am disappointed in myself.<br/>                     2 I am disgusted with myself.<br/>                     3 I hate myself.</p>   |
| <p>2. 0 I am not particularly discouraged about the future.<br/>                     1 I feel discouraged about the future.<br/>                     2 I feel I have nothing to look forward to.<br/>                     3 I feel that the future is hopeless and that things cannot improve.</p> | <p>8. 0 I do not feel I am any worse than anybody else.<br/>                     1 I am critical of myself for my weaknesses or mistakes.<br/>                     2 I blame myself all the time for my faults.<br/>                     3 I blame myself for everything bad that happens.</p>           |
| <p>3. 0 I do not feel like a failure.<br/>                     1 I feel I have failed more than the average person.<br/>                     2 As I look back on my life, all I can see is a lot of failures.<br/>                     3 I feel I am a complete failure as a person.</p>           | <p>9. 0 I do not have any thoughts of killing myself.<br/>                     1 I have thoughts of killing myself, but I would not carry them out.<br/>                     2 I would like to kill myself.<br/>                     3 I would kill myself if I had the chance.</p>                      |
| <p>4. 0 I get as much satisfaction out of things as I used to.<br/>                     1 I do not enjoy things the way I used to.<br/>                     2 I do not get real satisfaction out of anything anymore.<br/>                     3 I am dissatisfied or bored with everything.</p>   | <p>10. 0 I do not cry any more than usual.<br/>                     1 I cry more now than I used to.<br/>                     2 I cry all the time now.<br/>                     3 I used to be able to cry, but now I cannot cry even though I want to.</p>   |
| <p>5. 0 I do not feel particularly guilty.<br/>                     1 I feel guilty a good part of the time.<br/>                     2 I feel quite guilty most of the time.<br/>                     3 I feel guilty all of the time.</p>  | <p>11. 0 I am no more irritated now than I ever am.<br/>                     1 I get annoyed or irritated more easily than I used to.<br/>                     2 I feel irritated all the time now.<br/>                     3 I do not get irritated at all by the things that used to irritate me.</p> |
| <p>6. 0 I do not feel I am being punished.<br/>                     1 I feel I may be punished.<br/>                     2 I expect to be punished.<br/>                     3 I feel I am being punished.</p>   | <p>12. 0 I have not lost interest in other people.<br/>                     1 I am less interested in other people than I used to be.<br/>                     2 I have lost most of my interest in other people.<br/>                     3 I have lost all of my interest in other people.</p>         |

\_\_\_\_\_ Subtotal Page 1

CONTINUED ON BACK



13. 0 I make decisions about as well as I ever could.  
 1 I put off making decisions more than I used to.  
 2 I have greater difficulty in making decisions than before.  
 3 I cannot make decisions at all anymore.
14. 0 I do not feel I look any worse than I used to.  
 1 I am worried that I am looking old or unattractive.  
 2 I feel that there are permanent changes in my appearance that make me look unattractive.  
 3 I believe that I look ugly.
15. 0 I can work about as well as before.  
 1 It takes an extra effort to get started at doing something.  
 2 I have to push myself very hard to do anything.  
 3 I cannot do any work at all.
16. 0 I can sleep as well as usual.  
 1 I do not sleep as well as I used to.  
 2 I wake up 1-2 hours earlier than usual and find it hard to get back to sleep.  
 3 I wake up several hours earlier than I used to and cannot get back to sleep.
17. 0 I do not get more tired than usual.  
 1 I get tired more easily than I used to.  
 2 I get tired from doing almost anything.  
 3 I am too tired to do anything.

18. 0 My appetite is no worse than usual.  
 1 My appetite is not as good as it used to be.  
 2 My appetite is much worse now.  
 3 I have no appetite at all anymore.
19. 0 I have not lost much weight, if any, lately.  
 1 I have lost more than 5 pounds.  
 2 I have lost more than 10 pounds.  
 3 I have lost more than 15 pounds.  
 I am purposely trying to lose weight by eating less.  
 \_\_\_\_\_yes \_\_\_\_\_no
20. 0 I am no more worried about my health than usual.  
 1 I am worried about physical problems such as aches and pains; or upset stomach; or constipation.  
 2 I am very worried about physical problems and it is hard to think of much else.  
 3 I am so worried about my physical problems that I cannot think about anything else.
21. 0 I have not noticed any recent change in my interest in sex.  
 1 I am less interested in sex than I used to be.  
 2 I am much less interested in sex now.  
 3 I have lost interest in sex completely.

\_\_\_\_\_ Subtotal Page 2  
 \_\_\_\_\_ Subtotal Page 1  
 \_\_\_\_\_ Total Score

## APPENDIX G

**Rhodes Index of Nausea, Vomiting, and Retching**

# Rhodes Index of Nausea, Vomiting, and Retching (INVR)

Directions: Please mark the box in each row that most clearly corresponds to your experience. Please make *one* mark on each *line*.

I.D. Number: \_\_\_\_\_ Date: \_\_\_\_\_  
Time: \_\_\_\_\_

1.	In the last 12 hours, I threw up _____ times.	7 or more	5-6	3-4	1-2	I did not throw up
2.	In the last 12 hours, from retching or dry heaves I have felt _____ distress.	no	mild	moderate	great	severe
3.	In the last 12 hours, from vomiting or throwing up, I have felt _____ distress.	severe	great	moderate	mild	no
4.	In the last 12 hours, I have felt nauseated or sick at my stomach _____.	not at all	1 hour or less	2-3 hours	4-6 hours	more than 6
5.	In the last 12 hours, from nausea /sickness at my stomach, I have felt _____ distress.	no	mild	moderate	great	severe
6.	In the last 12 hours, each time I threw up I produced a _____ amount.	very large (3 cups or more)	large (2-3 cups)	moderate (½ - 2 cups)	small (up to ½ cup)	I did not throw up
7.	In the last 12 hours, I have felt nauseated or sick at my stomach _____ times.	7 or more	5-6	3-4	1-2	no
8.	In the last 12 hours, I have had periods of retching or dry heaves without bringing anything up _____ times.	no	1-2	3-4	5-6	7 or more

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**INSTRUCTIONS FOR ADMINISTERING AND SCORING  
THE RHODES INDEX OF NAUSEA AND VOMITING (INV-2) or  
THE RHODES INDEX OF NAUSEA, VOMITING, AND RETCHING (RINVR)**

Both the Rhodes Index of Nausea and Vomiting Form 2 (INV), and the Rhodes Index of Nausea, Vomiting and Retching (RINVR) are an 8-item, 5-point Likert-type self-report pencil and paper tool that 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, total scores for vomiting, total scores for dry heaves, and subscale scores for each can be derived from the INV. The RINVR has a more concise format and is currently being tested for reliability and validity.

Subjects should be instructed to mark through or draw a circle around the sentence in each row that most clearly corresponds to their experience or describes how they feel. The tool is designed to be administered every 12 hours. The subject should be asked to choose the best hour for his/her schedule. Beginning with the chosen hour, the subject should complete one INV Scale every 12 hours at the same clock hour for the desired length of time.

Both tools are designed to be folded in thirds to display instructions on the back of the form. The form can be conveniently placed in a pocket or purse.

In order to score the INV or the RINVR, reverse items 1, 3, 6, and 7. Then assign a numeric value to each response from 0, the least amount of distress, to 4, the most distress. Total symptom experience from nausea and vomiting is calculated by summing the patient's responses to each of the 8 items on the Rhodes INV. The potential range of scores is from a low of 0 to a maximum score of 32. Subscale scores also can be obtained from the Rhodes INV for the following:

<u>Subscales for Symptom Experience</u>	<u>Items on Scale</u>	<u>Potential Range of Scores</u>
Nausea experience	4, 5, 7	0-12
Vomiting experience	1, 3, 6	0-12
Retching experience	2, 8	<u>0-8</u>
Total Experience Score	All Items	0-32

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<u>Subscales for Symptom Occurrence</u>	<u>Items on Scale</u>	<u>Potential Range of Scores</u>
Nausea occurrence	4, 7	0-8
Vomiting occurrence	1, 6	0-8
Retching occurrence	8	<u>0-4</u>
Total Occurrence Score	All Items	0-20

---

<u>Subscales for Symptom Distress</u>	<u>Items on Scale</u>	<u>Potential Range of Score</u>
Nausea distress	5	0-4
Vomiting distress	3	0-4
Retching distress	2	<u>0-4</u>
Total Distress Score	All Items	0-12

VR:cjh 8/87; 4/92; VR:ld 3/93; VR:lk 12/96

Rhodes\1996\RINVR

**APPENDIX H****Letter of Permission to Use Rhodes Index of Nausea.****Vomiting, and Retching**

From: [REDACTED]

[REDACTED]

Subject: RE: Rhodes Index of Nausea and Vomiting (INVR)

Date: Thursday, September 02, 1999 12:32 PM

There is no fee for the instrument but a copy of your research outcomes is requested. A copy of the INVR (white paper for better duplication) will be forwarded to you along with a copy of the instructions for administering and scoring. Proper citation of the copyrighted instrument is expected. Best wishes on a well chosen project.

--V. Rhodes

-----  
[REDACTED]  
1999 9:40 AM  
To: Rhodes, Verna

Subject: Re: Rhodes Index of Nausea and Vomiting(INVR)

Dear Dr. Rhodes:

Thank you for your permission to use your instrument. You mentioned in your reply that you would mail me a copy of the instrument. I would like that. My home address is:

[REDACTED]  
Thank you so much again. Is there a fee to use your instrument?

----- Original Message -----

From: [REDACTED]

Subject: RE: Rhodes Index of Nausea and Vomiting (INV)

Dear Christina:

In the June, 1999 issue of ONCOLOGY NURSING FORUM, you will find a manuscript about the new format of the INV, the INVR. Examples of the difference between the two instruments are illustrated and the INVR is shown. I suggest the printing of such on buff colored paper for better visual reception. In the event you wish a copy of the printed instrument, as we have it, please forward your address. However, you have my permission to use the INVR in your doctoral study of a most worthwhile topic. If you have further questions, please contact me at

[REDACTED]  
Sincerely,

Verna A. Rhodes

[REDACTED]  
[REDACTED]  
[REDACTED]  
Subject: Rhodes Index Of Nausea and Vomiting-Form (INV)

Hello Dr Rhodes

My name is Christine Meyer and I am a graduate student in the doctoral program in the School of Nursing at Duquesne University in Pittsburgh. I am interested in using your INV Form 2 in my study for my dissertation. The purpose of my study is to investigate the efficacy of acupressure wrist bands on the incidence, frequency, duration, and intensity of nausea and vomiting in patients who are receiving chemotherapy in an outpatient setting. I am planning to ask the patients to complete the NVI each day beginning with day of chemo to 72 hours after chemo.

I read in the Instruments for Assessing Clinical Problems that a new format of the INV-2, the Rhodes, Index of nausea, Vomiting and retching (RINVR) is being tested for reliability and validity.

I am writing in hopes that you may be able to help me and possibly answer a few questions:

- Could you direct me to a published source for the reliability and validity for the new format of the RINVR? If not, would you consider sharing that information with me so I can include it in my Methodology section?

- I am not sure about the formal process to obtain your tool. I found your email address at the website called <http://www.qlmed.org/INV/index.html> and it said to contact you for information and permission to use your tool. I would like to request permission to use your tool in my dissertation study.

- What and how do I go about ordering the tool. Is there a fee per use, per tool?

I know that you must be a very busy person, but I would surely appreciate any direction or advice that you may be able to provide regarding the use of your tool.

I hope to hear from you soon.

Sincerely,

Christine Meyer, RN, MSN (doctoral student)

## APPENDIX I

Home Log for the Experimental Group



Patient Name: \_\_\_\_\_

## HOME LOG

Wrist Used: Right      Left

Date: \_\_\_\_\_

ID NUMBER: \_\_\_\_\_

### Directions for Home Log

- Circle the appropriate wrist location in the upper right corner of this form.
- Please wear the acupressure band on your dominant wrist, with the rectangular block placed as precisely as possible according to the instructions.
- Please wear the acupressure band as continuously as possible for 72 hours after your chemotherapy treatment. If you remove the band for more than 5 minutes, please record this information in the log with the date, time, length of time that you did not wear the band, and reason for removing the band.
- It is recommended that you wear the acupressure band while you shower or bathe, and replace with a dry band after your shower or bath.
- If you experience nausea or vomiting, or both at any time from the time that you receive your chemotherapy treatment until 72 hours after the treatment, please make an entry into this log. Another person can record the information you provide.
- If you begin to feel sick in your stomach at any time, it is recommended that you may press on the bead on the inner aspect of your wrist for 5 minutes at a time, to help you feel better.
- Please make one entry before you start your chemotherapy treatment. Record a zero (0) for the absence of nausea or vomiting.
- Nausea and vomiting is a very unpleasant experience, and at times, you may feel too sick to complete this form. However, it is very important to obtain information from you that is as accurate as possible for this study. Please do your best to complete this log as accurately and promptly as possible. Your responses will help make this a better study and will possibly assist future patients who will receive chemotherapy.
- If you experience both nausea and vomiting at the same time, please enter information on them on two separate lines or rows.
- If you do not experience any nausea or vomiting for a 24-hour period, please make an entry every 24 hours.

See other side for sample.

Patient Name: \_\_\_\_\_

**HOME LOG**

Wrist Used: **Right**      **Left**

Date: \_\_\_\_\_

ID NUMBER: \_\_\_\_\_

**SAMPLE**

<b>Date and Time of Chemotherapy Treatment:</b>							
<b>Date</b>	<b>Time</b>	<b>Event</b>	<b>Rating of Event</b>	<b>What did you do to help control the nausea or vomiting?</b>	<b>Rating of Nausea or Vomiting 30 minutes after Remedy</b>	<b>Entered by:</b>	<b>Comments</b>
		0. Removed band 1. Nausea 2. Vomit 3. Retching	0. No distress 1. Mild distress 2. Moderate distress 3. Great distress 4. Severe distress	0. No drug - no band 1. Took Drug only (name it) 2. Used acupressure bands only 3. Pressed on acupressure band for 5 minutes only 4. Used both drug & acupressure 5. Used drug and pressed on the acupressure band for 5 minutes	0. No Nausea or Vomiting 1. Mild distress 2. Moderate distress 3. Great distress 4. Severe distress	1. Patient 2. Family 3. Friend 4. Other (please identify)	
1	<b>Before Chemo</b> 8-26-99 8:45 am	∅	∅	① Took Reglan	∅	1-patient	
2	8-26-99 1:15 pm	Vomited	4	③ and ⑤ Pressed on band for 5 minutes, at two different times	1	1- patient	I threw up but nausea is almost gone.
3	8-27-99 3:25 pm	Removed band for 1 hour	2	① Took Reglan	∅	1-patient	Did not want I to explain what the band was to a visitor
4	8-27-99 5 pm	Nausea	3	⑤ Continued to have some dry heaves for 1 hour	2	4 Home nurse	
5							

Patient Name: \_\_\_\_\_

**HOME LOG**

Wrist Used: **Right**      **Left**

Date: \_\_\_\_\_

ID NUMBER: \_\_\_\_\_

**Date and Time of Chemotherapy Treatment:**

Date	Time	Event	Rating of Event	What did you do to help control the nausea or vomiting?	Rating of Nausea or Vomiting 30 minutes after Remedy	Entered by:	Comments
		0. Removed band 1. Nausea 2. Vomit 3. Retching	0. No distress 1. Mild distress 2. Moderate distress 3. Great distress 4. Severe distress	0. No drug - no band 1. Took Drug only (name it) 2. Used acupressure bands only 3. Pressed on acupressure band for 5 minutes only 4. Used both drug & acupressure 5. Used drug and pressed on the acupressure band for 5 minutes	0. No Nausea or Vomiting 1. Mild distress 2. Moderate distress 3. Great distress 4. Severe distress	1. Patient 2. Family 3. Friend 4. Other (please identify)	
1	<b>Before Chemo</b>						
2							
3							
4							
5							
6							
7							
8							
9							
10							
11							
12							
13							

Patient Name: \_\_\_\_\_

**HOME LOG**

Wrist Used: Right      Left

Date: \_\_\_\_\_

ID NUMBER: \_\_\_\_\_

**Date and Time of Chemotherapy Treatment:**

Date	Time	Event	Rating of Event	What did you do to help control the nausea or vomiting?	Rating of Nausea or Vomiting 30 minutes after Remedy	Entered by:	Comments
		0. Removed band 1. Nausea 2. Vomit 3. Retching	0. No distress 1. Mild distress 2. Moderate distress 3. Great distress 4. Severe distress	0. No drug -no band 1. Took Drug only (name it) 2. Used acupressure bands only 3. Pressed on acupressure band for 5 minutes only 4. Used both drug & acupressure 5. Used drug and pressed on the acupressure band for 5 minutes	0. No Nausea or Vomiting 1. Mild distress 2. Moderate distress 3. Great distress 4. Severe distress	1. Patient 2. Family 3. Friend 4. Other (please identify)	
14							
15							
16							
17							
18							
19							
20							
21							
22							
23							
24							
25							

## APPENDIX J

Home Log for the Control Group

**Patient Name:** \_\_\_\_\_

**HOME LOG**

**Wrist Used:** **Right**      **Left**

**Date:** \_\_\_\_\_

**ID NUMBER:** \_\_\_\_\_

**Directions for Home Log**

- Circle the appropriate wrist location in the upper right corner of this form.
- Please wear the acupressure band on your dominant wrist, with the rectangular block placed as precisely as possible according to the instructions.
- Please wear the acupressure band as continuously as possible for 72 hours after your chemotherapy treatment. If you remove the band for more than 5 minutes, please record this information in the log with the date, time, length of time that you did not wear the band, and reason for removing the band.
- It is recommended that you wear the acupressure band while you shower or bathe, and replace with a dry band after your shower or bath.
- If you experience nausea or vomiting, or both at any time from the time that you receive your chemotherapy treatment until 72 hours after the treatment, please make an entry into this log. Another person can record the information you provide.
- If you begin to feel sick in your stomach at any time, it is recommended that you may press on the band on the outer aspect of your wrist for 5 minutes at a time, to help you feel better.
- Please make one entry before you start your chemotherapy treatment today. Record a zero (Ø) for the absence of nausea or vomiting.
- Nausea and vomiting is a very unpleasant experience, and at times, you may feel too sick to complete this form. However, it is very important to obtain information from you that is as accurate as possible for this study. Please do your best to complete this log as accurately and promptly as possible. Your responses will help make this a better study and will possibly assist future patients who will receive chemotherapy.
- If you experience both nausea and vomiting at the same time, please enter information on them on two separate lines or rows.
- If you do not experience any nausea or vomiting for a 24-hour period, please make an entry every 24 hours.

See other side for sample.

Patient Name: \_\_\_\_\_

**HOME LOG**

Wrist Used: Right      Left

Date: \_\_\_\_\_

ID NUMBER: \_\_\_\_\_

**SAMPLE**

<b>Date and Time of Chemotherapy Treatment:</b>							
<b>Date</b>	<b>Time</b>	<b>Event</b>	<b>Rating of Event</b>	<b>What did you do to help control the nausea or vomiting?</b>	<b>Rating of Nausea or Vomiting 30 minutes after Remedy</b>	<b>Entered by:</b>	<b>Comments</b>
		4. Removed band 5. Nausea 6. Vomit 7. Retching	5. No distress 6. Mild distress 7. Moderate distress 8. Great distress 9. Severe distress	6. No drug - no band 7. Took Drug only (name it) 8. Used acupressure bands only 9. Pressed on acupressure band for 5 minutes only 10. Used both drug & acupressure 11. Used drug and pressed on the acupressure band for 5 minutes	5. No Nausea or Vomiting 6. Mild distress 7. Moderate distress 8. Great distress 9. Severe distress	5. Patient 6. Family 7. Friend 8. Other (please identify)	
1	Before Chemo 8-26-99 8:45 am	∅	∅	① Took Reglan	∅	1-patient	
2	8-26-99 1:15 pm	Vomited	4	③ and ⑤ Pressed on band for 5 minutes, at two different times	1	1- patient	I threw up but nausea is almost gone.
3	8-27-99 3:25 pm	Removed band for 1 hour	2	① Took Reglan	∅	1-patient	Did not want 1 to explain what the band was to a visitor
4	8-27-99 5 pm	Nausea	3	⑤ Continued to have some dry heaves for 1 hour	2	4 Home nurse	
5							

Patient Name: \_\_\_\_\_

**HOME LOG**

Wrist Used: Right Left

Date: \_\_\_\_\_

ID NUMBER: \_\_\_\_\_

**Date and Time of Chemotherapy Treatment:**

Date	Time	Event	Rating of Event	What did you do to help control the nausea or vomiting?	Rating of Nausea or Vomiting 30 minutes after Remedy	Entered by:	Comments
		4. Removed band 5. Nausea 6. Vomit 7. Retching	5. No distress 6. Mild distress 7. Moderate distress 8. Great distress 9. Severe distress	6. No drug - no band 7. Took Drug only (name it) 8. Used acupressure bands only 9. Pressed on acupressure band for 5 minutes only 10. Used both drug & acupressure 11. Used drug and pressed on the acupressure band for 5 minutes	5. No Nausea or Vomiting 6. Mild distress 7. Moderate distress 8. Great distress 9. Severe distress	5. Patient 6. Family 7. Friend 8. Other (please identify)	
1	Before Chemo						
2							
3							
4							
5							
6							
7							
8							
9							
10							
11							
12							
13							



Patient Name: \_\_\_\_\_

**HOME LOG**

Wrist Used: Right      Left

Date: \_\_\_\_\_

ID NUMBER: \_\_\_\_\_

**Date and Time of Chemotherapy Treatment:**

Date	Time	Event	Rating of Event	What did you do to help control the nausea or vomiting?	Rating of Nausea or Vomiting 30 minutes after Remedy	Entered by:	Comments
		4. Removed band 5. Nausea 6. Vomit 7. Retching	5. No distress 6. Mild distress 7. Moderate distress 8. Great distress 9. Severe distress	6. No drug -no band 7. Took Drug only (name it) 8. Used acupressure bands only 9. Pressed on acupressure band for 5 minutes only 10. Used both drug & acupressure 11. Used drug and pressed on the acupressure band for 5 minutes	5. No Nausea or Vomiting 6. Mild distress 7. Moderate distress 8. Great distress 9. Severe distress	5. Patient 6. Family 7. Friend 8. Other (please identify)	
14							
15							
16							
17							
18							
19							
20							
21							
22							
23							
24							
25							

APPENDIX K

Confidentiality Statement

## Confidentiality Statement

(to be signed by research assistants who participate in a study with access to confidential information)

This statement summarizes the responsibilities and obligations of all persons who use, create or receive confidential records and information relating patients and staff. It is the responsibility of all persons granted access to confidential information to protect the confidentiality of patient, employee and hospital information and to make use of that information only to the extent authorized and necessary to conduct the research investigation.

*I recognize and acknowledge that all patient-identifiable information is confidential. I agree that I will not, at any time during or after my association with this research study, improperly disclose any confidential information to any person or permit any unauthorized person to examine or make copies of any reports, documents, or on-line information that comes into my possession. Additionally, as this confidential information is available only on a Need-to-Know basis, I will not access confidential information without authorization and will do so only when required to do so.*

*I recognize that the unauthorized disclosure of confidential information is totally prohibited.*

<b>Full Name (Print):</b>	
<b>Signature:</b>	
<b>Date:</b>	
<b>Research Study:</b>	The Effectiveness of Acupressure for Chemotherapy-Induced Nausea and Vomiting
<b>Primary Investigator:</b>	Christine D. Meyer, RN, MSN Home Address City, State Zip Phone: (xxx) xxx-xxxx
<b>Dissertation Chair:</b>	Gladys Husted, RN, PhD Professor of Nursing Duquesne University School of Nursing Forbes Avenue Pittsburgh, PA 15282 Phone: [REDACTED]

**Appendix L**

**Screening Tool to Determine Eligibility for Inclusion into Study**

**Directions: Check off the appropriate responses. If any check is made in the clear white box, this indicates that this patient is ineligible for inclusion into the study**

Patient Name	YES	NO
• Speak and read English		
• Older than 18 years old		
• Histologically proven diagnosis of breast cancer, lung cancer, or bladder		
• Chemotherapy-naïve (NEVER received chemotherapy)		
• Receiving Chemotherapy with emetogenic potential $\geq 4$		
• Expected survival span > 4 months		
• Previous experience with acupressure band		
<u>Presence of contraindicated conditions:</u>		
• Ex. Lymphodema; other edema, lack of arms; burns, wounds, cast, brace or sensory deficit in both arms		
• Metastatic CA to brain		
• Documented hypercalcemia		
• Documented hyponatremia		
• Documented uremia		
• Bowel Obstruction		
• Known emesis causing GI condition (cancer of stomach)		
• AIDS		
• Peripheral Neuropathy		
• Current documented psychosis		
• Concurrent radiotherapy		
• Receiving continuous infusion therapy		

**Appendix M****Record of All Eligible Patients Asked to Participate in the Study**

	<b>Date</b>	<b>Patient Name</b>	<b>Agreement to Participate? Yes or No</b>	<b>If Yes, Patient Code</b>	<b>If No, cite the reason</b>
1.					
2.					
3.					
4.					
5.					
6.					
7.					
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9.					
10.					
11.					
12.					
13.					
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17.					
18.					
19.					
20.					
21.					
22.					
23.					
24.					
25.					

**APPENDIX N**

**Subject Consent Form**



Approval Date: 2/23/01  
Renewal Date: 7/25/01;  
University  
Institutional Review Board  
IRB Number: 000768  
Page 1 of 4

University..... Cancer Institute

CONSENT TO ACT AS A SUBJECT IN A CLINICAL STUDY

TITLE Effectiveness of Acupressure for Chemotherapy-Induced Nausea and Vomiting

PRINCIPAL INVESTIGATOR: Christine D. Meyer, RN, MSN  
Doctoral Candidate  
Duquesne University, School of Nursing

DISSERTATION CHAIR: Gladys L. Husted, RN, PhD  
Professor of Nursing

CO-INVESTIGATORS: Louis Pietragallo MD; Ronald Fierro, MD; Martin Earle, MD; Kevin Kane, MD; Samuel Jacobs, MD; Jerome Seid, MD; Ronald Stoller, MD; Adam Brufsky, MD; Ranesh Ramanathan, MD; Sirisha Mahankali, MD; Cynthia Stanish, RN; Phyllis Wilson, RN; Mary Ellen Churchick; RN, Darrell Lis, RN; Catherine Bender, RN, Ph.D.; Jil Tauch, RN

SOURCE OF SUPPORT: None

DESCRIPTION:

The purpose of this research is to determine if acupressure is effective in the management of nausea, vomiting, and retching associated with the administration of chemotherapy. Participants in the study will include 60 male and female patients over the age of 18 years who are receiving chemotherapy for the first time. Participants will be randomly assigned into one of two groups: a control group or an experimental group. Both groups will be given a wristband to wear as instructed. The control group will receive no acupressure. The experimental group will receive acupressure. Because you have been scheduled by your physician to receive chemotherapy as a part of your treatment, you are being asked to participate in this study at the University.

If you agree to participate in this study you will be requested to complete the following paper and pencil forms before starting your chemotherapy:

- 1) a questionnaire requesting information such as your name, age, diagnosis, allergies, and history of selected conditions
- 2) two (2) brief questionnaires that question how you are feeling, in general.
- 3) an eight-item, self-report tool to measure the incidence, duration and intensity of nausea, vomiting and retching during your first visit before you receive chemotherapy
- 4) a single entry in the log that will be used during the study to record bouts of nausea, vomiting or retching.

After the chemotherapy is administered, you will also be asked to:

- 1) complete an eight-item, self-report tool to measure the incidence, duration and intensity of nausea, vomiting and retching for four evenings beginning with the day of chemotherapy and for the next three (3) evenings
- 2) record all bouts of nausea, vomiting and retching in the Home log
- 3) wear the band continuously for four days from the time you apply it before your first chemotherapy treatment until the fourth evening after your chemotherapy session.

#### PROCEDURE

Sixty patients will be randomly assigned to the experimental and control groups according to specific inclusion and exclusion criteria. Eligible patients will be asked if they would be interested in participating in a study that is studying the effectiveness of an acupuncture band on their dominant wrist to help them cope with nausea, vomiting, and retching associated with chemotherapy. If the patient agrees to participate in the study, the patient will be asked to read and sign the consent form, and then be randomly assigned into a treatment or control group. Patients who agree will complete the following items: 2 consent forms, a demographic questionnaire, Beck's Anxiety Inventory, Beck's Depression Inventory, The Rhodes Index of Nausea, Vomiting and Retching, and make one entry into the Home Diary Log. The chemotherapy nurse will complete a short medical questionnaire. The acupuncture band will be placed on the dominant wrist at least 30 minutes before chemotherapy begins. The patient will be instructed to wear the band 24 hours a day until the 4th evening. Patients will be instructed to press a specific point on the band for five minutes if nausea, vomiting or retching is experienced. Two bands will be provided to each participant so the patient can bathe or shower with the band in place and replace with a dry band.

Each patient will complete the Rhodes Nausea, Vomiting, and Retching Index each evening, and enter comments in their Home Diary Log with each episode of nausea, vomiting or retching for four evenings starting with the day of chemotherapy. The PI will call each participant within 48 hours after the administration of the chemotherapy to ask if there are any questions, and to remind the participant to mail their Log and Indices in the stamped, self-addressed

envelope on the fifth day . If the forms are not returned by the eighth day the PI will call the patient to provide a gentle reminder to mail the forms right away.

**RISKS AND BENEFITS:**

No known risks can be identified with this project. Benefits include a potential reduction in the incidence, duration, frequency and/or intensity of nausea, vomiting, and retching associated with the administration of chemotherapy at no cost to you. Results of the study may help future patients who experience nausea and vomiting

**ALTERNATIVE TREATMENTS:**

Your physician can provide you with detailed information about your disease and the benefits of the various treatments available. You have been told that you should feel free to discuss your disease and the probable course of your disease with your doctor.

**NEW INFORMATION:** You, or your representative, will be promptly notified of any new information that may cause you to change your mind about continuing to participate in this study. You have been told that should your disease become worse, should new scientific developments occur that indicate this treatment is not in your best interest, or should your physician feel that this treatment is no longer in your best interest, the treatment will be stopped.

**COSTS AND PAYMENTS:** Participation in this study is voluntary. No payment for participation will be given.

**CONFIDENTIALITY:** You understand that a record of your progress while on the study will be kept in a confidential form at the University Cancer Institute (UCI). However, your medical records may be examined and copied by members of the Food and Drug Administration (FDA) during their required reviews. You will not be specifically identified in any publication or research results. You understand that your research records, like hospital records, may be subpoenaed by court order. Your medical records and study records will be reviewed by qualified members of the UCI. All research records will be kept at the University for at least five years after the study has ended.

**RIGHT TO REFUSE/WITHDRAW:** You understand that you are free to refuse to participate in this study or withdraw at any time, and that your decision will not adversely affect your care at this institution or cause a loss of benefits to which you might otherwise be entitled.

**COMPENSATION FOR ILLNESS OR INJURY:** University investigators and their associates who provide services at the University Health system recognize the importance of your voluntary participation in their research studies. These individuals and their staffs will make reasonable efforts to minimize, control, and treat any injuries that may arise as a result of this research.

If you believe that you are injured as the result of the research procedures being performed, you should immediately contact the Principal Investigator listed on the cover sheet of this form or the University Institutional Review Board (Phone: xxx-xxx-xxxx). Emergency medical treatment for injuries solely and directly relating to your participation in this research will be provided to you by the hospitals of the University. It is possible that the University hospital may bill your insurance provider for the costs of this emergency treatment, but none of these costs will be charged directly to you. If your research-related injury requires medical care beyond this emergency treatment, you will be responsible for the costs of this follow-up care unless otherwise specifically stated below. You will not receive monetary payment for, or associated with, any injury that you suffer in relation to this research.

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**VOLUNTARY CONSENT:** I certify that I have read the preceding, or it has been read to me, and I understand its contents. I understand that any future questions I have about the research will be answered by a qualified individual or by the investigators listed at the beginning of this consent form at the phone numbers given. I also understand that I may always request that a listed investigator answer my questions. Any questions I have about my rights as a research subject will be answered by the Human Subjects Protection Advocate at the University IRB Office (xxx-xxx-xxxx), or Gene Mariani, Chair of IRB at Duquesne University ( ). A copy of this consent form will be given to me. My signature below means that I have freely agreed to participate in this project.

\_\_\_\_\_  
Date

\_\_\_\_\_  
Patient's Signature

\_\_\_\_\_  
Date

\_\_\_\_\_  
Witness' Signature

**INVESTIGATOR'S CERTIFICATION:** I certify that the nature and purpose, the potential benefits, and possible risks associated with participation in this research study have been explained to the above individual and that any questions about this information have been answered.

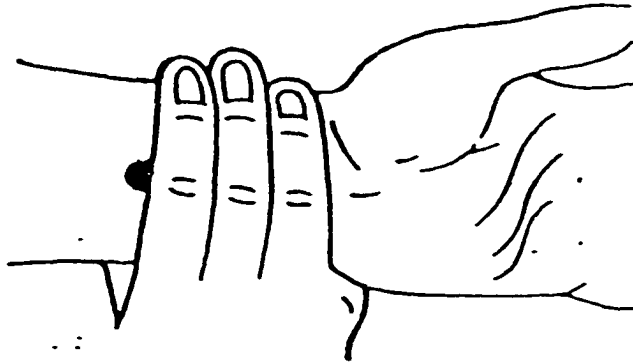
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Date

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Investigator's Signature

**APPENDIX O****Directions for Placement of Acupressure Band at P6 for Experimental Group**

### Instructions for Band Placement

- Place the band on the wrist of your dominant hand at least 30 minutes before your chemotherapy. Position the band so that the black rectangle area on the inner side of the band is centered on the inside of your wrist at the P6 point. You can locate this point by measuring the distance with your three fingers (index, middle and ring fingers) from the first wrist crease. See Figure 1.

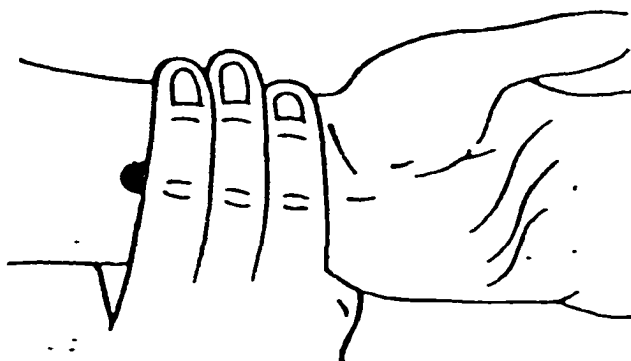


- Tighten the band until it is comfortably snug, and press the two adhesive surfaces together. You may need to slightly adjust the placement of the band in order to locate your own pressure point. You can expect relief to begin within 30 minutes or less.
- 
- If you begin to feel sick in your stomach at any time, press continuously on the bead for 5 minutes each time to help you feel better. Please record each time you do this in your Home Log.
  - You are encouraged to wear the band continuously for the first 72 hours after chemotherapy, even while you bathe or shower. You will be given 2 bands to use in order to replace the wet band.
  - If the band becomes soiled, it can be HAND WASHED in COLD water with mild soap, and air-dried.

**APPENDIX P****Directions for Placement of Acupressure Band at P6 for the Control Group**

### Instructions for Band Placement

- Place the band on the wrist of your dominant hand at least 30 minutes before your chemotherapy. Position the band so that the black rectangle area on the inner side of the band is centered on the inside of your wrist at the P6 point. You can locate this point by measuring the distance with your three fingers (index, middle and ring fingers) from the first wrist crease. See Figure 1.



- Tighten the band until it is comfortably snug, and press the two adhesive surfaces together. You may need to slightly adjust the placement of the band in order to locate your own pressure point. You can expect relief to begin within 30 minutes or less.

- 
- If you begin to feel sick in your stomach at any time, press continuously on the band on the outer aspect of the wrist for 5 minutes each time to help you feel better. Please record each time you do this in your Home Log.
  - You are encouraged to wear the band continuously for the first 72 hours after chemotherapy, even while you bathe or shower. You will be given 2 bands to use in order to replace the wet band.
  - If the band becomes soiled, it can be HAND WASHED in COLD water with mild soap, and air-dried.



## APPENDIX Q

Letters of Permission Duquesne University IRB, Participating Hospital IRB, and the  
Participating Hospital Cancer Institute



Duquesne University  
Institutional Review Board  
MEMORANDUM

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**From:** Eugene R. Mariani, Chair, DU-IRB [REDACTED]  
**To:** Christine D. Meyer  
**Re:** Proposal - "Efficacy of Acupressure Treatment at Neiguan Point with Acupressure Bands for Chemotherapy-induced Nausea, Vomiting and Retching"  
**Date:** December 7, 1999

Based upon the Department of Health and Human Services (HHS) regulations for the Protection of Human Subjects (45 CFR 46) as amended; 56 FR 28003, June 18, 1991), I have reviewed this research proposal in accordance with these procedures and those established and published in the Federal Register (46 FR 8392), January 26, 1981 for expedited review.

Based upon internal faculty review, the recommendation of IRB member Patricia Fedorka, and my own review as chairman of the Institutional Review Board, I have determined that your research proposal is consistent with the requirements of the appropriate sections of the *Code of Federal Regulations* cited above *re* expedited review. Furthermore, the intended research involves minimal risk to human subjects whose only involvement in the study will be to wear an acupressure band or a placebo, complete various paper and pencil forms, maintain a daily log of their experiences of nausea, vomiting and retching (NVR) for 72 hours after the day of chemotherapy and to complete the Rhodes Index of Nausea, Vomiting, and Retching-Form 2 each evening, starting the evening of the day of chemotherapy, and for the next three evenings. Your proposed research is hereby **approved** on an **expedited** basis.

Any additions to or changes in the procedures involving human subjects post-DU IRB approval must be brought to our attention by you. Please be advised that the DU IRB reserves the right to suspend or terminate the study if it is not conducted in accordance with the approved protocol or if any unexpected, adverse reactions arise. In the latter instance, either Patricia Fedorka, as your DU IRB representative, or, the DU IRB Chair, should be notified promptly. Once your study is complete, please provide the DU IRB with a copy of the study results.

Best wishes for your research.

c: Dr. Patricia Fedorka, School of Nursing  
Dr. Gladys Husted, School of Nursing  
Office of Sponsored Research  
IRB Files

502 Administration Building Pittsburgh PA 15282-0205  
Telephone: [REDACTED] FAX: [REDACTED] Email: [REDACTED]

**Participating Hospital IRB on file**

**Participating Hospital Cancer Institute on file**

**APPENDIX R****Letter to Patients in the Control Group at the Completion of the Study**

Hello,

When you were initially enrolled into the acupressure band study, it was explained that two bands were being examined for their effectiveness in the management of nausea and vomiting that may occur with chemotherapy. As was discussed, if we found that one band was more effective than the other was, we would send you the band that was found to be more effective. The enclosed band was found to be more effective than the one you were given.

It is recommended that you discard the original bands and use the enclosed band. Please note the directions for its use are different. The primary differences are that the enclosed band contains a small bead, which should be placed on the inside of your wrist, and that if you feel any nausea, you should apply pressure to the bead. More detailed instructions are enclosed.

It is suggested that you use the enclosed band for future chemotherapy treatments. Keep in mind that the band should be applied at least 30 minutes before treatment and remain in place for at least 3-4 days after your treatment.

If you have any questions, please call me at my home at [REDACTED]

Thank you again for your willingness to participate in this study.

Sincerely,

Christine D. Meyer, RN, MSN  
Doctoral Candidate  
Home Address  
City, State Zip

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## REFERENCES

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