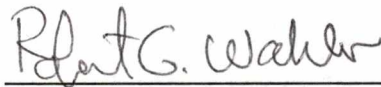


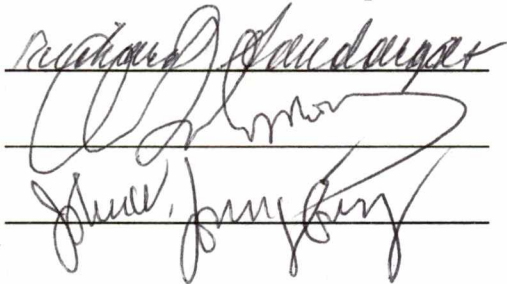
To the Graduate Council:

I am submitting herewith a dissertation written by Beth Gunn entitled "Behavioral Management of Chemotherapy Related Nausea and Vomiting." I have examined the final copy of this dissertation for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of Doctor of Philosophy, with a major in Psychology.



Robert G. Wahler, Major Professor

We have read this dissertation
and recommend its acceptance:



Accepted for the Council:



Vice Provost
and Dean of The Graduate School

BEHAVIORAL MANAGEMENT OF
CHEMOTHERAPY RELATED
NAUSEA AND VOMITING

A Dissertation
Presented for the
Doctor of Philosophy
Degree
The University of Tennessee, Knoxville

Beth Gunn

August 1989

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DEDICATION

To Rhonda Cooper, M.Div.
Jane Dickie, Ph.D. and
Katie Lydon, R.N., M.S.

For their commitment to the highest
professional and human ideals

ACKNOWLEDGEMENTS

Writing a dissertation is a lot like driving toward the Rocky Mountains: the eventual goal looms in the horizon long before arrival is imminent. Evaluating my progress and estimating with any precision the distance that remained, consistently eluded me. In retrospect, these inaccurate perceptions (typically underestimates of the tasks not completed) worked to my advantage by luring me for months toward a goal that seemed only weeks away. It was this vision of a completed dissertation (and academic career for that matter), along with the assistance of numerous individuals that continually renewed my ability to persevere.

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The data they provided however, seems of secondary importance to the friendship that I gained. Equally valuable were the contributions of the subjects themselves, whose willingness to participate stemmed from the hope that others would benefit. I am grateful to these courageous individuals and to members of their families, for what has truly been for me an enriching experience.

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ABSTRACT

Chemotherapy related nausea and vomiting constitutes a critical problem for cancer patients, and introduces both medical complications and psychological distress. For many patients, these adverse side effects become conditioned and occur in the absence of a chemotherapy administration. The lack of a completely acceptable antiemetic agent has stimulated the research of behavioral interventions. The objective of this study was to examine the potential for utilizing progressive muscle relaxation with guided imagery in treating hospitalized oncology patients for nausea and vomiting.

Eight subjects, ages 31 to 70, completed the control/baseline, intervention, and control/follow-up phases. All subjects either had a history of chemotherapy related nausea and vomiting, or were on a chemotherapy program that included: 1) agents with a high emetic potential, 2) plans to receive at least three more cycles, and 3) chemotherapy administration on the inpatient service. The three major components of the 30 minute relaxation training intervention included deep breathing, tensing and relaxing select muscle groups, and guided imagery.

The program of relaxation training was successfully implemented. Nonparametric statistical procedures were utilized solely for the purpose of summarizing and describing data across subjects. These were based on data generated by the six subjects who had previous experience with chemotherapy. According to them, the relaxation procedure helped to

reduce their perceived anxiety, but made no difference regarding their overall experience of nausea or vomiting. The reduction in anxiety was again reported at one month follow-up. Discrepancies were noted between patient and nurse reports. The strengths and limitations of subjective self-report were discussed. It is possible that the two subjects without previous experience with chemotherapy did not perceive the need for the relaxation procedure given their lack of nausea and vomiting. Several trends emerged from the extensive qualitative data and were presented. Important differences (e. g. subject sample, environment) between this research and previous work were presented and the implications for relaxation training were discussed.

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I. INTRODUCTION

One of the primary treatment modalities for cancer - chemotherapy - is undermined by devastating side effects. While those chemical agents employed either destroy or control the growth of cancer cells, they likewise affect other rapidly multiplying cells, such as those of the bone marrow (red and white blood cells and platelets), gastrointestinal tract, (mouth, stomach, intestines), reproductive system, and hair follicles. This toxic action accounts for the immunosuppression, nausea, emesis, diarrhea, sterility, and hair loss that are commonly experienced by patients during the protracted course of chemotherapy (Golden, Horwich, & Lockrich, 1980). Among these chemotherapy-induced side effects, nausea and vomiting are recognized as the most frequent and disabling.

Three major consequences of persistent nausea and vomiting have been identified. First, medical complications from unusually violent retching may result in esophageal tears (Mallory-Weiss syndrome) or in pathological bone fractures (Laszlo, 1983). Dehydration may exacerbate the nephrotoxicity of antineoplastic agents, while prolonged anorexia and malnutrition may reduce the patient's tolerance of normal dosages. Major metabolic disturbances resulting from vomiting include metabolic alkalosis, chloride and potassium depletion, and extracellular fluid depletion (Dennis, 1982). Second, patient discomfort arises from the mental and physical suffering that interferes with their professional and personal lives. Thus, nausea and vomiting exert a significant impact on the patient's quality of life. Third, patient non-compliance frequently

results from the above factors. Patients may terminate chemotherapy prematurely, postpone treatments, or decline therapy altogether. These actions may seriously compromise their chances for survival.

Documented incidence rates of this iatrogenic problem vary considerably. In one report, 40% of the patients surveyed reported that nausea and vomiting interrupted their ability to perform daily activities; 23% of the patients found the symptoms so debilitating that they went to bed (Grant, 1987). In another, 66% of the patients reported nausea and 50% reported vomiting either during or after chemotherapy (Olafsdottir, Sjoden, & Westling, 1986). According to other researchers, almost all patients experience moderately severe nausea and vomiting with many commonly used chemotherapy combinations (Eyre & Ward, 1984).

One logical explanation for these discrepancies is the variable emetic potentials of chemotherapeutic agents. Among the highly potent drugs are Platinol, Adriamycin, Nitrogen mustard and DTIC. Moderately potent drugs include Cytosan, Mutamycin, Methotrexate, and BCNU. Among the least potent drugs are 5-Fluorouracil, Bleomycin, Thiotepa, Vincristine, and Vinblastine. While these general categories are based on usual dosages, chemotherapy agents are thought to have a cumulative effect such that their emetic potentials increase with repeated administrations. For example, the fourteenth course of 5-Fluorouracil might produce moderate nausea and vomiting even though the initial course may have been well tolerated. Also, stronger side effects have been demonstrated to result from regimens involving long infusions as compared to those consisting of short injections (Lyles, Burish, Krozely, &

Oldham, 1982). More extensive classification schemes and inclusive lists of chemotherapy drugs appear elsewhere (see Grant, 1987; Laszlo, 1983; Borison & McCarthy, 1983).

Conditioned nausea and vomiting (CNV) may develop in addition to pharmacologically induced side effects. While the symptoms are virtually identical, conditioned side effects may occur before, during, or after chemotherapy administration. When they occur before treatment, they are generally referred to as anticipatory nausea and vomiting (ANV). When they occur during or after the treatment they appear with and are often indistinguishable from pharmacologically induced side effects (Burish, Carey, Krozely, & Greco, 1987). Thus, conditioned symptoms are associated with the same medical and psychological consequences as pharmacological side effects and once established, are extremely difficult to manage.

The etiology of CNV is most frequently conceptualized through a classical conditioning paradigm. Through repeated pairings of chemotherapy and its pharmacologic side effects, previously neutral stimuli (e.g. the sights, sounds and odors of the treatment setting) can become potent elicitors of nausea and/or vomiting (Redd, Burish, & Andrykowski, 1985). For example, when a patient receives a course of Cytosan, Adriamycin, and 5-Fluorouracil, environmental cues such as the nurse or treatment room may inadvertently become associated with nausea and vomiting. Subsequently these cues may elicit nausea and vomiting in the absence of a chemotherapy administration. This acquired

response is similar in form and intensity to the pharmacologically induced symptoms.

An estimated 14% to 65% of cancer chemotherapy patients develop CNV. As noted by Olafsdottir, Sjoden, & Westling (1986), the type of cancer, the chemotherapeutic treatment regimen, the manner of administering the drugs, the number of treatment sessions experienced by the patients and the manner of assessing nausea and vomiting differ between many of the studies investigating incidence rates. Onset of conditioned symptoms generally occurs after four or five courses of chemotherapy.

Given these statistical data, attempts have been made to delineate variables that are associated with the development of CNV. As suggested by Burish and Carey (1986), most of these variables can be subsumed under two general categories. The first category consists of factors surrounding the actual chemotherapy administration. Conditioning is more likely to occur with more severe pharmacologically induced symptoms, with greater emetogenic drugs, with more distinctive tastes or odors associated with chemotherapy, with the sight of other patients becoming ill, with longer infusions, and with a greater number of previous infusions. The second category consists of individual difference variables. Conditioning is more likely to occur among patients that are less than 40 years old, female and unmarried, anxious or depressed, and who evidence advanced disease. Identification of variables predictive of CNV is geared toward earlier intervention with patients at higher risk.

Pharmacologic interventions for nausea and vomiting have employed various drug groups for their antiemetic properties. Among the more commonly prescribed agents (individually or in combination) are the barbiturates, benzodiazepines, butyrophenones, glucocorticosteroids, and phenothiazines. Adverse side effects frequently accompany these therapies, including extrapyramidal symptoms, agitation, sedation, faintness, lethargy, and weakness. Drowsiness may also occur, but constitutes a desired effect for some patients. More comprehensive lists of antiemetics appear elsewhere (see Grant, 1987; Goodman, 1987).

The effectiveness of these pharmacological agents in controlling chemotherapy induced nausea and vomiting has been limited. While the phenothiazines constitute the most widely prescribed antiemetics, they are only effective for the mild nausea associated with low emetogenic chemotherapies (Yasko, 1985), and are virtually without effect in patients receiving highly potent drugs (Laszlo & Lucas, 1981). Furthermore, the use of standard antiemetics in the management of ANV has proven largely ineffective. Thus, as indicated by previously cited incidence rates, nausea and vomiting remain prevalent despite the prescription of antiemetics and sedatives for most patients.

The absence of a nontoxic and completely effective antiemetic agent for the reduction of chemotherapy related nausea and vomiting has encouraged researchers to explore the usefulness of behavioral strategies for the amelioration of these problems (Burish, Redd, & Carey, 1985). Five separate approaches constitute the core of behavioral interventions: distraction, biofeedback, hypnosis, systematic desensitization, and

progressive muscle relaxation with guided imagery. These techniques hold advantages over standard antiemetics as they are virtually void of side effects, are within the control of the individual patient, are relatively easily learned, and are readily used in clinical and home settings (Cotanch, 1983). There is a small body of research primarily anecdotal in nature, that suggests the possibility of relaxation-induced anxiety (see Heide & Borkovec, 1983). These paradoxical increases in anxiety resulting from therapeutic intervention (e.g. biofeedback), affect a subset of anxious patients and can generally be circumvented through therapist support.

The most widely researched technique, progressive muscle relaxation with guided imagery, is a 30 minute procedure comprised of deep breathing, tensing and relaxing select muscle groups, and guided imagery. While initial reports consisted of single case designs (e.g. Hamberger, 1982), subsequent research employed randomized trials. A recent study by Carey and Burish (1987) evaluated the effectiveness of three strategies for delivering relaxation training. Forty-five subjects were randomly assigned to one of four groups: (a) progressive muscle relaxation training with guided imagery provided by a professional therapist, (b) identical procedures by a trained volunteer (i. e. paraprofessional) therapist, (c) identical procedures provided by professionally prepared audiotapes, or (d) standard treatment (i. e. antiemetic only) control. Subjects in experimental groups received their respective interventions in addition to standard antiemetics. Results indicated that the relaxation training procedures when administered by a professional therapist, reduced emotional distress and physiological

arousal, and increased subject's food intake. While professionally administered relaxation procedures were superior to paraprofessional and audiotaped training, neither of these latter methods reduced symptoms more than standard antiemetics. The failure of professionally administered relaxation training to achieve a reduction in subject's nausea, either during or after chemotherapy constitutes an important finding. This conflicts with previous research (e. g. Burish & Lyles, 1981; Lyles, Burish, Krozely, & Oldham, 1982) and was viewed as a basement effect. When comparing original data, subjects in the present study were found to have considerably lower baseline nausea scores than subjects in the earlier research, thus limiting their capacity for improvement.

These encouraging results among subjects who had already exhibited conditioned nausea and anxiety sparked interest in the possibility of preventing such symptoms from developing. In an important study by Burish and his colleagues (1987), 24 subjects scheduled to receive highly emetogenic chemotherapy regimens were (a) taught progressive muscle relaxation with guided imagery before the initiation of chemotherapy, or (b) placed in a control group. Results indicated that patients who received the relaxation training intervention experienced significantly less nausea and vomiting, and had significantly lower blood pressures, pulse rates, and anxiety than control patients. Thus, data look promising for the reduction or prevention of CNV among patients who receive early training in relaxation procedures.

Research to date has documented the superiority of therapist directed relaxation training, and established the effectiveness of this

procedure for managing conditioned side effects. No consistent reductions in vomiting have been achieved although this may reflect less severe baseline symptoms among patients studied. Symptom reduction is usually greatest during training and declines during follow-up. Finally, relaxation training has been shown to delay or prevent the onset of conditioned side effects in new chemotherapy patients.

As best surmised from the literature, ambulatory outpatients are the sole population upon which these findings have been generated (see Carey & Burish, in press; Sims, 1987). Outpatient chemotherapy administrations generally consist of shorter infusions of less emetogenic agents. While the Burish, Carey, Krozely, & Greco study (1987) utilized newly diagnosed subjects scheduled to be placed on highly emetogenic chemotherapy regimens, neither the specific drugs nor protocols were listed. An additional problem encountered in previous studies is a basement effect due to low baseline levels of nausea (in the 1987 Carey and Burish study) and vomiting. Thus, the effectiveness of relaxation procedures may be contingent upon a medically stable patient population.

The objective of this research was to examine the potential for utilizing progressive muscle relaxation with guided imagery in treating hospitalized oncology patients for nausea and vomiting. These patients tend to receive more potent chemotherapy agents, usually by drip infusion over a period of days, and present with established side effects and advanced disease. The study is viewed as formative with an emphasis placed on describing and evaluating the intervention within the constraints of an inpatient oncology setting.

A within subjects design was utilized, with each subject undergoing all three phases: 1) control/baseline, 2) intervention, and 3) control/follow-up. Nonparametric statistical procedures were utilized solely for the purpose of summarizing and describing data across subjects in a concise manner. In keeping with the formative nature of this research, case by case analyses were undertaken with an emphasis on individual patient responses to the program of relaxation training. An effort was also made to illuminate trends that emerged from the qualitative data.

II. METHOD

Subjects

Subjects were hospitalized cancer patients that represented a range of diagnoses. All were receiving ongoing chemotherapy under the supervision of Alan Solomon, M.D., medical oncologist, and Medical Director of the Baptist Hospital Cancer Center. The Cancer Center is accredited by the American College of Surgeons, and provides the Knoxville community with medical, surgical, radiation, and gynecological oncology services. This setting is unique in having close physical proximity with the 30 bed inpatient oncology unit, which shares staff nurses, social workers, dietitians, and chaplains with the outpatient oncology clinic. Dr. Solomon treats men and women from the East Tennessee region, whose ages range from approximately eighteen through eighty. They represent diverse religious, educational, professional, and socioeconomic backgrounds.

Subjects were drawn from the above population following a referral by Dr. Solomon. In order to meet selection criteria, patients needed to be on a chemotherapy program that included: 1) agents with a high emetic potential (e.g. Adriamycin, Platinol), 2) plans to receive at least three more cycles, and 3) chemotherapy administration on the inpatient service. Patients with a history of chemotherapy related nausea and vomiting who were not receiving chemotherapies with a high emetic potential were also considered.

Twenty-six patients were screened by the investigator at the beginning of a routine hospitalization. Fifteen failed to meet criteria for inclusion. One refused to participate since she believed she had little to contribute, and did not want to complete the necessary questions and forms. Ten were judged to be appropriate candidates and were begun in accordance with the research protocol. The status of two subjects subsequently changed, rendering them inappropriate for the study. One sought treatment at M. D. Anderson Hospital and Tumor Institute in Houston Texas; she had completed the baseline phase. Treatment for the second was discontinued due to a lack of tumor reduction; she had completed the baseline and intervention phases. Differences between these and the remaining subjects were considered insignificant with reference to the research. All subjects were treated in accordance with the American Psychological Association's "Ethical Principles of Psychologists."

Eight subjects completed all phases of the research. There were two females and five males. Their ages ranged from 31 to 70. Figure 1 contains a summary of each subject's treatment history. Subjects differed with respect to the number of years since diagnosis, their number of previous chemotherapy treatments, and the specific agents they received individually or in combination. Antiemetic medications were administered according to the emetic potential of chemotherapeutic agents. No medications were altered as a function of this research.

SUBJECT	CHEMOTHERAPY		RADIATION	SURGERY
Group One *				
5 (16)	H	Adriamycin	External Beam	Left Modified Radical Mastectomy
	M	Cytosan		
	L	5-Fluorouracil		
	M	Methotrexate		
	L	Thiotepa		
	L	Vinblastine		
	L	Vincristine		
3 (14)	L	5-Fluorouracil	----	Colon Resection
7 (10)	H	Adriamycin	External Beam	Right Modified Radical Mastectomy
	M	Cytosan		Radical Hysterectomy
	L	5-Fluorouracil		
	M	Methotrexate		
	L	Thiotepa		
	L	Vinblastine		
	L	Vincristine		
4 (7)	H	Adriamycin	----	Left Nephrectomy
	M	Cytosan		Excision of 2 Tumors (Recurrent)
	H	DTIC		Debulking of Sarcoma Mass (Recurrent)
2 (5)	L	5-Fluorouracil	External Beam	Colon Resection
1 (4)	L	5-Fluorouracil	----	Colon Resection
Group Two				
6 (1)	L	Bleomycin	External Beam	Right Modified Radical Neck Dissection
	M	Methotrexate	Electron Beam	Excision of Chest Wall Lesion (Recurrent)
	L	Vincristine		
8 (0)	M	BCNU	External Beam	Excision of Malignant Melanoma
	H	DTIC		Transurethral Resection of Prostate
				Partial Thyroid Resection (Recurrent)

The number of previous chemotherapy treatments is in parentheses.

*Emetic potentials corresponding to chemotherapy agents are indicated by the following: H=high, M=moderate, and L=low.

Figure 1. Treatment history by subject: chemotherapy agents administered, radiation utilized, and surgery performed.

Instruments

The Manitoba Functional Living Index-Cancer (FLIC) was used to obtain information regarding the subject's quality of life (see Appendix A). Specifically, this instrument measured physical well being and ability, emotional state, sociability, family situation, and nausea. The 22 item questionnaire was designed for repeated patient self-administration at frequent intervals (Schipper & Levitt, 1985). Each item was answerable in Likert format with a range of 1 to 7.

Researchers' belief that the FLIC represents a validated measure of the overall functional quality of a cancer patient's day-to-day life (Schipper, Clinch, McMurray, & Levitt, 1984) is substantiated by strong evidence for both its construct and concurrent validity.

A shortened version (see Burish & Houston, 1979) of the Multiple Affect Adjective Check List (MAACL) was used to measure changing emotional states within the subjects (see Appendix B). Specifically, this instrument measured immediate or day to day changes in anxiety, depression, and hostility. The 55 item check list was designed for the study of emotions or other response tendencies where the measures may be expected to change markedly as a function of changing external or internal events (Zuckerman, Lubin, Vogel, & Valerius, 1964). Sufficient split-half reliabilities and validity have been established (Zuckerman, Lubin, Vogel, & Valerius, 1964).

Several structured interviews (each with a specific focus) were conducted to collect information pertaining to the subject's experience of cancer and of the relaxation training program. While the sets of questions

were predetermined, both the investigator and the subject enjoyed a degree of flexibility to individualize the interviews. The Patient Interview (see Appendix C) was created by the investigator and was based on both her clinical work and that of Buddenhagen (1984) and Weisman (1979). The eleven questions addressed the subject's adjustment in the physical, social, emotional, and spiritual realms. The areas of lifestyle, stress, expectations, locus of control, and personality type were also addressed. A medical history was obtained with particular emphasis placed on the subject's diagnosis of cancer, recurrent disease, treatment modalities, and past nausea and vomiting. The Exit Interview (see Appendix D) was developed by the investigator and provided a mechanism for subject feedback or "debriefing." The five questions elicited the subject's comments regarding their experiences with hospitals, their present admission, their patient teaching, and their level of satisfaction with medical and nursing care. The Relaxation Training Follow-up Interview (see Appendix E) was developed by the investigator to monitor the subject's independent practice at home and in the hospital. The four questions elicited their reasons for practicing or not, and their perceptions of any effect. Their ability to independently implement the relaxation procedure was also assessed. All of the above interviews were previously tested and refined in conjunction with the investigator's patient care responsibilities at the Cancer Center.

Additional brief measures were used to supplement the more thorough interviews, and to obtain very specific information. The two item Expectancy Questionnaire (see Appendix F) and the two item

Confidence Questionnaire (see Appendix G) were adapted from the work of Burish (Carey & Burish, 1984). These rating scales elicited the subject's beliefs regarding their chemotherapy, their participation in the study, and the relaxation training program. The Patient Interaction Checklist (see Appendix H) was based on a similar measure, the Community Interaction Checklist, devised by Wahler and Dumas (1983). When completed, this form provided a list of the subject's visitors while hospitalized, and their length and time of visit.

Data sheets were developed by the investigator to systematically record behavioral observations and the subject's self-reports. The Daily Data Sheet (see Appendix I) was adapted from the work of Burish (Carey & Burish, 1984) and compiled the subject's reports of their nausea, vomiting, anxiety, food intake, sleep, prn medications, and activities. Their assigned nurse, the presence of others, the chemotherapy agent infusing, their comments, and the investigator's observations (all at the time of questioning), were also noted. The Relaxation Training Form (see Appendix J) provided a record of past experience with relaxation training, presence of others, number of independent practice trials and the reasons, vital signs, length and quality of training sessions, ability to follow instructions, and interruptions. The subject's comments, including perceptions of their physiological state, and the investigator's observations were again noted.

Vital signs were obtained in order to monitor changes in the subject's physiological relaxation. These were subsequently taken as indicators of the successful or unsuccessful implementation of the

relaxation training program. Blood pressure and pulse rate were measured via an automated (e. g. IVAC) vital sign monitor. Respiration rate was obtained by observing the subject and counting the number of breaths per minute.

In addition to the above instruments that utilized subjects as the primary source of data, supplementary information was sought from a family member and from members of the inpatient nursing staff. The three item Family Rating Scale (see Appendix K) was adapted from the work of Burish (Carey & Burish, 1984) and had a relative rate the patient's adjustment to chemotherapy, the family's adjustment to the illness, and the severity of the patient's side effects. A description of side effects and any further comments were also noted. The Family Interview (see Appendix L) was created by the investigator and was based on both her clinical work and that of Buddenhagen (1984) and Weisman (1979). The four questions addressed the relationship between the patient and relative, including their perceptions of any changes that had occurred, and the relative's perceptions of the patient's adjustment in the physical, social, emotional, and spiritual realms. The Nurse Form (see Appendix M) was adapted from the work of Burish (Carey & Burish, 1984) and compiled nurses' reports of the subject's nausea, vomiting, anxiety, food intake, and prn medications. The number of patient initiated interactions, the chemotherapy agent infusing, and the nurse's observations (all at the time of questioning) were also recorded.

The relaxation training intervention was adapted from a similar procedure used by Burish (see Carey & Burish, 1984) in his work with

outpatients receiving chemotherapy. The three major components of the present intervention included deep breathing, tensing and relaxing select muscle groups, and guided imagery. During the deep breathing portion, subjects were asked to let their chest and stomach rise up while inhaling through their nose, then to let these areas fall down while exhaling, again through their nose. Breathing was gradually slowed as subjects were encouraged to hold each breath for a few seconds. Subjects were given both a verbal description and a visual example of the correct muscle tensing and relaxing motions. The targeted muscle groups included arms, forehead, jaw and neck, back and shoulders, stomach, thighs, calves, and feet. Areas of the body that were pain generating, immobilized, or that contained an intravenous line were omitted from the procedure. Thus, the intervention was individualized for each subject. During the guided imagery portion, subjects listened to a vivid description of a beach scene, read by the investigator. They were asked to focus their attention exclusively on this scene and their relaxed muscles. The relaxation procedure is not experimental; it is a generally accepted and widely applied clinical technique.

Procedure

All patients who met criteria for inclusion, along with anyone they wished present, were explained the nature of the study and of their involvement. Written informed consent was obtained from patients agreeing to proceed (see Appendix N). This was completed at the beginning of a routine hospitalization. All subsequent procedures

requiring patient participation occurred in the patient's room and in the absence of any visitors. The potential for others to inhibit or otherwise bias the subject's response was thus reduced.

Data collection procedures for the baseline phase continued throughout this hospitalization. Subjects were given the Expectancy Questionnaire and the FLIC. All instruments including these, were administered verbally to subjects by the investigator. This format increased compliance, adjusted for differences in subjects' reading abilities, and proved to be more practical than asking subjects to write while in bed with an intravenous line connecting them to an infusion pump. The medical history was obtained and the Patient Interview was conducted. If available and willing, a family member with the subject's consent, provided information through the Family Rating Scale and the Family Interview. The relative's participation which required about 30 minutes, occurred in a separate private room within the Oncology Unit. Both the Patient and Family Interviews were recorded via a Dictaphone in order to expedite the process. These recordings were transcribed by the investigator, then mechanically erased.

Additional information was collected from patients each hospitalized day and recorded on the Daily Data Sheet and the Patient Interaction Checklist. These measures required about ten minutes per day. An effort was made to collect this information at approximately the same time each day.

Information was also collected from the subject's primary nurse each hospitalized day and recorded on the Nurse Form. This required

about two minutes per day, and occurred at the nurses' station. A similar effort was made to collect this information at approximately the same time each day.

Just prior to discharge, the Exit Interview was completed with subjects. The time commitment from subjects during the entire baseline phase was about three hours.

Data collection procedures for the intervention phase occurred during the subject's next regularly scheduled hospitalization. Subjects were initially given the FLIC, then followed throughout this admission via the Daily Data Sheet, the Patient Interaction Checklist, and the Nurse Form.

The relaxation training intervention, implemented during this phase, began with an explanation (see Appendix O) and opportunity to ask questions. The Confidence Instrument was then completed. Progressive muscle relaxation and guided imagery techniques were taught to subjects and supervised by the investigator each day, with appropriate notations being made on the Relaxation Training Form. Just prior to the 30 minute training sessions, the subject's primary nurse was consulted in order to accommodate both ongoing nursing care, and the investigator's need to minimize interruptions. A "Please Do Not Enter" sign was placed on the subject's door and any distractions in the room were eliminated (e.g. television turned off, visitors excused). After the first training session, subjects were given the Instruction Sheet (see Appendix P). These written instructions were adapted to each subject corresponding to their individualized relaxation procedure. After each training session, subjects

were instructed to practice the relaxation procedure by themselves once per day. An effort was made to conduct these sessions at approximately the same time each day.

During relaxation training on the last day of this admission, pretest vital signs were taken, and the pretest MAACL was administered. Relaxation training then occurred, followed by posttest vital signs, and the posttest MAACL. Vital signs were taken by the investigator and recorded on the Relaxation Training Form. Subjects were instructed to continue practicing the relaxation techniques at home.

Just prior to discharge, the Exit Interview was completed with subjects. The time commitment from subjects during the entire intervention phase was about three-and-one-half hours.

Data collection procedures for the follow-up phase were completed during the subject's next routine hospitalization. Subjects were initially given the FLIC, then again followed throughout this admission via the Daily Data Sheet, the Patient Interaction Checklist, and the Nurse Form.

Just prior to discharge, the Relaxation Training Follow-up Interview, and the Exit Interview were completed with subjects. The time commitment from subjects during the entire follow-up phase was about one-and-one-half hours.

III. RESULTS

The objective of this research was to examine the potential for utilizing progressive muscle relaxation with guided imagery in treating hospitalized oncology patients for nausea and vomiting. Specifically, it was asked whether the addition of relaxation training would be accompanied by any change in patients' experiences of nausea, vomiting, or anxiety. The following nonparametric statistical procedures were utilized solely for the purpose of summarizing and describing data across subjects in a concise manner.

It was anticipated that a program of relaxation training could be successfully implemented for hospitalized patients receiving chemotherapies with a high emetic potential. Data in this section are presented for seven of the eight subjects, as one subject refused vital sign recordings. Figure 2 presents the pre- and post-intervention pulse rates, by subject number. The pulse rates remained constant or decreased in six of the eight subjects. Figure 3 presents the pre- and post-intervention respiration rates, also by subject number. The respiration rates decreased for all subjects except one, whose rate remained constant. For general description, the median provided the most accurate measure of central tendency. Table 1 contains the probability values for blood pressure, pulse and respiration rates (utilizing median scores). The probability values for pulse and respiration rate offer encouraging evidence of the potential for relaxation training to decrease physiological arousal. Each probability value in this table was tested for significance by means of the Wilcoxon

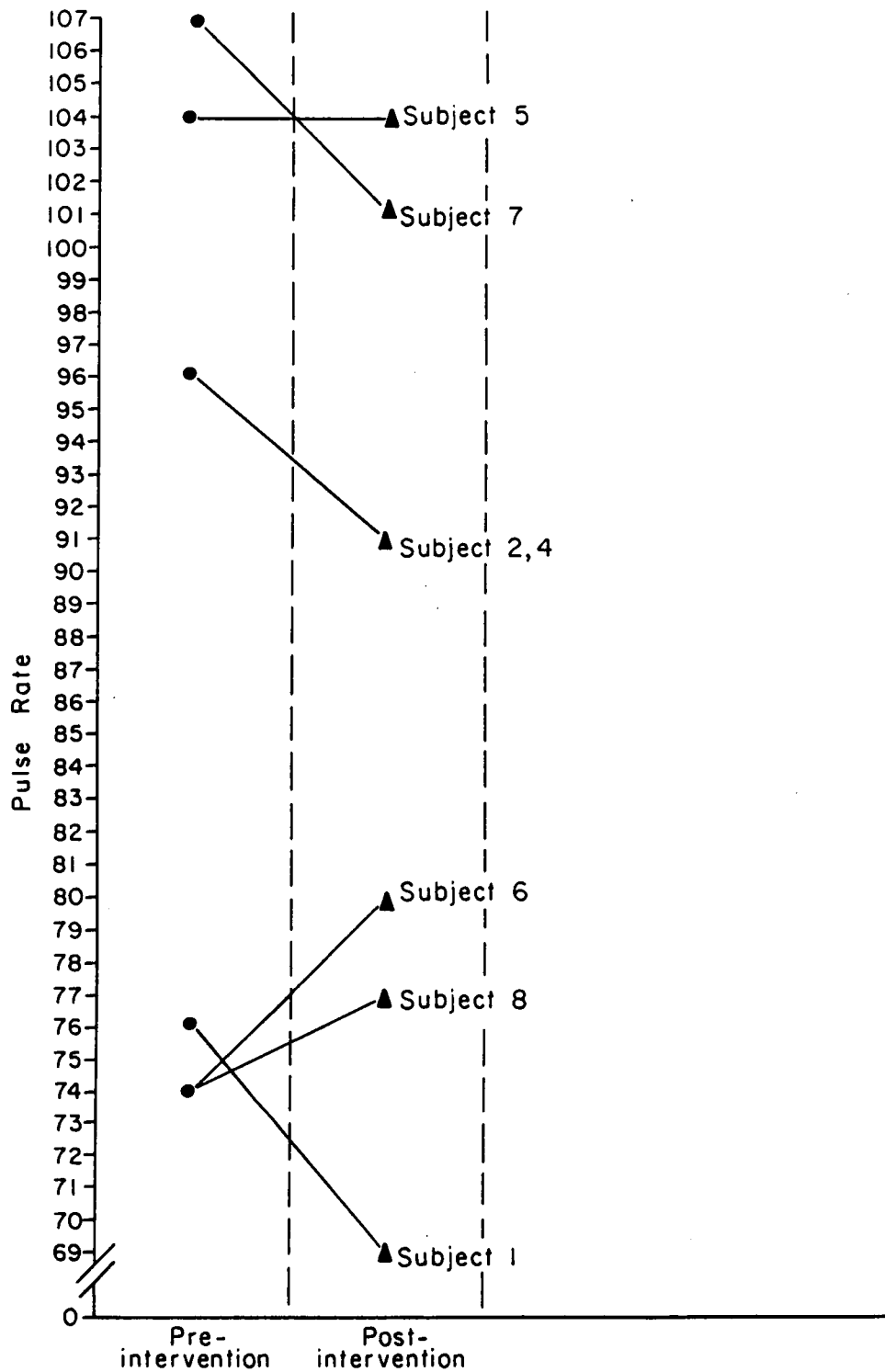


Figure 2. Pre- and post-intervention pulse rates by subject number (using median scores).

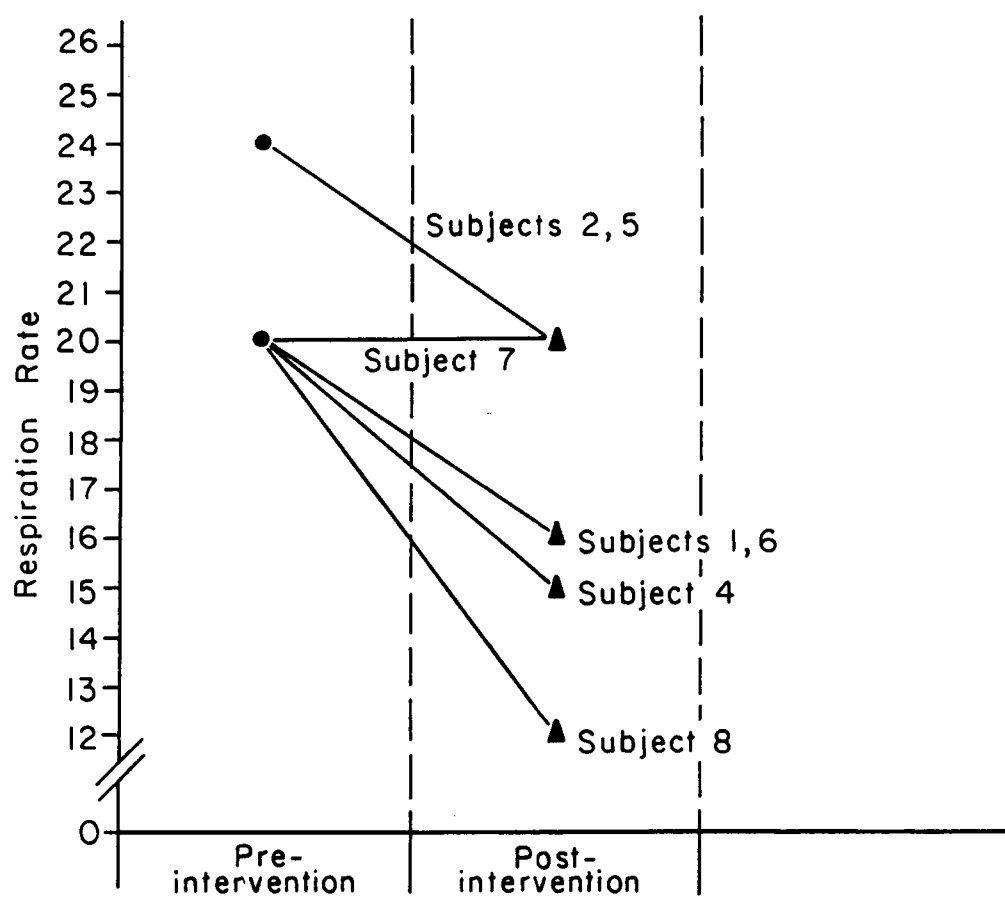


Figure 3. Pre- and post-intervention respiration rates by subject number (using median scores).

TABLE 1

Wilcoxon Test for Two Matched Samples on Physiological Measures
(Using Median Scores)

COMPARISON	SAMPLE SIZE	P VALUE
BLOOD PRESSURE		
SYSTOLIC	7	.344
DIASTOLIC	6	.383
PULSE RATE	6	.188*
RESPIRATION RATE	6	.016*

test for two matched samples. As indicated by the decrease in pulse and respiration rates, it appears that the program of relaxation training was successfully implemented.

Given successful implementation of relaxation training, it was speculated that patients' reports of nausea, vomiting, and anxiety would be decreased during the intervention, as compared to the baseline phase. It was further thought that this effect would be maintained such that nausea, vomiting, and anxiety would also be decreased during the follow-up, as compared to the baseline phase. For purposes of data reduction, patients' daily reports of nausea were condensed into a single median score per phase. The same was done for vomiting and anxiety. Figure 4 presents the median scores for patient reported nausea during the baseline, intervention, and follow-up phases. High median scores correspond to a report of "extremely nauseated;" low median scores correspond to a report of "not at all nauseated." Subject order was determined by number of previous chemotherapy treatments. For example, subject 5 underwent 16 previous courses of chemotherapy, while subject 8 had not undergone any. Aside from subjects 6 and 8 who evidenced a basement effect, no significant trends emerged. Figure 5 presents the median number of times that patients reported vomiting during the three phases. Six patients presented a basement effect. Figure 6 presents the median scores for patient reported anxiety during the baseline, intervention, and follow-up phases. High median scores correspond to a report of "extremely anxious;" low median scores correspond to a report of "not at all anxious." All subjects reported

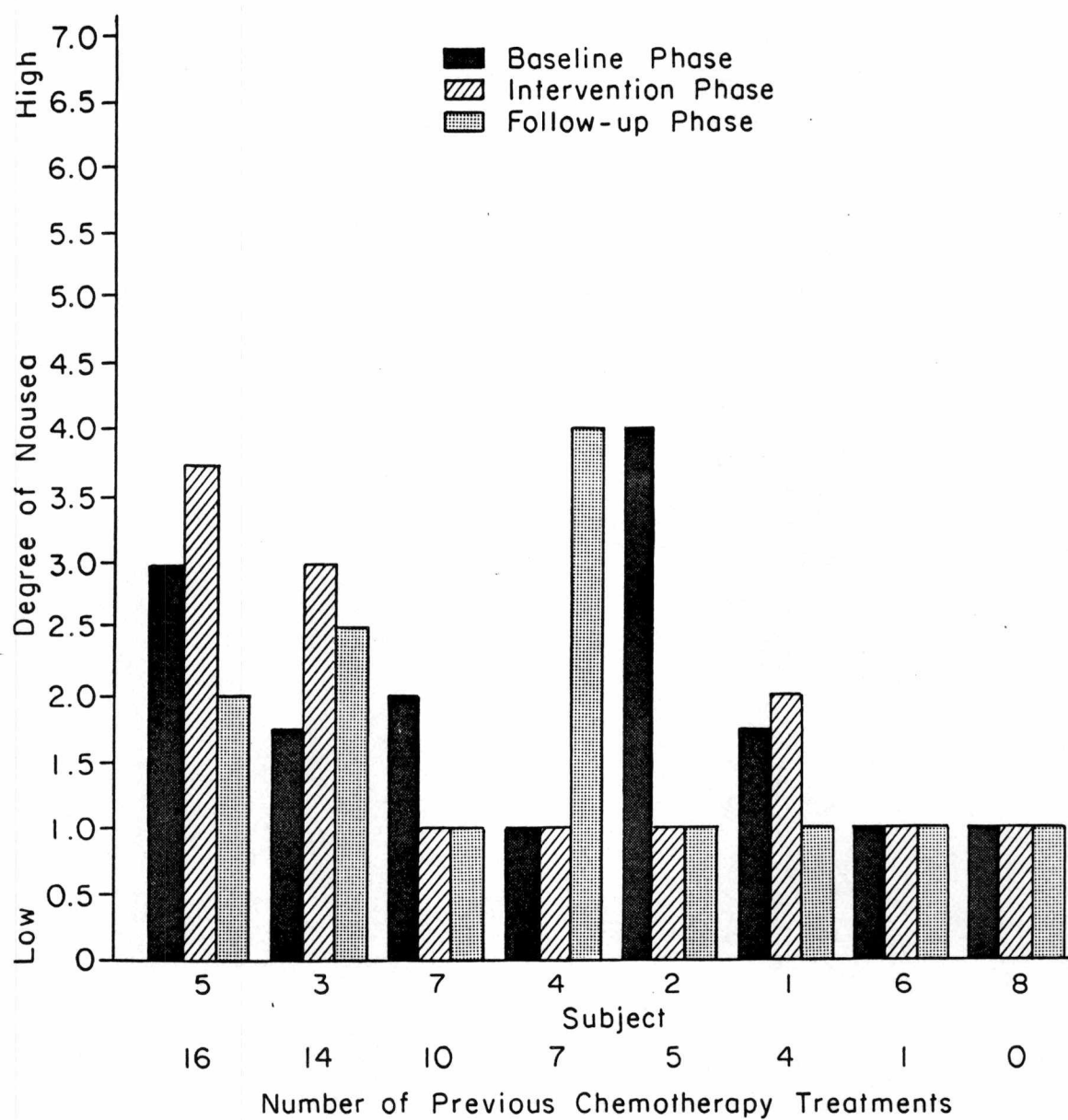


Figure 4. Subject reported nausea during the baseline, intervention, and follow-up phases (using median scores).

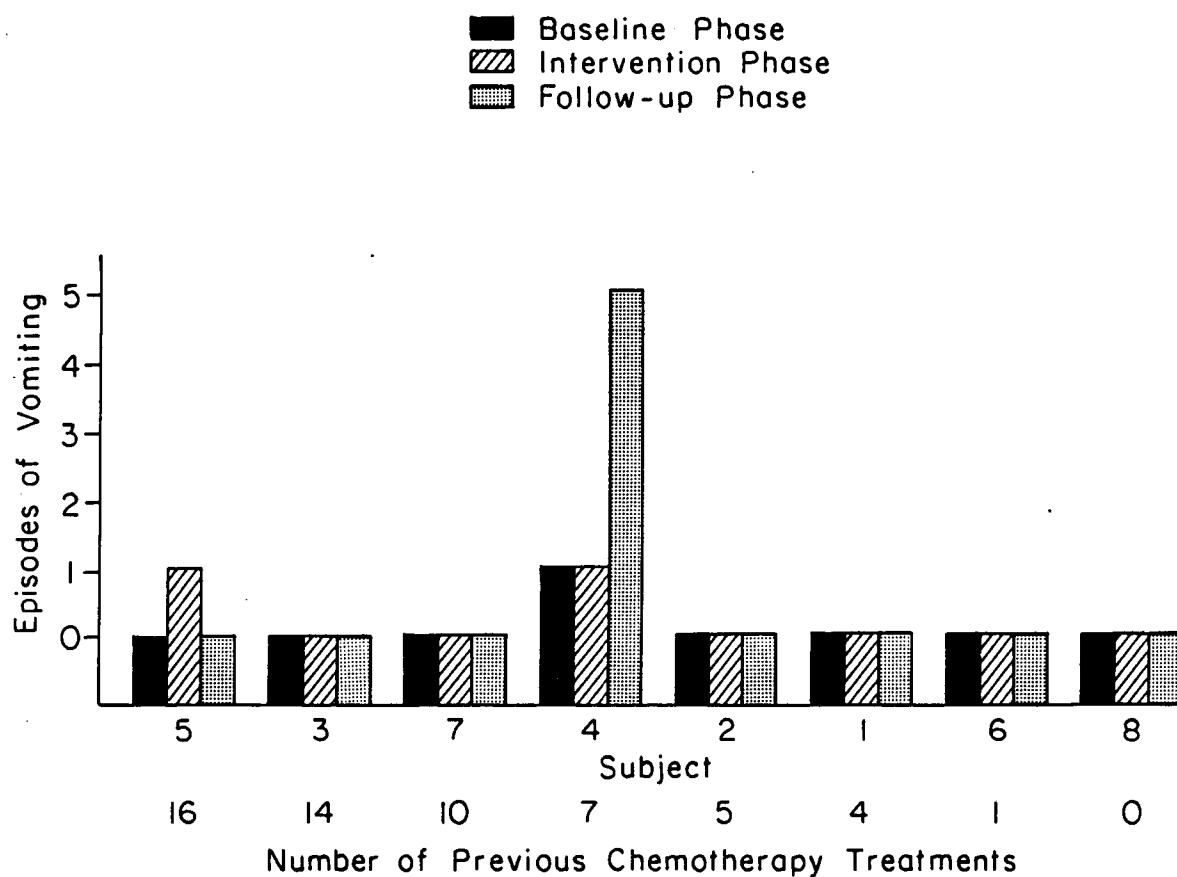


Figure 5. Subject reported vomiting during the baseline, intervention, and follow-up phases (using median scores).

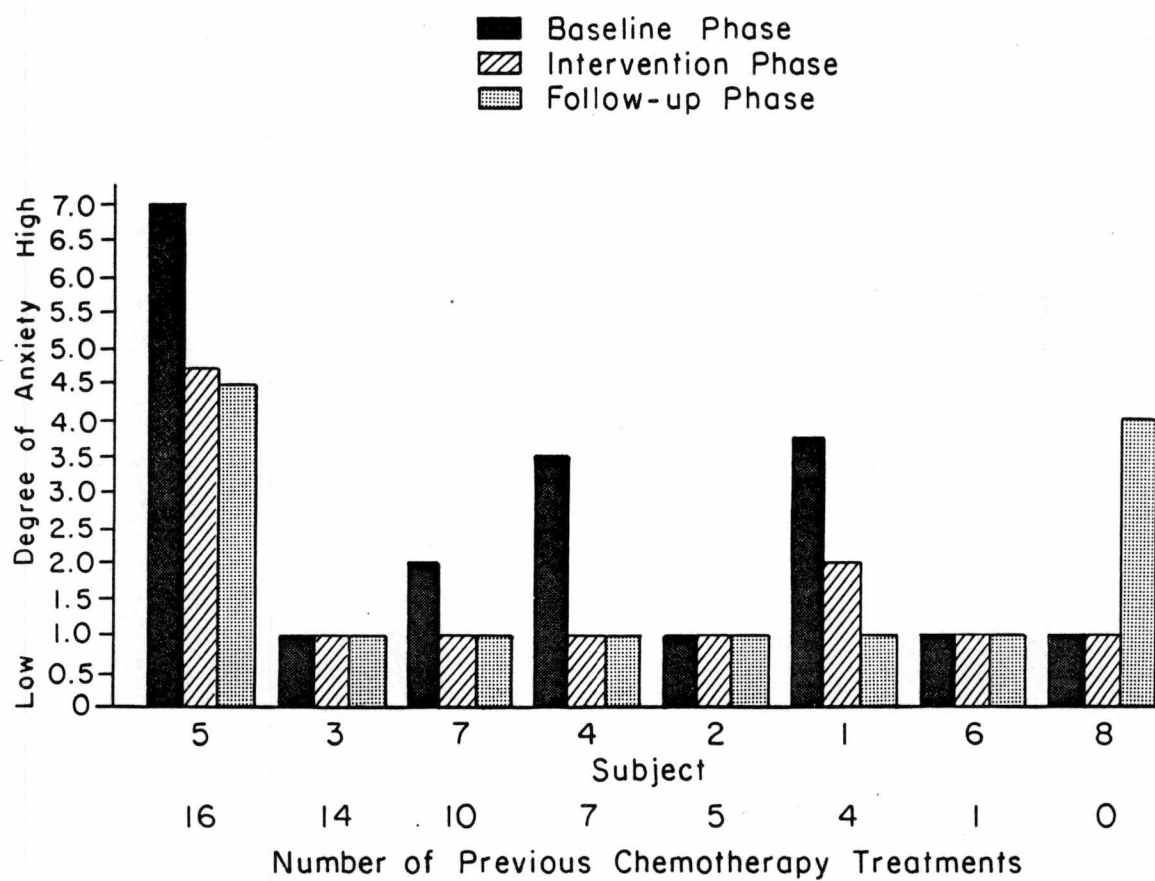


Figure 6. Subject reported anxiety during the baseline, intervention, and follow-up phases (using median scores).

constant or decreased anxiety across phases, except for subject 8, who reported an increase.

The differences among subjects in number of previous chemotherapy treatments were thought to be important. In light of existing research that indicates patients develop more pronounced nausea and vomiting after four or more cycles of chemotherapy, it was little surprise that subjects 6 (with one previous treatment) and 8 (with no previous treatments) evidenced a basement effect. Thus, these subjects were thought to comprise a distinct group, and were excluded from all subsequent statistical analyses.

Table 2 contains the probability values corresponding to various comparisons made using subjects' reports. For general description, the median provided the most accurate measure of central tendency. Higher medians reflect greater nausea, vomiting, and anxiety. In order to indicate the direction of change when comparing phases, subjects' individual median scores for the baseline phase were reduced into one overall median score (for that phase). The same was done for the intervention and follow-up phases. Comparisons between phases for nausea and vomiting yielded no differences. Comparisons between phases for anxiety however, yielded less anxiety during the intervention than the baseline phase. Likewise, less anxiety was reported during the follow-up than the baseline phase. Each probability value in this table was tested for significance by means of the Wilcoxon test for two matched samples. While patient reported anxiety evidenced a decrease during the intervention phase and also during the follow-up phase, similar trends

TABLE 2

Wilcoxon Test for Two Matched Samples on Subjects' Reports (Using Median Scores)

COMPARISON VALUE	OVERALL MEDIAN SCORE BY PHASE			SAMPLE SIZE	P
NAUSEA					
T1 VS T2	1.75	VS	1.0	5	.500
T2 VS T3	1.0	VS	1.0	4	.438
T1 VS T3	1.75	VS	1.0	5	.359
VOMITING					
T1 VS T2	0	VS	0	1	----
T2 VS T3	0	VS	0	2	.500
T1 VS T3	0	VS	0	1	----
ANXIETY					
T1 VS T2	1.5	VS	1.0	4	.062*
T2 VS T3	1.0	VS	1.0	2	.250
T1 VS T3	1.5	VS	1.0	4	.062*

for nausea and vomiting did not emerge. Thus, according to patients, the program of relaxation training did not effect their overall experience of nausea or vomiting. There is tentative evidence however, that a reduction was achieved in their perceived anxiety.

Table 3 contains the probability values corresponding to various comparisons made using nurses' reports. For general description, the median provided the most accurate measure of central tendency. Higher medians reflect greater nausea, vomiting, and anxiety. In order to indicate the direction of change when comparing phases, nurses' individual median scores for the baseline phase were reduced into one overall median score (for that phase). The same was done for the intervention and follow-up phases. Comparisons between phases for nausea, vomiting and anxiety yielded no differences. Each probability value in this table was tested for significance by means of the Wilcoxon test for two matched samples. As indicated by these data (utilizing median scores), the relaxation training program appeared to have no effect. This suggests that according to nurses, the program made no difference in patients' overall experiences of nausea, vomiting, or anxiety.

Subsequent comparisons were made between patient and nurse reports. For general description, the median provided the most accurate measure of central tendency. Higher medians reflect greater nausea, vomiting, and anxiety. Table 4 contains the probability values for these comparisons during all three phases. In order to indicate the direction of change when comparing patient and nurse reports, patients' individual median scores for the baseline phase were reduced into one overall

TABLE 3

Wilcoxon Test for Two Matched Samples on Nurses' Reports (Using Median Scores)

COMPARISON VALUE	OVERALL MEDIAN SCORE BY PHASE			SAMPLE SIZE	P
NAUSEA					
T1 VS T2	1.0	VS	1.0	2	.500
T2 VS T3	1.0	VS	1.0	4	.438
T1 VS T3	1.0	VS	1.0	4	.312
VOMITING					
T1 VS T2	0	VS	0	2	.250
T2 VS T3	0	VS	0	0	----
T1 VS T3	0	VS	0	2	.250
ANXIETY					
T1 VS T2	1.0	VS	1.0	2	.500
T2 VS T3	1.0	VS	1.0	3	.375
T1 VS T3	1.0	VS	1.0	3	.625

TABLE 4

Wilcoxon Test for Two Matched Samples Comparing Subjects' and Nurses' Reports (Using Median Scores)

COMPARISON VALUE	OVERALL MEDIAN SCORE SUBJECT VS NURSE REPORT			SAMPLE SIZE	P
NAUSEA					
T1	1.75	VS	1.0	6	.133*
T2	1.0	VS	1.0	3	.250
T3	1.0	VS	1.0	5	.359
VOMITING					
T1	0	VS	0	1	----
T2	0	VS	0	2	.250
T3	0	VS	0	1	----
ANXIETY					
T1	1.5	VS	1.0	3	.125*
T2	1.0	VS	1.0	4	.250
T3	1.0	VS	1.0	3	.313

median score (for that phase). The same was done for the intervention and follow-up phases. Nurses' individual median scores were similarly reduced into one overall median score per phase. Slight differences between patient and nurse reports of nausea and anxiety emerged during the baseline phase. Nurses reported somewhat less nausea and anxiety than patients at baseline. Each probability value in this table was tested for significance by means of the Wilcoxon test for two matched samples. This examination of overall reports suggested that patients reported greater nausea and anxiety than nurses at baseline.

This discrepancy between patient and nurse reports of nausea and anxiety at baseline was pursued. For purposes of subsequent analyses, the single highest (or worst) score given by patients during the baseline phase, was obtained from their daily report of nausea, vomiting, and anxiety. The same was done for the intervention and follow-up phases. A similar procedure was followed in obtaining the single highest score given by nurses. Figure 7 presents the highest scores given by patients and nurses for nausea across phases. High scores correspond to a report of "extremely nauseated;" low scores correspond to a report of "not at all nauseated." There is a general tendency for nurses' ratings to be lower than patients'. This effect is most pronounced during the baseline phase. Figure 8 presents the greatest number of vomiting episodes reported by patients and nurses across phases. Again, there is a general tendency for nurses' reports to be less than patients'. Here, the effect is most pronounced during the follow-up phase. Figure 9 presents the highest scores given by patients and nurses for anxiety across phases. High scores correspond to a

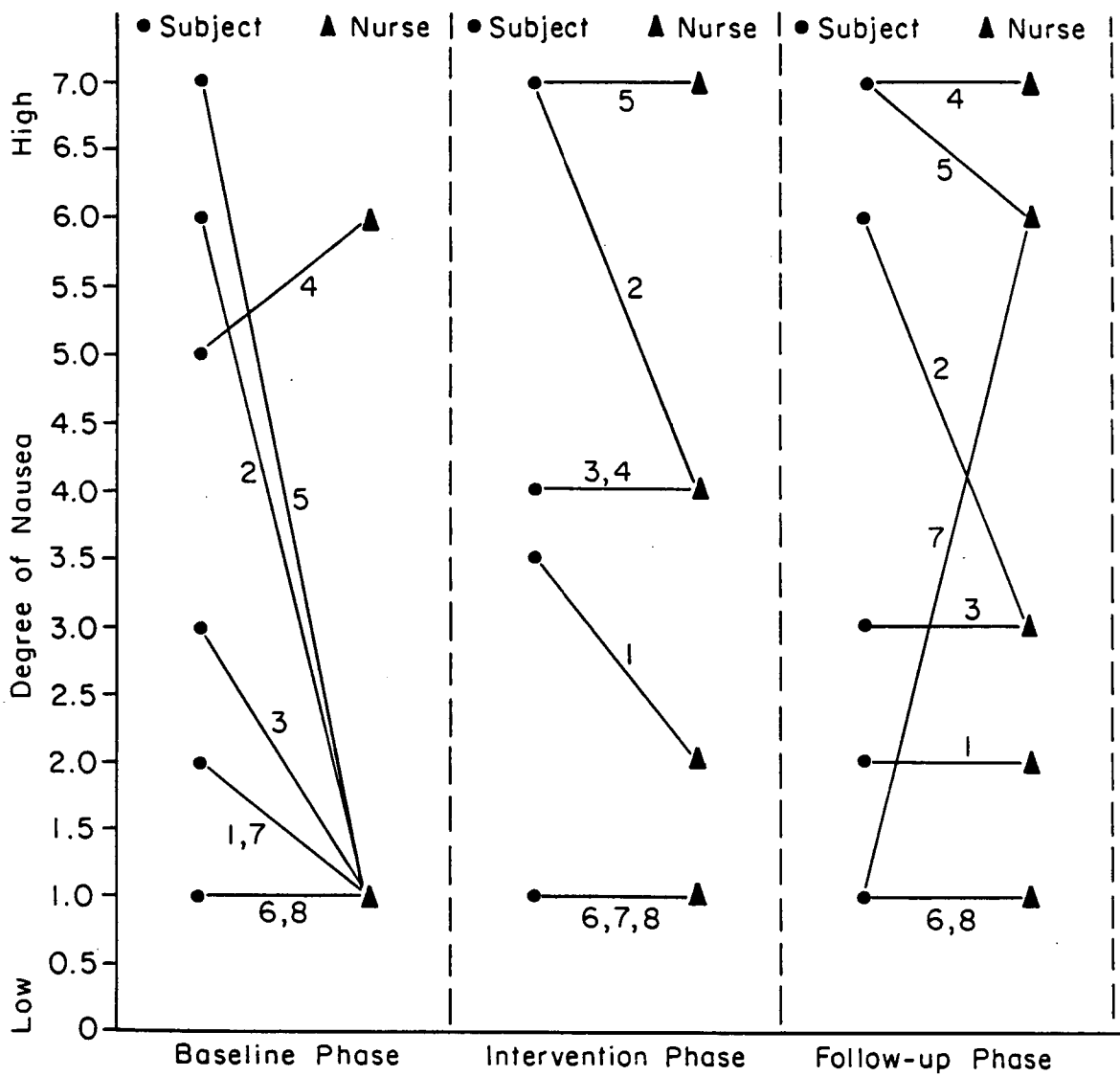


Figure 7. Subject and nurse reports of nausea during the baseline, intervention, and follow-up phases (using highest scores).

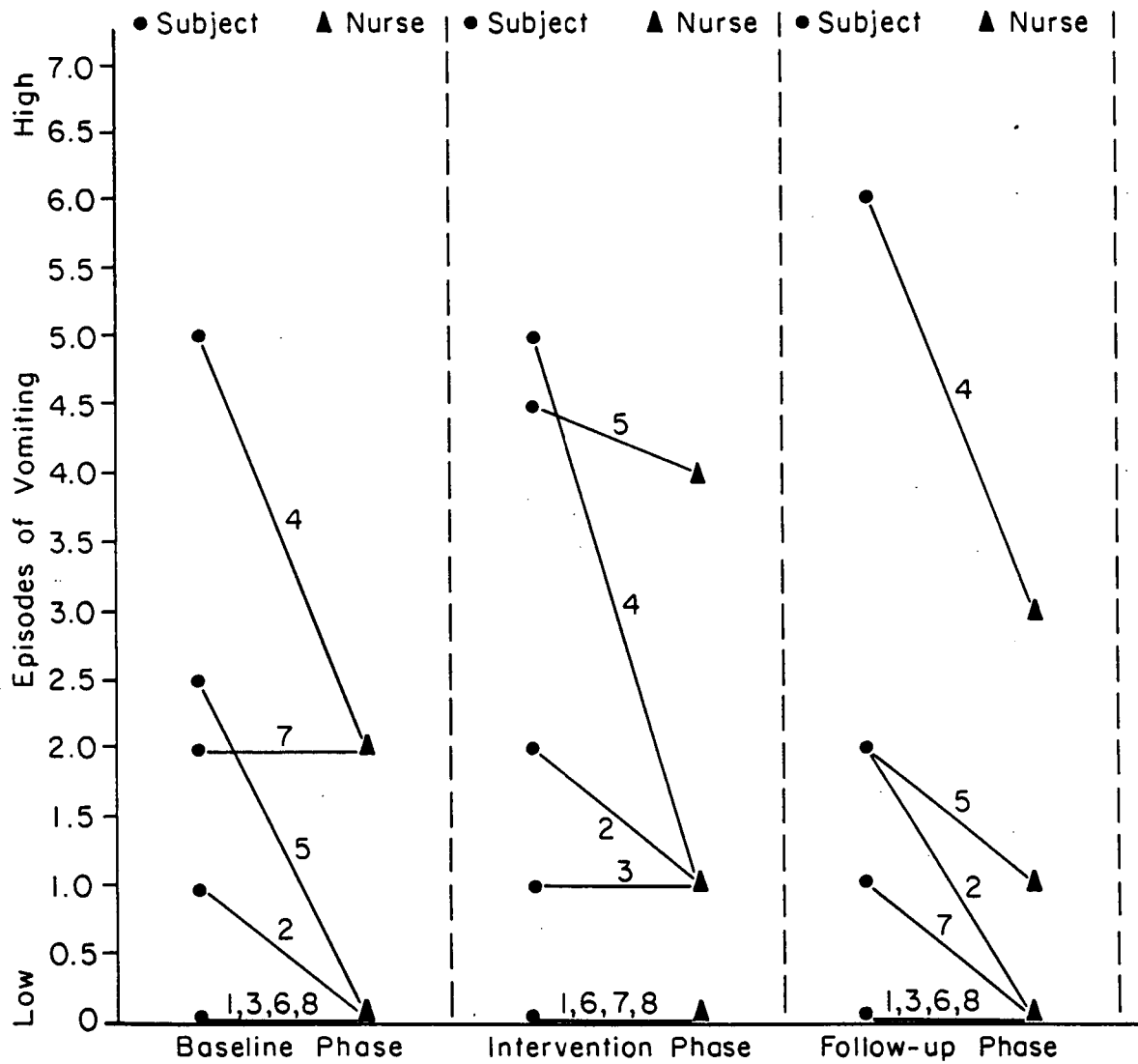


Figure 8. Subject and nurse reports of vomiting during the baseline, intervention, and follow-up phases (using highest scores).

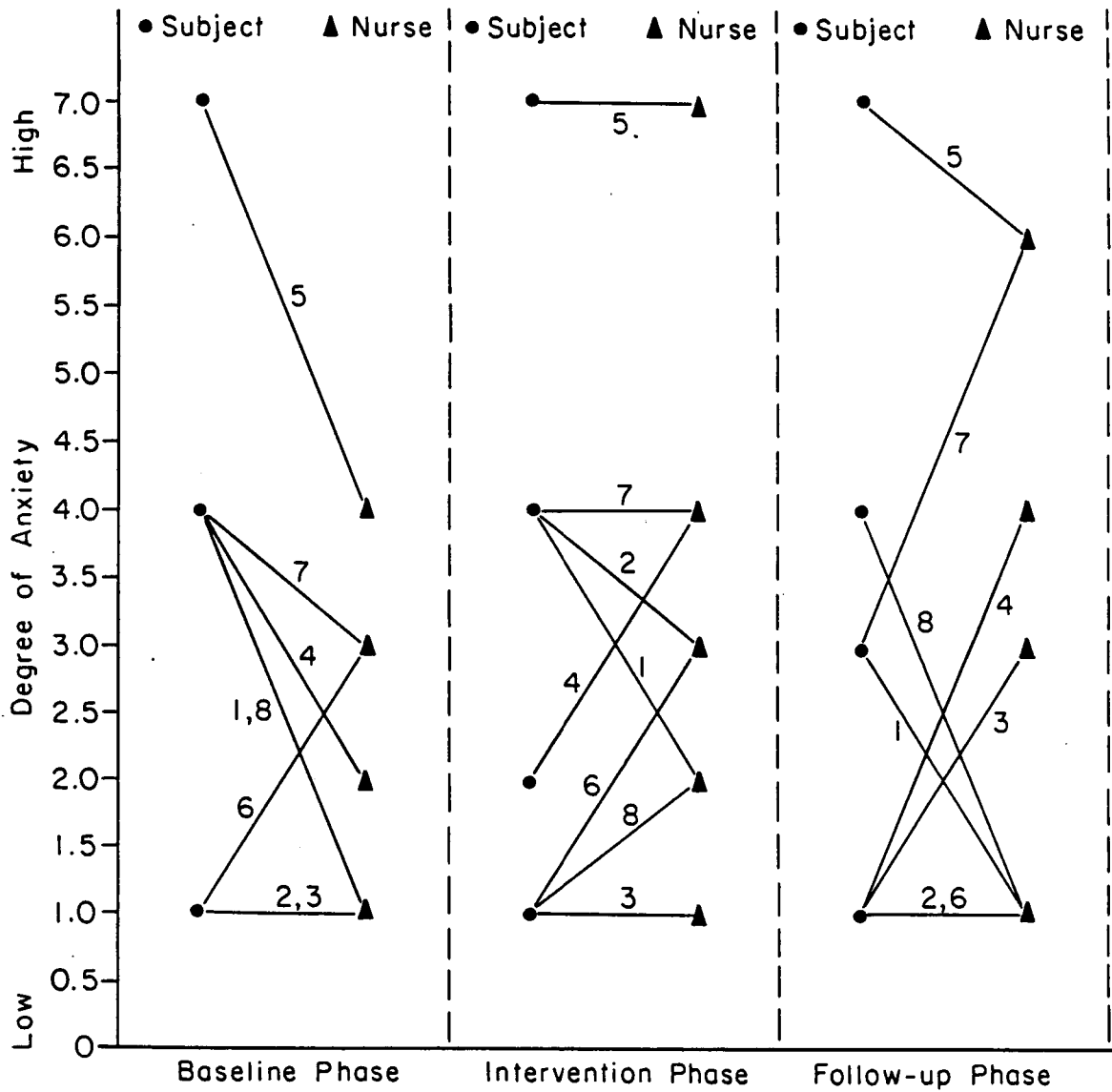


Figure 9. Subject and nurse reports of anxiety during the baseline, intervention, and follow-up phases (using highest scores).

report of "extremely anxious;" low scores correspond to a report of "not at all anxious." The trend toward lower nurse ratings persisted during the baseline phase. During the intervention and follow-up phases however, no clear patterns emerged.

Table 5 contains the probability values for comparisons between patient and nurse reports of nausea, vomiting, and anxiety, using the highest (or worst) scores. Higher scores reflect greater nausea, vomiting, and anxiety. In order to indicate the direction of change when comparing these reports, the single highest scores given by patients during the baseline phase were reduced into one overall score (for that phase). The same was done for the intervention and follow-up phases. Nurses' single highest scores for patients were similarly reduced into one overall score per phase. Examination of these more pronounced episodes of nausea and anxiety yielded important differences between patient and nurse reports during the baseline phase. Compared to patients, nurses rated both nausea and anxiety as less severe at baseline. The differences with reference to vomiting were small during the baseline and intervention phases and were somewhat larger at follow-up, with nurses reporting less vomiting than patients. Each value in this table was tested for significance by means of the Wilcoxon test for two matched samples. These data seem to reveal some important disagreement between patients and nurses, regarding patients' worst episodes of nausea, vomiting, and anxiety. This presents tentative evidence that patients reported worse nausea and anxiety than nurses at baseline, and that they reported more vomiting than nurses at follow-up.

TABLE 5

Wilcoxon Test for Two Matched Samples Comparing Subjects' and Nurses' Reports (Using Highest Scores)

COMPARISON VALUE	OVERALL HIGHEST SCORE SUBJECT VS NURSE REPORT			SAMPLE SIZE	P
NAUSEA					
T1	2.5	VS	1.0	6	.047*
T2	3.75	VS	3.0	2	.250
T3	2.5	VS	3.0	3	.625
VOMITING					
T1	0.5	VS	0	3	.125
T2	0.5	VS	0.5	3	.125
T3	0.5	VS	0	4	.062*
ANXIETY					
T1	4.0	VS	1.5	4	.062*
T2	3.0	VS	3.0	3	.500
T3	2.0	VS	2.0	5	.188

These analyses collectively addressed the impact of relaxation training on subjects' experiences of nausea, vomiting, and anxiety. As alluded to previously, two distinct groups of patients emerged. The six subjects in the first group had received between four and sixteen previous courses of chemotherapy. The two subjects in the second group had received either zero or one previous course of chemotherapy. In keeping with the formative nature of this research, three figures were compiled and present a wealth of qualitative data. Figure 10 summarizes subject's demographic information and medical history. Figure 11 summarizes subject's psychosocial history. Figure 12 summarizes information pertaining to the relaxation training intervention. In order to monitor any systematic covariation in chemotherapy and antiemetic dosages across phases, Figure 13 was compiled and presents these medications as ordered at the time of admission. Subsequent sections contain case by case descriptions with an emphasis on individual patient responses to the program of relaxation training. While the ensuing discussion places an emphasis on individual patients, an effort is also made to illuminate commonalties between subjects in each group.

Subject 5

This was a 43 year old married Caucasian female with Stage IV breast cancer and extensive bone metastasis. She was a very dependent and demanding person who could not tolerate being left alone. For example, she pushed the call light more than other patients, and consistently requested that her pain medication be given intramuscularly or intravenously rather than orally. Regarding her adjustment to cancer

SUBJECT

	5	3	7	4	2	1	6	8
Demographic Information								
Age	43	70	31	69	54	65	58	56
Race	Caucasian	Caucasian	Caucasian	Caucasian	Black	Caucasian	Black	Caucasian
Sex	female	male	female	male	male	male	male	male
Marital status	married	married	divorced	married	married	married	divorced	married
Occupation	homemaker	factory supervisor (ret)	homemaker	knitting mills (ret)	manual labor (ret)	groc store (ret), Bapt preacher	construction (ret)	steel mills & foundry (ret)

Medical History								
Diagnosis	breast	colon	breast	sarcoma	colon	colon	tonsil	melanoma, prostate
Year of Dx	1985	1985	1984	1972	1986	1986	1986	1987
Metastasis	bone	liver, kidney, adrenal	liver, lung, bone, brain	none	liver	none	neck, lung, chest wall, tongue, palate, sternum	thyroid, parotid, kidney, adrenal
# prev chemo txmts	16	14	10	7	5	4	1	0
Pre-existing conditions	hypertension, obesity, gall stones, gen'l anx disorder	gall bladder disease, gall stones	none	none	anemia	kidney stone, hernia	hernia, stomach ulcer, anemia, gastritis	hypertension, diabetes, COPD
Health status as of July, 1988	expired	expired	expired	stable, tmt continues	tmt discon't, Hospice	stable, no tmt	stable, no tmt	expired
Nausea/vomiting history	N/V btwn txmts, ANV thoughts of impending hospzn	N/V btwn txmts	N/V same day post tmt	N/V during txmts, ANV prechemo hydration, sight/smell food reduction	N/V after DC, ANV thoughts of impending hospzn reduction	N after DC, ANV thoughts of impending hospzn reduction	minimal N	none
Cues for ANV	thoughts of impending hospzn	---	---	---	---	---	---	---
Impact of N/V on appetite, food intake	slight reduction	reduction	reduction	reduction	reduction	reduction	no change	---

Figure 10. Qualitative data by subject: demographic information and medical history.

SUBJECT

	5	3	7	4	2	1	6	8
Psychosocial History								
Personality type prior to Ca Dx: at present:	Type A Type A	Type A Type B	Type A Type B	Type A Type B	Type A Type B	Type A Type B	Type A Type B	Type A Type A
Nurses' description of pt	demands attn, whines, complains	lonely, focused on D/C, compliant	underlying dep, emot'l withdrawn	anx exacerbated by wife	shy, quiet, nervous, worries	good natured, worries	noncompliant, lonely, angry, nervous	compliant, quiet, cooperative
Coping mechanisms	meds, sleep, worries, psychosomatic	alcohol	emot'l outlets, sleeps, talks	religion	psychosomatic	cognitive distraction	denies stress	emot'l outlets, worries
Effectiveness of coping (per pt)	ineffective	effective	ineffective	effective	effective	effective	effective	effective
Change in ADL since Ca Dx: present ADL	greatly reduced: lays in bed, sits in chair	reduced: golf, attends church, eats out	greatly reduced: watches TV	reduced: light yard work, car rides in mts	reduced: watches TV	reduced: yard work, preaches at church	reduced: plays billiards at Sr. Citizens Ctr	greatly reduced: takes short walks
Contributing factors to Ca Dx (per pt)	unknown	red meat	birth control pills	unknown	alcohol	unknown	cigarettes, alcohol, inhaled tar, chemicals	unknown
Pt's efforts to infl illness	none	put Ca out of mind, vocab	tell Ca to "Go Away"	maintain pos attitude	put Ca out of mind	attend church for social contact	quit drinking, smoking	complies with med'l advice
Expectations of chemo	cure	reduce tumor	cure	cure	cure	control tumor growth	cure	cure
# visitors by phase	husb stayed entire hospzn each phase			wife stayed entire hospzn each phase				
T1 T2 T3	15* 13 4	2 5 3	6 17 28	7* 6 1	2 2 1	3 7 6	5 2 outpt	9 7 outpt
Total # visitors for all phases	32	10	51	14	5	16	7	16

*Spouse counted once per phase

Figure 11. Qualitative data by subject: psychosocial history.

SUBJECT

5 3 7 4 2 1 6 8

RT Intervention	5	3	7	4	2	1	6	8
Confidence in RT	none	moderate	moderate	no comment	no comment	no comment	high	high
Setting	private rm	private rm	private rm	private rm	semi-private rm	private rm	semi-private rm	private rm
Interruptions (all RT sessions)	1. quiet TV 2. drank water	1. nurse asst	none	1. pt talked 2. pt talked 3. pt talked 4. food trays 5. rm intercom 6. loud drilling 7. nurse 8. nurse	1. loud TV 2. loud TV 3. loud TV 4. loud TV 5. equip beeped 6. loud talking 7. nurse 8. visitor 9. nurse asst	1. nurse 2. phone rang 3. rm intercom	1. TV, talking 2. TV, talking 3. TV, talking 4. phone rang	1. nurse asst
# RT sessions	5	3	2	5	4	5	4	4
Pt's attitude toward RT	hesitant	ambivalent, resistant	very receptive	receptive	reluctant	receptive	reluctant	receptive
Eval of effort	fair	fair	excellent	excellent	fair	excellent	fair	excellent
Beh'l obs post RT	resting quietly	resting quietly	appeared sleeping	interruption #4 triggered V	stretched, yawned	appeared sleeping	resting quietly	appeared sleeping
Pt's reactions	sleepy, relaxed, or no change	no change	sleepy, relaxed, stomach improved	more relaxed, or no change	more relaxed, limber	more relaxed, tired	more relaxed	felt better, more relaxed, less bored
Pulse rate post RT	constant	no data	decreased	decreased	decreased	decreased	increased	increased
Resp rate post RT	decreased	no data	constant	decreased	decreased	decreased	decreased	decreased
Total # independent practice trials (T1)	4x	2x	1x	4x	3x	2x	3x	3x
Why practiced (or not)*	obtain relief	obtain N relief	obtain relief during MRI scan	obtain relief	bored, felt able, RT felt good	bored, (too lazy, did own exercises)	become relaxed	RT felt good
Was RT effective? (per pt)	not sure	not sure	yes	not sure	yes	not sure	not sure	yes
Home practice	1x total	4-5x wk	1x total	2x day	4-5x wk	3-4x wk	yes	2-3x day
Why practiced (or not)*	obtain relief	cog distract, pain relief, exercise	get comfortable, (too sick)	curiosity	loosen up bones	build muscles	none given	obtain relief
Was RT effective? (per pt)	no	yes, cognitive distraction	no	not sure	yes, for pain	not sure	not sure	yes, for pain, breathing, sleep
Hosp practice (T3)	0	0	0	2x day	0	3x total	0	0
Why practiced (or not)*	(just didn't)	(walked, rode in-door bike instead)	(too sick)	didn't know	(too busy)	bored	(just didn't)	(rested instead)
Assessment of benefit from RT	physiological	psychological	physiological, psychological	physiological, psychological	physiological	physiological, psychological	questionable	questionable

*The reasons for not practicing are in parentheses.

Figure 12. Qualitative data by subject: relaxation training intervention.

PHASE CHEMOTHERAPY

ANTIEMETICS

Subject 5							
	5 FU			Compazine			
T1	3200 mg/4 days			80 mg/4 days PO			
T2	6400 mg/4 days			80 mg/4 days PO			
T3	8000 mg/4 days			80 mg/4 days PO			
Subject 3							
	5 FU			Compazine			
T1	10400 mg/4 days			80 mg/4 days PO			
T2	8000 mg/4 days			80 mg/4 days PO			
T3	8800 mg/4 days			80 mg/4 days PO			
Subject 7							
	5 FU	Thiotepa		Compazine			
T1	1000 mg	20 mg		10 mg IM			
T2	2040 mg/3 days	---		60 mg/3 days PO			
T3	4000 mg/4 days	---		80 mg/4 days PO			
Subject 4*							
	Adriamycin	Cytosin	DTIC	Decadron	Compazine	Seconal	Vistaril
T1	40 mg/4 days	800 mg/4 hrs	1000 mg/4 days	80 mg/4 days	---	---	---
T2	40 mg/4 days	800 mg/4 hrs	1000 mg/4 days	80 mg/4 days	10 mg IM	50 mg IM	---
T3	40 mg/4 days	800 mg/4 hrs	1000 mg/4 days	80 mg/4 days	---	50 mg IM	50 mg IM
Subject 2							
	5 FU			Compazine			
T1	8800 mg/4 days			80 mg/4 days PO			
T2	8800 mg/4 days			80 mg/4 days PO			
T3	6400 mg/4 days			80 mg/4 days PO			
Subject 1							
	5 FU			Compazine			
T1	5600 mg/4 days			80 mg/4 days PO			
T2	5600 mg/4 days			80 mg/4 days PO			
T3	5600 mg/4 days			80 mg/4 days PO			
Subject 6							
	Bleomycin	Methotrexate	Vincristine	Benadryl			
T1	90 units/3 days	480 mg	2 mg	400 mg/4 days PO			
T2	90 units/3 days	480 mg	2 mg	400 mg/4 days PO			
T3	---	---	---	---			
Subject 8*							
	BCNU	DTIC		Compazine	Decadron	Seconal	
T1	190 mg	2375 mg/5 days		10 mg IM	20 mg	50 mg IM	
T2	100 mg	2500 mg/5 days		10 mg IM	20 mg	50 mg IM	
T3	100 mg	2000 mg/5 days		40 mg/4 days IM	20 mg	50 mg IM	

All medications were administered IV unless noted otherwise.

*The subject also received a continuous phenergan infusion.

Figure 13. Medication and dosage: physician's orders at time of admission.

she stated, "I'm just not able to do anything, and I don't feel like doing anything," and "I get uptight and I stay uptight all the time." Her husband reported that "It seems like she does more crying. Crying more and throwing up more. I believe that's all she thinks about, is having cancer." When experiencing stress she said "I just get me something to calm my nerves and I go to bed."

During the intervention phase, the patient put forth a better effort with her deep breathing, than she did with her muscle tensing and relaxing. During the latter, she stated that the procedure put too much strain on her. She was also concerned about displacing the needle in her subcutaneous indwelling venus access device (e. g. Infusaport catheter).

The subject's physiological response to relaxation training evidenced a constant pulse rate and decreased respiration rate, after five training sessions. There were no outliers in the subject's report of nausea, vomiting, or anxiety. With reference to unusual circumstances, she received twice as much chemotherapy during the intervention as compared to the baseline phase. Her antiemetic dosages however, remained constant during all three phases. Not surprisingly her nausea and vomiting were both greatest during the intervention phase. The increase in her chemotherapy dose during the follow-up phase was of a lesser increment.

In sum, this was a seriously ill patient who, for three years underwent extensive treatment for breast cancer. Due to the number and variety of chemotherapy treatments that she received, her persistent nausea and vomiting was not unusual. These symptoms were probably

exacerbated by her generalized anxiety disorder, or "poor nerves." This subject was thought to have benefitted from the program of relaxation training, based on her vital signs and self-report data. Without this intervention it is possible that her symptoms would have worsened.

Subject 3

This was a 70 year old married Caucasian male with Duke's D colon cancer and extensive liver, adrenal, and kidney metastasis. He seemed to be a lonely person and had few visitors during his hospitalization. It is possible that these factors influenced his talkativeness throughout the research. Regarding his adjustment to cancer his wife stated, "Neither of us dwell on his illness, and we try and maintain as normal a life as possible." When experiencing stress, he reported "Sitting down with a scotch and water or two, according to how I feel, or maybe three; if I got a lot of time, maybe four."

During the intervention phase, the subject seemed ambivalent about the procedure as indicated by his comment "After going through this much, you'll try anything" and later remark "All right, that's enough," as he discontinued the imagery portion. Even with the initial coaching that it took to get him started, the patient remained resistant. For example, he refused relaxation training and vital sign recordings his last hospital day, because he was entirely focused on going home.

Since the subject refused vital sign recordings, there were no data on his physiological response to his three training sessions. There were no outliers in his report of nausea, vomiting, or anxiety, nor were there any unusual circumstances during any of the research phases.

In sum, this was a seriously ill patient who, for three years underwent treatment for colon cancer. Due to the number of chemotherapy treatments that he received, his persistent nausea and vomiting was not unusual. This subject was thought to have obtained some psychological benefit from the program of relaxation training.

Subject 7

This was a 31 year old divorced Caucasian female with Stage IV breast cancer and extensive liver, lung, bone, and brain metastasis. She was thought to be an emotionally withdrawn person with an underlying depression and few, if any people to confide in. It is possible that these factors influenced her willingness to express herself openly to the investigator. With reference to her adjustment to cancer, the patient said, "I've laid, I don't know how many times since this has come back, and talked to God, and said if you can't make me no better, please let me die, because I can't live like this." While her mother does not feel like the patient had given up, she did notice that she just was not responding this time like she had before. In her words, "It's like all of her isn't there." Despite this, the mother said, "I never think in terms of her not getting well; I never think things like that. I just take it one day at a time. And she has always gotten better. But it just keeps coming back, and its kindly floored her this time." The subject typically responded to stress through anger, laughter, or by talking, crying, or sleeping, depending upon its origin.

During the intervention phase, the subject was very receptive to this procedure as indicated by her comments, "This is better than a

sleeping pill. I don't like taking drugs." Although she refused relaxation training sessions twice (from feeling poorly), she actually initiated one session with, "We should try the relaxation training because my stomach is all knotted up." She put forth an excellent effort. Despite this effort, her breathing remained rather rapid and shallow, presumably due to lung metastasis. She utilized the relaxation procedure during an approximately 40 minute Magnetic Resonance Imaging (MRI) scan of her brain, in which she was to lie perfectly still.

The subject's physiological response to relaxation training evidenced a decreased pulse rate and constant respiration rate, after two training sessions. There were no outliers in the subject's report of nausea, vomiting, or anxiety. Just prior to the baseline phase, the subject's health worsened. Her chemotherapy during baseline was given on an outpatient basis. During the intervention phase, she underwent more diagnostic tests that revealed brain metastasis. During the follow-up phase, she presented hepatic insufficiency and precoma. Midway through this hospitalization, chemotherapy was discontinued as death seemed imminent. In keeping with her wishes and against considerable odds, the patient lived to be discharged and died at home approximately two weeks later.

In sum, this was a seriously ill patient who, for three years underwent extensive treatment for breast cancer. Considering the number and variety of chemotherapy treatments that she received, it was perhaps unusual that nausea and vomiting had not developed into a more serious problem. This subject was thought to have obtained both

physiological and psychological benefits from the program of relaxation training. Despite the severity of her condition, a positive physiological response was noted. Certain similarities with the investigator (e.g. age, sex) were thought to have enhanced the effects of modeling, as an important component in the relaxation training program. The relaxation procedures appeared to have extended her a degree of comfort when the investigator was present, and also in the specific context of a stressful diagnostic test.

Subject 4

This was a 69 year old married Caucasian male with abdominal sarcoma. While he appeared to be a generally peaceful person, his wife did exacerbate his anxiety (e. g. through her habit of answering questions for him). Perhaps this tension along with their sparse communication influenced his willingness to talk openly with the investigator. Referring to his adjustment to cancer, his wife reported "He's not no invalid." When confronted with stress the subject drew comfort through prayer, "to help the situation from getting out of hand when you can't do nothing about it. That's when you turn to a higher power."

During the intervention phase, the patient seemed to identify with this procedure as indicated by his comment, "I've been doing that (breathing) for 69 years" and "Most of that stuff (muscle tensing) I've done unconsciously all my life. I've been pretty active." He put forth a good effort with his deep breathing, and he completed extra muscle tensing repetitions. It is important to note that he interrupted two training sessions by talking briefly. He interrupted a third session by talking for ten

minutes about various decisions (e.g. choice of oncologist, hospital), and some friends (e.g. who recently died, who refused treatments for cancer).

The subject's physiological response to relaxation training evidenced a decrease in both pulse and respiration rates, after five training sessions. Three outliers appeared in his report of nausea, vomiting, and anxiety. His overall anxiety was highest during the baseline phase. Despite this, he reported prior to discharge that he experienced about the same amount of stress during that hospitalization. With this conflicting report there was no sufficient explanation for this extreme data point. His overall nausea, and the median number of vomiting episodes were both highest during the follow-up phase. This was explained by a one hour lapse between the completion of one bottle of Phenergan (intravenous nausea medication) and its replacement bottle, which for some reason was delayed by the hospital pharmacy. One unusual circumstance that occurred during the intervention phase, entailed the subject being told that a Magnetic Resonance Imaging (MRI) brain scan had been scheduled for him. This was cancelled when hospital staff realized the test was intended for another patient on the floor with the same surname.

In sum, this was a relatively stable patient who, for 16 years had been diagnosed with abdominal sarcoma. The chemotherapy related nausea and vomiting and the anticipatory nausea and vomiting that he experienced, was not unusual considering the agents used in his treatment regime. This subject was thought to have obtained both physiological and psychological benefits from the program of relaxation training. Perhaps as important as the positive physiological response, was

the opportunity to reflect on some serious decisions, in the presence of the investigator.

Subject 2

This was a 54 year old married black male with Duke's D colon cancer and extensive liver metastasis. He was characterized as a shy and quiet person who was prone to worry. The patient adjusted to his diagnosis so that "He takes his treatments and goes on" according to his wife. He handled stress by internalizing it, and thus developing an upset stomach.

During the intervention phase, the patient was initially resistant as noted through his question "Is it going to take very long?" and statement "I just want to go to sleep." He was more cooperative when feeling well than he was when feeling poorly. The latter was apparent through his comments "I'm sick and I don't feel like being bothered" and "If I get sick it'll be your fault."

The subject's physiological response to relaxation training evidenced a decrease in both pulse and respiration rates, after four training sessions. One outlier appeared in the subject's report of nausea, indicating his overall nausea was highest during the baseline phase. It is possible that this reflected his distress over an approximately one hour lapse between the completion of one bag of chemotherapy and its subsequent bag (another pharmacy delay). He reported a restless night following this incident, in which he was unable to get any sleep. While no further outliers emerged, similarly unusual circumstances occurred during subsequent phases. His infusion pump malfunctioned and needed

to be replaced, costing him 30 minutes during the intervention phase. His treatment regimen was altered, adding an additional day of hospitalization during the follow-up phase. The incident during the baseline phase may have had a greater impact, as it was the first unusual circumstance in the course of his treatment.

In sum, this was a seriously ill patient who, for two years underwent treatment for colon cancer. He was thought to have obtained a degree of physiological relaxation from the program. In light of this patient's tendency to internalize tension, his anticipatory nausea and vomiting was thought to be stress related (e.g. occurs with impending hospitalization).

Subject 1

This was a 65 year old married Caucasian male with Duke's C-II colon cancer. He was a good natured person but also prone to worry. For example, he teasingly accused the nurses of mistaking him for his roommate and then administering the wrong chemotherapy dose. He also concealed his problems by maintaining a joking front with his wife. His adjustment to cancer was characterized by a reduced tolerance for stress. He believed "It don't take so much to make me nervous and get me upset, like it used to." He typically responded to stress by trying to keep occupied in order to distract his mind.

During the intervention phase, the subject seemed receptive to relaxation training. He put forth an excellent effort on both the breathing and muscle tensing and relaxing components.

The subject's physiological response to relaxation training evidenced a decrease in both pulse and respiration rates, after five training sessions. There were no outliers in the subject's report of nausea, vomiting, or anxiety. Various unusual circumstances occurred during each phase. At baseline, he lost time due to a slow admitting process. During the intervention phase, he lost approximately 40 minutes due to a chemotherapy spill, and another few hours due to his intravenous site swelling, and a second site infiltrating. At follow-up, his hospitalization was extended a day due to a change in his treatment regimen.

In sum, this was a stable patient who, for two years underwent treatment for colon cancer. He was thought to have benefitted from the program of relaxation training, based on his vital signs and self-report data. Given the unusual circumstances that occurred during each phase, it is possible that his symptoms may have been worse without this intervention.

This first group was comprised of six subjects who previously underwent several cycles of chemotherapy. A cumulative list of agents that they received is contained in Figure 1. Subjects in this group tended to receive agents with moderate to high emetic potentials. Not surprisingly, five of the six subjects experienced chemotherapy related nausea and vomiting. In addition, four of the six subjects experienced anticipatory nausea and vomiting. These patients gave a history of being anxious and were often prone to worry. Despite these characteristics and pre-existing side effects, all subjects in this group were thought to have benefitted from the program of relaxation training. For some subjects,

positive effects encompassed both physiological and psychological realms. Collectively, the relaxation training program appeared to have made a contribution toward reducing their perceived anxiety. Two subjects in this group reported practicing the procedure during the follow-up phase. It is possible that their more pronounced nausea and vomiting enabled them to recognize the need for relief through alternative methods. This experience with chemotherapy probably provided the motivation to practice the relaxation procedure. This was perhaps best summarized by subject 3 who remarked, "After going through this much, you'll try anything." Thus, subjects in this group had extensive experience with chemotherapy and the related nausea and vomiting. The program of relaxation training was thought to have benefitted these subjects.

Subject 6

This was a 58 year old divorced black male with squamous cell carcinoma of the tonsil and metastatic disease involving the tongue, palate, neck, sternum, chest wall, and lung. He was characterized as lonely (visitors were sparse), nervous about losing his hair (even though he would not), demanding (he expected nurses to perform self-care tasks), angry about the length of his hospitalization, and preoccupied with his intravenous site. He was also considered noncompliant with medical treatment by at least one of his physicians, since he rarely kept appointments beyond those directed toward pain control (e.g obtaining pain medication). His adjustment to cancer was marked by a reduction in the work he was able to complete at home. Concerning his experience of stress the patient stated "I don't ever get distressed hardly. If I don't feel

good I just try to rest the best I can." He claimed he stopped worrying a long time ago, since "worrying's no good."

During the intervention phase, the patient put forth a fair effort, with several oppositional, or passive aggressive behaviors noted. For example, before one session was formally concluded, he picked up a newspaper, turned on the television (picture and volume), and turned off an overhead light. When asked to close his eyes during another session, he did so only briefly before reopening them and avoiding eye contact with the investigator.

The subject's physiological response to relaxation training evidenced an increased pulse and a decreased respiration rate, after four training sessions. There were no outliers in the subject's data, as his self-report yielded a basement effect for nausea, vomiting, and anxiety. Two unusual circumstances occurred. First, the patient had a blood spill during the baseline phase. He was instructed to keep his left arm immobilized while receiving a blood transfusion. He did not, and subsequently tore open and splattered his blood products mid way through the transfusion. His bed, gown, floor area, infusion pump, and the attending nurse were all contaminated. Second, due to a change in his treatment plan, the patient was referred for electron beam radiation therapy during the follow-up phase rather than receiving another course of chemotherapy. While he was initially followed, he eventually refused further participation and dropped out of the study.

In sum, this was a relatively stable patient who; for two years had undergone treatment for squamous cell carcinoma of the tonsil. It was

questionable whether or not he received any benefit from this program of relaxation training, given his conflicting vital sign data and the basement effect in his self-report. His oppositional behavior and withdrawal from the study might suggest the procedure created more stress than it alleviated. In light of his self-reported experience of nausea, vomiting, and anxiety, he had little motivation to pursue the relaxation procedure.

Subject 8

This was a 56 year old married Caucasian male with malignant melanoma, Stage III, adenocarcinoma of the prostate, Stage B, and metastatic disease involving the thyroid, parotid, right kidney, and both adrenal glands. He also had a melanoma removed from his back about seven years ago, and received radiation for a malignant tumor involving his left jaw about forty-two years ago. He was a quiet, cooperative, and highly compliant patient. He was well adjusted to living with cancer, given a history of the disease that dated back to age fourteen. When experiencing stress, the patient tended to get nervous. According to his wife, "He just gets sort of shaky and tore up and then he'll cry a little bit and then its over."

During the intervention phase, the patient was receptive and seemed to identify with this procedure as indicated by his comment, "I do some of this on my own at home." He put forth an excellent effort.

The subject's physiological response to relaxation training evidenced an increased pulse and a decreased respiration rate, after four training sessions. One outlier appeared in the subject's report of anxiety, indicating his his overall anxiety was highest during the follow-up phase.

Also during this phase his chemotherapy was given on an outpatient basis, nevertheless requiring the same number of days. This change was possible as his infusion was noncontinuous. It is possible that this outlier was actually a more accurate account, as it reflected information gathered in the presence of his wife. She further commented, "He did better (now) than if he had stayed in the hospital. Waiting gets to him." Thus, his self-report data is thought to be an underrepresentation of his anxiety during the earlier (hospitalized) phases.

In sum, this patient was recently diagnosed with malignant melanoma and prostatic adenocarcinoma, and begun on chemotherapy. It is questionable whether or not he received any benefit from this program of relaxation training, given his conflicting vital sign data, and the widespread basement effect in his self-report. His presumably biased self-report, and his tendency toward compliance might further detract from the credibility of his positive comments with reference to the procedure.

This second group was comprised of two subjects who previously underwent zero or one cycle of chemotherapy. A cumulative list of agents that they received is contained in Figure 1. Subjects in this group tended to receive agents with low to moderate emetic potentials. Not surprisingly, neither of these subjects experienced chemotherapy related vomiting and only one reported slight nausea. It was questionable whether either subject benefitted from the program of relaxation training. Evidence of physiological benefit was challenged by discrepancies in vital sign data. Each subject evidenced an increased pulse and a decreased respiration rate. Evidence of psychological benefit was undermined by the

selective subject loss of one subject in this group. While the relaxation training program appeared to have made no difference in their perceived nausea, vomiting, and anxiety, it is important to note that they reported none to begin with! Neither of the subjects in this group reported practicing the procedure during the follow-up phase. It is possible that in the absence of pronounced nausea and vomiting, subjects did not perceive the need for the relaxation procedure. This was perhaps best seen in subject 6 who withdrew from the study. Thus, subjects in this group had minimal experience with chemotherapy and the related nausea and vomiting. It is questionable whether or not the program of relaxation training benefitted these subjects.

While general conclusions were drawn regarding the benefit of relaxation training to subjects in each group, exceptions were also apparent. Several trends emerged from the qualitative data and encompassed factors such as subject's attitude, coping ability, relationships, and engagement with their environment. Figures 10, 11, and 12 serve to facilitate comparisons between the eight subjects, and were the source from which this information was gleaned.

First, the subject's attitude toward relaxation training appeared to be related to the effort they put forth. A very receptive attitude was associated with an excellent effort in subjects 7, 4, 1, and 8. Except for subject 8, these patients also received both physiological and psychological benefit. A resistant attitude was associated with a fair effort in subjects 5, 3, 2, and 6. These patients received less benefit from relaxation training.

Second, ineffective coping by the subject was associated with greatly reduced activities of daily living (ADL) in patients 5 and 7. These factors were further associated with the least amount of independent practice of the relaxation procedure by these patients at home, and at follow-up. The seriousness of their condition was thought to have prevented them from practicing.

Third, the quality of subject's relationships appeared related to the extent of psychological benefit from the relaxation training program. Subjects who were presently dissatisfied and unfulfilled in their relationships, received psychological benefit (e. g. subjects 3, 7, 4, and 1). A superior therapeutic relationship was also thought to have been formed with these subjects, perhaps because of their willingness to talk openly. Subjects who were presently satisfied in their social interactions did not receive a pronounced psychological benefit (e. g. subjects 5, 2, 6, and 8). Thus, it appears that the relaxation training program filled a deficit experienced by the former subjects but not the latter.

Fourth, the ability to disengage from the high stimulus hospital environment was somewhat related to the benefit obtained from relaxation training. Subjects who appeared sleeping after relaxation training sessions obtained physical and psychological benefit (e. g. subjects 7 and 1). Subject 4 presented an exception as he was not sleeping, presumably due to the nausea and vomiting he experienced during chemotherapy. Despite this, he was thought to obtain both physiological and psychological benefit. Subject 8 likewise presented an exception as he appeared sleeping but received questionable benefit. It is possible that

subject 8 emerged as an exception due to nonspecific factors related to the recency of his diagnosis (1987) and the seriousness of his condition (expired as of July 1988).

IV. DISCUSSION

The program of relaxation training was successfully implemented. Two distinct groups of subjects emerged. The first group of six subjects previously underwent several cycles of chemotherapy and received agents with moderate to high emetic potentials. The second group of two subjects previously underwent zero or one cycle of chemotherapy and received agents with low to moderate emetic potentials. Statistical procedures were based on data generated by subjects in the first group. According to patients, the program of relaxation training did not effect their overall experience of nausea or vomiting. There is tentative evidence however, that a reduction was achieved in their perceived anxiety. This trend also emerged at one month follow-up. According to nurses, it appears that the program of relaxation training did not effect patients' overall experiences of nausea, vomiting, or anxiety. Subsequent comparisons were made between patient and nurse reports. Examination of overall reports yielded slight differences, with patients reporting greater nausea and anxiety than nurses at baseline. Examination of more intense episodes yielded important differences. At baseline, patients reported worse nausea and anxiety than nurses; at follow-up, they reported more vomiting than nurses. Given these discrepancies, the validity of patients' self-reports might be questioned.

The absence of a noticeable impact by the relaxation training program on patients' nausea constitutes an important finding. These results are in agreement with Carey and Burish (1987), but stand in

contrast to the earlier studies of Lyles and his colleagues (1982) and Burish and Lyles (1981) who found subjects to be less nauseated after receiving relaxation training. While Carey and Burish (1987) viewed the apparent failure of relaxation training as resulting from low baseline levels of nausea, this appears not to be the case in the present study. Rather, differences surrounding the actual chemotherapy administration are thought to have influenced these opposing outcomes. Specifically, subjects in the earlier research received significantly shorter chemotherapy infusions administered on an outpatient basis. Among subjects who present with nausea, relaxation training may be effective in reducing these symptoms during relatively shorter infusions (measured in hours), but ineffective during longer ones (measured in days). Thus, relaxation procedures may produce a short term effect but fail to sustain any longer term benefits.

Since no consistent reductions in vomiting have been documented in the literature, the current results come as no surprise. As hypothesized elsewhere (Carey & Burish, in press) a basement effect is thought to be operable.

The reduction in subjects' perceived anxiety and its maintenance approximately one month later corroborates existing research. This has important implications as it was obtained under vastly different conditions. In previous studies these results were achieved in a less stressful environment (e. g. outpatient setting), where patients retain a greater degree of control. For example, when coming for a clinic appointment, patients generally know of any other tests or scans that have

been scheduled. Hospitalized patients however, experience much more anxiety provoking circumstances that they can neither predict nor control. In addition to the unfamiliar surroundings (e. g. hospital room, nursing staff), patients are subjected to procedures that seemingly occur at random (e. g. specialty consults, diagnostic tests). This reduction in subjects' anxiety amidst highly stressful circumstances may point to the strength of the relaxation training intervention.

Despite uniform selection criteria, two distinct groups of subjects emerged. The above findings were based on data generated by subjects who had previous experience with moderate to high emetogenic chemotherapies. A separate group of subjects who had minimal experience with chemotherapy appears to be a close approximation of the sample studied by Burish and his colleagues (1987). While the Burish study achieved lower levels of nausea, vomiting, anxiety, and decreased pulse rates among the twelve subjects receiving relaxation training, corresponding trends did not emerge in the present subgroup of two subjects. Since the random groups design (in the Burish study) obscured individual subject variables, it is not possible to know which subjects in the relaxation training group would have maintained a low incidence of side effects in the absence of an intervention. To the extent that this occurred, the data are skewed in favor of the relaxation training intervention. Due to the small numbers of subjects, these remarks remain highly speculative.

Several of the trends that emerged from the qualitative data offer preliminary information regarding who benefits from relaxation training.

Specifically there is evidence that benefit was obtained by subjects who were receptive to the intervention, who were dissatisfied with their relationships, and who were able to disengage from a high stimulus environment. These trends, generated from a sample of eight subjects, might be formulated into more specific hypotheses required by quantitative research. For example, quantitative investigations employing greater numbers of subjects might address whether or not patients with dissatisfying relationships tend to receive greater benefits from the intervention. This information would advance efforts to determine prognostic indicators for the effectiveness of relaxation training.

Collectively, these results must be considered in the context that they were generated. Virtually all of the subjects (on whom the data was statistically analyzed) presented with established side effects and advanced disease. Four patients died shortly after completing their participation in the study. One more was referred to Hospice for his terminal care. While subjects in other studies are thought to have been less seriously ill and received fewer previous chemotherapy treatments, it would be interesting to make actual comparisons. This is prohibited however, by a lack of corresponding information in the literature. In view of the apparent reduction in subjects' perceived anxiety, the effectiveness of relaxation training (in the psychological realm) appears not to hinge upon its use with a medically stable patient population. Similar efficacy for other symptoms (e. g. nausea and vomiting) remains to be established by subsequent research.

The discrepancy between patient and nurse ratings was not anticipated. The tendency for nurses' reports to be lower than patients during the baseline phase is viewed as a training effect of the relaxation program on nurses. Since nurses received nothing beyond minimal instructions prior to their participation in the study, they may have been initially unprepared to give information in the manner requested by the investigator. For example, nurses respond to patients' symptoms by formulating potential pharmacological therapies (e. g. particular nausea symptoms could be alleviated by a 10 mg Compazine spansule). In addition, nurses may rely heavily on patients' requests for medication in their subjective assessments, and may not attend to these symptoms in the absence of such requests. With the initiation of the program however, nurses were asked, without advance notice, to rate a given patient's nausea using a Likert scale. By the intervention and follow-up phases, it is possible that nurses had become accustomed to the investigator's manner of inquiry. For these reasons, nurses are thought to have inadvertently underreported patients' symptoms during the baseline phase. The absence of more thorough preparation of nurses constitutes a weakness of the study.

In another discrepancy, nurses reported less vomiting than patients during the follow-up phase. It is possible that patients reported the total number of times they vomited per day, and nurses reported the number of times that patients vomited during their particular shift. The effects of this miscommunication may have been most pronounced during the

follow-up phase. The lack of clarity in obtaining this information likewise represents a weakness of the study.

Given these discrepancies, issues might be raised regarding the accuracy of trusting self-perceptions as valid indicators of patients' symptoms. Nisbitt and Wilson (1977) have argued that humans are not particularly adept at reporting their own internal processes. Furthermore, there does not appear to be a clinically applicable, reliable and valid noninvasive instrument or procedure for measuring nausea and vomiting (see Morrow, 1984; Burish & Carey, 1986). As a result, convergent evidence is sought by collecting observer's reports, as in the present study. While this information appears related to patient reports, it remains dependent on cues provided by the patient. For example, a nurse may not know that a patient is nauseated unless told of that symptom. Since these symptoms (e. g. nausea, anxiety) are not observable and exist only insofar as they are defined by the patient, they can only be conjectured by another human being (Rhodes, Watson, & Johnson, 1984). Thus, given our inability to directly observe or monitor another person's subjective experience, and given that we are generally interested in its content, we are dependent on indirect means of observation that are subject to inaccuracy and reactivity (Hollon & Bemis, 1981).

Self-report measures enjoy such widespread use partially by default as there are few alternatives, but also for the advantages they do present. These methods of assessment are quick, easy, and feasible for purposes of research and clinical work (Nicholas & Hollandsworth, 1986). Furthermore, accuracy can be improved by reducing the amount of recall

required of patients. Concurrent reporting (as in the present study), rather than long-term recall, is less threatened by contamination. Given the issues surrounding subjective self-report, an underlying caution should be maintained when interpreting patient and nurse ratings.

Distinct similarities exist between the present relaxation program and that used by Burish, as the latter served as a prototype. Application to an inpatient oncology unit necessitated important modifications however. Training sessions in both programs were: a) approximately 30 minutes long, b) conducted prior to and during chemotherapy administration, and c) led by an experienced staff member. Burish's subjects typically received a total of four sessions with a two week interval between each. These were conducted in a small private treatment room within an outpatient clinic. Subjects in the present study received anywhere from two to five sessions on consecutive days. These occurred in the subject's private or semi-private hospital room. Relaxation training spanned approximately two months for Burish's subjects, and one week for subjects studied here.

The conditions (e. g. time intervals between sessions) and environment (e. g. level of stress, number of interruptions) in which relaxation training occurs will influence a patient's ability to learn the procedure. The level of skill achieved is likewise an important consideration as it will influence the patient's outcome with various symptoms (see Sims, 1987). If relaxation training is a viable therapy, it seems that patients more skilled in its use would achieve greater symptom reduction. In apparent failures of relaxation training it then becomes a challenging task to differentiate inadequate learning by the

patient from the possibility that the intervention does not work. For example, the failure by this study to produce a decrease in patients' nausea may reflect an inadequate level of skill development by these inpatients, rather than an ineffective intervention per se. Thus, skills need to be considered in the analysis of the results but it is unclear how proficiency in [relaxation] technique is best measured (Sims, 1987).

To the extent that these measurement problems are resolved, attention can be directed toward refining relaxation training in order to maximize patients' acquisition and retention of this skill. General principles of learning would serve as a starting point in this endeavor, however precise applications remain to be established. For example, distributed practice (with long intertrial intervals) leads to better motor skill learning than does massed practice (Hintzman, 1978). In the context of relaxation training the questions then become: What is the optimal interval between training sessions? and Does this vary according to patient acuity? Answers to these questions are particularly important for patients who are weak or evidence dyspnoea since the sustained effort that is required may prove overly fatiguing. As another example, the rate of forgetting over time is quite rapid at first and becomes slower at longer intervals (Hintzman, 1978). As the trend continues toward utilizing relaxation training earlier in treatment (as a preventative measure), retention intervals will need to be addressed. Specifically, at what intervals should training sessions be reinstated in order to facilitate long term maintenance of any symptom reduction? The investigation of

various theories of learning in the context of this intervention invites further research and should prove of great clinical importance.

The extension of relaxation training procedures to hospitalized oncology patients (who are more seriously ill and receive more potent chemotherapy regimens) constitutes the major contribution of this study. The successful implementation of this program implies that the intervention and its related procedures did not interfere with the ongoing delivery of medical or nursing services. This demanded flexibility from the investigator to accommodate hospital routine (e. g. diagnostic tests, patient's sleep). The inpatient setting presented the disadvantages of more frequent interruptions and a more stressful environment, but also offered several advantages. Greater patient accessibility presented the convenience of personally monitoring their independent practice, and of more flexibility in scheduling training sessions. The increased contact between the investigator (clinician) and patient both throughout the day and over the course of the week, may have enhanced the psychological benefits of the relaxation training program. As recognized by Burish and his colleagues (1985), behavioral treatments, more than antiemetic drug therapies, are interpersonal in nature, and the quality of this interaction can significantly influence the success of the intervention. In sum, the inpatient setting allowed an intensive application of relaxation procedures in a brief period of time.

The inherent complexity of an inpatient setting invites the examination of an investigator's basic assumptions in the behavioral sciences. Specifically, is a highly complex setting such as this, to be

observed and described as it naturally occurs, or should it be controlled through randomization, large sample sizes, and extensive measurement? The first approach, or descriptive research, enables researchers to understand a phenomenon in a general way in order to determine which questions are relevant and worthy to pursue, frequently through the second approach, or experimental research. Previous investigation, along with existing knowledge of a phenomenon, are just two factors that serve to guide an investigator's choice of method. Regardless of approach, descriptive and experimental research are both integral aspects of scientific inquiry.

This research offers preliminary answers to the appeals of other investigators to discover which cancer patient groups benefit from relaxation training and in what ways (Sims, 1987). This evidence of a reduction in anxiety among oncology inpatients despite a small sample size, warrants additional efforts toward replication. It is impossible to know whether these subjects would have presented even greater nausea and vomiting as a cumulative effect of their ongoing chemotherapy programs. Such speculation points to the need for larger sample sizes and use of control groups in future research. Ongoing efforts towards developing cost-effective behavioral treatment programs might shift from the current focus on alternative delivery methods (e. g. paraprofessional therapist, audiotaped recordings) to examining time intervals between training sessions for optimal acquisition and maintenance. Trends illuminated in this research point to the possibility of reducing anxiety after only two training sessions. The importance of skill acquisition

among patients is underscored by Burish and his colleagues (1985) who realize that unless they eventually learn to produce the treatment effect on their own, a therapist would be required to spend time with them during all or most chemotherapy treatments. While laudable advances have been made in the behavioral management of chemotherapy related nausea and vomiting, future research should prove equally challenging. Behavioral research on chemotherapy side effects indeed represents a rich blend of scientific inquiry and humanitarian endeavor for the behavioral sciences (Redd, Burish, & Andrykowski, 1985).

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APPENDIXES

APPENDIX A
MANITOBA FUNCTIONAL LIVING INDEX-CANCER (FLIC)

TEAR
HERE

**MANITOBA CANCER TREATMENT & RESEARCH FOUNDATION
FUNCTIONAL LIVING INDEX: CANCER (FLIC)**

Date _____

1. Most people experience some feelings of depression at times. Rate how often you feel these feelings.

1 Never 2 3 4 5 6 Continually
7

2. How well are you coping with your everyday stress?

1 Not Well 2 3 4 5 6 Very Well
7

3. How much time do you spend thinking about your illness?

1 Constantly 2 3 4 5 6 Never
7

4. Rate your ability to maintain your usual recreation or leisure activities.

1 Able 2 3 4 5 6 Unable
7

5. Has nausea affected your daily functioning?

1 Not At All 2 3 4 5 6 A Great Deal
7

6. How well do you feel today?

1 Extremely Poor 2 3 4 5 6 Extremely Well
7

7. Do you feel well enough to make a meal or do minor household repairs today?

1 Very Able 2 3 4 5 6 Not Able
7

8. Rate the degree to which your cancer has imposed a hardship on those closest to you in the past 2 weeks

1 No Hardship 2 3 4 5 6 Tremendous Hardship
7

9. Rate how often you feel discouraged about your life.

1 Always 2 3 4 5 6 Never
7

10. Rate your satisfaction with your work and your jobs around the house in the past month.

1 Very Dissatisfied 2 3 4 5 6 Very Satisfied
7

11. How uncomfortable do you feel today?

1 Not At All 2 3 4 5 6 Very Uncomfortable
7

TEAR
HERE

B

9 N° 18

(over)

PLEASE INDICATE WITH YOUR RATING

12. Rate in your opinion, how disruptive your cancer has been to those closest to you in the past 2 weeks

1 Totally Disruptive 2 3 4 5 6 No Disruption
7

13. How much is pain or discomfort interfering with your daily activities?

1 Not At All 2 3 4 5 6 A Great Deal
7

14. Rate the degree to which your cancer has imposed a hardship on you (personally) in the past 2 weeks.

1 Tremendous Hardship 2 3 4 5 6 No Hardship
7

15. How much of your usual household tasks are you able to complete?

1 All 2 3 4 5 6 None
7

16. Rate how willing you were to see and spend time with those closest to you, in the past 2 weeks.

1 Unwilling 2 3 4 5 6 Very Willing
7

17. How much nausea have you had in the past 2 weeks.

1 None 2 3 4 5 6 A Great Deal
7

18. Rate the degree to which you are frightened of the future.

1 Constantly Terrified 2 3 4 5 6 Not Afraid
7

19. Rate how willing you were to see and spend time with friends, in the past 2 weeks.

1 Unwilling 2 3 4 5 6 Very Willing
7

20. How much of your pain or discomfort over the past 2 weeks was related to your cancer?

1 None 2 3 4 5 6 All
7

21. Rate your confidence in your prescribed course of treatment.

1 No Confidence 2 3 4 5 6 Very Confident
7

22. How well do you appear today?

1 Extremely Poor 2 3 4 5 6 Extremely Well
7

Please check to see if you have completed all questions. Then, fold on the perforated line, seal, and drop in the mail. Thank you for your valuable assistance in this project.

APPENDIX B

MULTIPLE AFFECT ADJECTIVE CHECKLIST (MAACL)

Pt. _____ Date _____
Rm. _____

MAACL-PRE

Below you will find words that describe different kinds of moods and feelings. Please use this list to describe your feelings right now. Although some of the words may sound alike, please think about each word by itself. Check the blank to the left of each word that describes your feelings right now. Work rapidly - your first reaction is best.

- | | |
|--------------------|---------------------|
| _____ active | _____ lonely |
| _____ afraid | _____ loving |
| _____ agreeable | _____ low |
| _____ alone | _____ lucky |
| _____ angry | _____ mad |
| _____ awful | _____ mean |
| _____ blue | _____ merry |
| _____ calm | _____ miserable |
| _____ cheerful | _____ nervous |
| _____ contented | _____ offended |
| _____ cruel | _____ panicky |
| _____ desperate | _____ peaceful |
| _____ discouraged | _____ pleasant |
| _____ disgusted | _____ polite |
| _____ enthusiastic | _____ rejected |
| _____ fearful | _____ safe |
| _____ friendly | _____ secure |
| _____ frightened | _____ shaky |
| _____ furious | _____ steady |
| _____ glad | _____ sunk |
| _____ good | _____ sympathetic |
| _____ good-natured | _____ tense |
| _____ happy | _____ terrified |
| _____ healthy | _____ thoughtful |
| _____ hopeless | _____ understanding |
| _____ interested | _____ upset |
| _____ irritated | _____ worrying |
| _____ joyful | |

Pt. _____ Date _____
Rm. _____

MAACL-POST

Below you will find words that describe different kinds of moods and feelings. Please use this list to describe your feelings right now. Check all the adjectives that describe you you feel right now. Although some of the words may sound alike, please think about each word by itself. Check the blank to the left of each word that describes your feelings right now. Work rapidly - your first reaction is best.

- | | |
|--------------------|-------------------|
| _____ active | _____ lost |
| _____ afraid | _____ loving |
| _____ agreeable | _____ low |
| _____ angry | _____ miserable |
| _____ calm | _____ nervous |
| _____ cheerful | _____ panicky |
| _____ contented | _____ peaceful |
| _____ cooperative | _____ pleasant |
| _____ cruel | _____ rejected |
| _____ desperate | _____ sad |
| _____ disagreeable | _____ safe |
| _____ discontented | _____ secure |
| _____ disgusted | _____ shaky |
| _____ enthusiastic | _____ steady |
| _____ fearful | _____ strong |
| _____ friendly | _____ suffering |
| _____ frightened | _____ sunk |
| _____ furious | _____ sympathetic |
| _____ glad | _____ tense |
| _____ gloomy | _____ terrible |
| _____ good | _____ terrified |
| _____ good-natured | _____ thoughtful |
| _____ happy | _____ unhappy |
| _____ healthy | _____ unsociable |
| _____ interested | _____ upset |
| _____ irritated | _____ worrying |
| _____ joyful | _____ young |
| _____ kindly | |

APPENDIX C
PATIENT INTERVIEW

PATIENT INTERVIEW

1. In what ways has cancer affected your daily life?
(work, home activities, recreation, religion, interests)
2. Do you know anyone who has had cancer?
(type, extent of contact with that person)
3. What were your expectations after learning of your diagnosis?
What did you think your life would be like?
(fears, r. e. treatments—surgery/radiation/chemotherapy,
nausea/vomiting, longevity, remission, cure)
What are your expectations for the future?
(r. e. cancer and treatments)
4. Can you describe how cancer and your treatments have affected you
physically?
(pain: degree, past, present)
5. How has cancer affected your relationships with important people in
your life, especially friends and family?
(level of involvement, desire, quality of contact)
6. What other difficult or stressful events have you experienced in your
life?
(what, when, other stresses at present)
During this year were there any especially good or especially bad things
that were taking place in your life?
How does your diagnosis of cancer compare with these?
What are you like under stressful conditions?
7. Grief or sadness are important feelings that patients usually experience
at some point. This may be a difficult question, but could you talk
about the times when you have felt sad or frightened?
How do you handle these feelings when you have them?
(describe how cancer and your treatments have affected you
emotionally)
8. In your opinion did you do anything before you got cancer that might
be related to your illness now?
9. Do you believe you can influence the course of your illness?
10. Would you describe yourself as a relaxed, easy going person or a
hurried and uptight individual?
11. Patients like to know different amounts of information about their
cancer. Some like to know all they can; others do not want to know
very much. How do you feel?

APPENDIX D
EXIT INTERVIEW

EXIT INTERVIEW

1. Have you been a patient at any other hospital?
2. Can you tell me about your experiences with hospitals?
3. How does this admission compare with previous admissions?
(nursing care, medical procedures, stress, number visitors)
4. How satisfied were you with the information you were given
concerning the side effects of chemotherapy?
(including nausea/vomiting)
5. How satisfied were you with the care you received at this hospital?

APPENDIX E

RELAXATION TRAINING FOLLOW-UP INTERVIEW

RELAXATION TRAINING FOLLOW-UP INTERVIEW

1. Did you practice relaxation training while at home?

Why?
(sleep, nausea/vomiting)

Why not?

How often?

Could you notice any differences in how you felt?
What were they?

2. Did you practice relaxation training while in the hospital this admission?

Why?
(sleep, nausea/vomiting)

Why not?

How often?

What did you hope this would accomplish for you?
(expectations)

Could you notice any differences in how you felt?

What were they?

3. Were you able to remember all of the steps of the procedure?

4. Were you able to follow all of the steps?

APPENDIX F
EXPECTANCY QUESTIONNAIRE

Name _____

Date _____

EXPECTANCY QUESTIONNAIRE

We would like to know what, if any, benefits you are expecting to receive from the chemotherapy you have had and will have, and from participating in this study. Please answer honestly.

I expect that the chemotherapy that I am receiving will:

1	2	3	4	5	6	7	8	9
Cure my cancer			Not make any difference				Make my cancer much worse	

I expect that participating in this study will:

1	2	3	4	5	6	7	8	9
Make receiving chemotherapy easier			Not make any difference				Make receiving chemotherapy harder	

APPENDIX G
CONFIDENCE QUESTIONNAIRE

Name _____
Date _____

CONFIDENCE QUESTIONNAIRE

How confident are you that relaxation training will eliminate the nausea and vomiting? Please circle one.

Totally confident	01
Extremely confident	02
Very confident	03
Moderately confident	04
Slightly confident	05
Not very confident	06
Not at all confident	07

How confident did the person who explained relaxation training seem that it would eliminate the nausea and vomiting? Please circle one.

Totally confident	01
Extremely confident	02
Very confident	03
Moderately confident	04
Slightly confident	05
Not very confident	06
Not at all confident	07

APPENDIX H
PATIENT INTERACTION CHECKLIST

Patient Interaction Checklist

Pt. _____ Date _____
 Rm. _____ Time _____
 Date Adm. _____
 T1 T2 T3

Date	Visitor (Relationship)	Length of Visit

Date: _____ Comments: list any unusual circumstances

Date: _____ Behavioral Observations:

APPENDIX I
DAILY DATA SHEET

Daily Data Sheet

Pt. _____
 Rm. _____
 Physician _____
 Date Adm. _____ Expected DC _____
 T1 T2 T3

	Baseline-Pre						
Date Time							
Nurse							
Others Present							
Nausea	1 2 3 4 5 6 7	1 2 3 4 5 6 7	1 2 3 4 5 6 7	1 2 3 4 5 6 7	1 2 3 4 5 6 7	1 2 3 4 5 6 7	1 2 3 4 5 6 7
Vomiting #							
Tense/Anxious	1 2 3 4 5 6 7	1 2 3 4 5 6 7	1 2 3 4 5 6 7	1 2 3 4 5 6 7	1 2 3 4 5 6 7	1 2 3 4 5 6 7	1 2 3 4 5 6 7
Food Intake	n l a m o e v o n s e r e s . e	n l a m o e v o n s e r e s . e	n l a m o e v o n s e r e s . e	n l a m o e v o n s e r e s . e	n l a m o e v o n s e r e s . e	n l a m o e v o n s e r e s . e	n l a m o e v o n s e r e s . e
Sleep	n l a m o e v o n s e r e s . e	n l a m o e v o n s e r e s . e	n l a m o e v o n s e r e s . e	n l a m o e v o n s e r e s . e	n l a m o e v o n s e r e s . e	n l a m o e v o n s e r e s . e	n l a m o e v o n s e r e s . e
Chemo Infusing							
PRN Meds							

Activities:

Date: _____ Comments: Anything bothering you today?

Date: _____ Behavioral Observations:

APPENDIX J

RELAXATION TRAINING FORM

Relaxation Training Form

Pt.
Rm.
Physician
Date Adm.

Date Time	Baseline-Pre						
Others Present							
Practice RT # Why/Why Not							
Pre RT Vitals-BP PR RR							
RT Administered							
Post RT Vitals-BP PR RR							
Able to follow all instructions?							
Interruptions							
How Feel? Any Change?							

Past experience with RT?

Learned:
 Where/Who?
 How long ago?
 Rx for:

Applied:
 How often?
 Time of day?
 Benefits?

Date:

Comments:

Date:

Behavioral Observations:

APPENDIX K
FAMILY RATING SCALE

Name _____
Patient _____
Date _____

Family Rating Scale

How well is the patient adjusting to chemotherapy?

1	2	3	4	5	6	7	8	9
poorly				moderately				excellently
				well				

How well are you and your family coping with this illness and related difficulties?

1	2	3	4	5	6	7	8	9
poorly				moderately				excellently
				well				

How severe are the patient's side effects from treatment?

1	2	3	4	5	6	7	8	9
very				moderate				not at all
severe								severe

Please describe any side effects:

Additional comments:

APPENDIX L
FAMILY INTERVIEW

FAMILY INTERVIEW

1. In what ways has cancer affected your daily life with this person?
(work, hove activities, recreation, religion, interests)

2. Can you describe how cancer and the treatments have affected this person physically?
(pain: degree, past, present)

3. How has this person's cancer affected your relationship?
(level of involvement, desire, quality of contact)

4. Describe how cancer and the treatments have affected this person emotionally.
(sad, depressed, fearful)

APPENDIX M
NURSE FORM

Nurse Form

Pt. _____
 Rm. _____
 Physician _____
 Date Adm. _____ Expected D/C _____
 T1 T2 T3

	Baseline-Pre						
Date Time							
Nurse							
Nausea	1 2 3 4 5 6 7	1 2 3 4 5 6 7	1 2 3 4 5 6 7	1 2 3 4 5 6 7	1 2 3 4 5 6 7	1 2 3 4 5 6 7	1 2 3 4 5 6 7
Vomiting #							
Nervous	1 2 3 4 5 6 7	1 2 3 4 5 6 7	1 2 3 4 5 6 7	1 2 3 4 5 6 7	1 2 3 4 5 6 7	1 2 3 4 5 6 7	1 2 3 4 5 6 7
Food Intake	n l a m o e v o n s e r e s . e	n l a m o e v o n s e r e s . e	n l a m o e v o n s e r e s . e	n l a m o e v o n s e r e s . e	n l a m o e v o n s e r e s . e	n l a m o e v o n s e r e s . e	n l a m o e v o n s e r e s . e
Pt. Initiated Interactions	n l a m o e v o n s e r e s . e	n l a m o e v o n s e r e s . e	n l a m o e v o n s e r e s . e	n l a m o e v o n s e r e s . e	n l a m o e v o n s e r e s . e	n l a m o e v o n s e r e s . e	n l a m o e v o n s e r e s . e
Chemo Infusing							
PRN Meds							

Date: _____ Comments: Anything seem to be bothering the patient today?

APPENDIX N
INFORMED CONSENT

BEHAVIORAL MANAGEMENT OF CHEMOTHERAPY RELATED
NAUSEA AND VOMITING
Informed Consent

You are being asked to participate voluntarily in research on nausea and vomiting that is part of a student's doctoral dissertation. All involvement with this project will occur during a regularly scheduled hospitalization for chemotherapy. Participation in this study will in no way affect or interfere with medical treatment. Involvement will consist of an interview with the investigator that will be audio taped, and the completion of various brief questions. A family member, if available and willing, will be interviewed (also audio taped). Each audio tape will be made available to the person interviewed, for his/her review, should this be desired. These interviews will focus on the experience of cancer, and will include questions about past medical history. At one point, the investigator will teach you progressive muscle relaxation and guided imagery techniques, and then she or a nurse will monitor your vital signs. You will be encouraged (but not required) to continue practicing the relaxation techniques on your own. Participation will span a three month period (during three cycles of chemotherapy), and will require about three hours or less each hospitalization.

By analyzing information from this research, the investigator hopes to determine the effects of relaxation techniques on hospitalized oncology patients. Involvement in this study is not expected to be stressful. In the unlikely event that anxiety develops, participation may be discontinued and additional consultation may be provided free of charge. This study offers free training in behavioral techniques that have been shown to increase physiological relaxation and sense of well-being. The relaxation procedure is not experimental; it is a generally accepted and widely applied clinical technique. Strict confidentiality of all information will be maintained: data will be accessible only to the investigator, it will be stored (locked) in her private office, and the audio tapes will be mechanically erased after the study's completion. Participation is completely voluntary and may be discontinued at any time, without consequence. If questions arise, or you wish information regarding the findings of this study, please contact the investigator, Beth Gunn, at East Tennessee Baptist Hospital Community Cancer Center, P. O. Box 1788, Knoxville Tennessee 37901 (632-5011 ext. 4494).

I have read and understand the above explanation of the research procedure, and I voluntarily agree to participate:

Signed _____ Witness _____

Date _____

APPENDIX O

RELAXATION TRAINING EXPLANATION

Relaxation Training Explanation

My job is to help you feel more comfortable during chemotherapy. Some people experience nausea and vomiting after a treatment and some even get sick before a treatment. If this develops it is very normal. I can teach you a procedure that may help reduce any nausea and vomiting and also help you feel more relaxed and comfortable before and after chemotherapy.

One way to minimize anxiety, nausea, and vomiting is through relaxation training. Relaxation training is a special set of exercises that are easy to learn. They can help you throughout chemotherapy and also in any stressful situations. For example, many people use their relaxation skills to reduce headaches and other aches and pains, to go to sleep easier and calm themselves when they get upset, and also to feel peaceful after a difficult day. A variation of relaxation training is commonly taught to women to help them feel more comfortable during childbirth.

Relaxation exercises are very easy to learn and have few if any side effects. While some people may become slightly more anxious, this is a highly unlikely occurrence. In fact, most people report feeling more calm and peaceful. If you experience any discomfort please let me know right away. I'm a firm believer in the benefits of relaxation training, and frequently use it to improve my own life.

Do you have any questions?

APPENDIX P

RELAXATION TRAINING INSTRUCTION SHEET

Relaxation Training Instruction Sheet

Breathing

1. breathe air in through nose
2. let chest and stomach rise while inhaling air
3. let chest fall down while exhaling

Procedure

1. focus on the muscle group to be relaxed
2. tense the muscle group
3. maintain tension for 5-7 seconds
4. focus attention on the muscle group as it relaxes

Tensing Instructions

1. Hands & Arms -make fists, bend arms at elbows, hold fists up toward ceiling
2. Forehead -open eyes wide, raise eyebrows, wrinkle forehead
3. Jaw & Neck -clench teeth, stretch chin out
4. Back & Shoulders -lift shoulders up, pull shoulder blades toward each other
5. Stomach -extend stomach, make muscles hard and firm
6. Thighs -tighten muscles of thighs and upper legs
7. Calves -pull toes back toward head
8. Feet -point toes away from body, straighten ankles

Imagery

Think of a peaceful scene outdoors, such as an open meadow or the beach

VITA

Beth Gunn was born in Grand Rapids, Michigan on July 3, 1962. She attended the National Music Camp at Interlochen, Michigan to study the clarinet during the summers of 1974 through 1978. She received her high school diploma from Forest Hills Central in June 1980. The following September she entered Hope College in Holland, Michigan and studied psychology and English. She graduated Magna Cum Laude and Phi Beta Kappa in May 1984.

Ms. Gunn entered graduate school at The University of Tennessee, Knoxville in September 1984. As part of her doctoral program in clinical psychology she spent four years as a research assistant at The Child Behavior Institute under the direction of Robert G. Wahler, Ph.D and two years as a psychology intern at Baptist Hospital Cancer Center under the direction of Alan Solomon, M.D. Following a one year predoctoral internship at Baylor College of Medicine in Houston, TX she received the Doctor of Philosophy degree in August 1989.

In addition to an interest in psychology, the author is an avid cyclist, having biked across the states of Georgia and Tennessee. She enjoys competitive running, an occasional triathlon, and virtually any athletic endeavor that occurs in the mountains or water.