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Investigation of the Role of Self-Efficacy in Postoperative Outcomes in Spinal Fusion Patients

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INVESTIGATION OF THE ROLE OF SELF-EFFICACY IN POSTOPERATIVE OUTCOMES IN SPINAL FUSION PATIENTS

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A descriptive correlational design was utilized to explore the relationship between preoperative self-efficacy and the postoperative outcomes of distance ambulated, brace application, discharge disposition and length of stay in surgical spinal fusion patients. Social cognitive theory and the concept of self-efficacy were used to provide the theoretical framework. A novel self-efficacy questionnaire was developed to measure the independent variable, it was tested for reliability and validity in a 16 patient pilot study. The pilot study was followed by a study of 52 post-operative patients. Preoperative self-efficacy significantly correlated to distance ambulated in the entire sample. Females in this sample demonstrated correlational relationship with two of the outcome variables, distance ambulated, and discharge disposition. Males demonstrated correlation in distance ambulated only.

DEDICATION

To my best friend Michael, for your love and support

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CHAPTER 1

INTRODUCTION

Low back pain is an experience endured by up to eighty percent of all adults during their lifetime (Altmaier, Russell, Kao, Lehmann, & Weinstein, 1993). The cost of diagnosis and treatment of back pain along with lost work expense costs the United States (U.S.) economy 16 billion to 60 billion dollars annually (Frymoyer, Hadler & Ducker, 1996). Pressures to decrease the cost of health care have resulted in scrutiny of efficiencies in care practices. One frequently employed method of decreasing the cost of care is to reduce the length of hospital stay (Noetscher & Morreale, 2001).

Low back pain is caused by a multitude of factors, including muscle strain or sprain, age related degeneration of discs and facets, herniation of intervertebral discs, osteoporotic compression fractures and spinal stenosis. These conditions are multifactorial in etiology (Cohen, Chopra & Upshur, 2001). Those persons affected by low back pain are at risk for mobility limitation secondary to pain and possibly neurological deficit (Padinya, Pandinpai, Kim, & Hais, 2001).

Although up to ninety percent of acute low back pain episodes will resolve with time and conservative management, those persons with continued pain may require surgical intervention (Hickey, 1997). Herniated intervertebral discs or spinal stenosis

are common problems requiring surgical intervention, and spinal stenosis is the leading cause of spinal surgery in persons over age 65 (Deyo, 1998). Conservative therapies such as modified activities and non-narcotic medication administration are the standard starting points for conservative treatment, but they rarely have long-term effectiveness for those persons experiencing degeneration of disks and facets and spinal stenosis (Jolles, Porchet & Theumann, 2001).

In addition to spinal stenosis, the presence of spondylosis and spondylolisthesis can complicate the pathology and also cause the patient to require surgical decompression and fusion (Hickey, 1997). Spondylosis is the degeneration of the vertebral bodies or intervertebral disc with narrowing of the intervertebral space. Spondylolisthesis involves breakdown on both sides of the vertebrae with displacement of the vertebral body (Hickey, 1997). Spinal stenosis, spondylosis, and spondylolisthesis are three possible reasons for performing spinal fusion.

Operative laminectomies are performed on persons as a method to ameliorate both spinal cord and nerve root compression. When the spinal cord and nerve roots are decompressed, the bony structure of the spine may become structurally unstable and fusion becomes necessary to maintain structural integrity (Chipps, Clanin, & Campbell, 1992). Deyo (1998) reports national data that reveals the incidence of spinal fusion surgeries have increased by 343 percent since 1979. Spinal stenosis surgeries are far more complex and often require multiple levels of spinal surgery when compared to simple disc procedures (Deyo, 1998). Given the complexity of spine fusion procedures, nursing interventions that promote rehabilitation assist the patient in regaining functional mobility (Hickey, 1997).

Post-operative recovery from surgical decompression and fusion of the spine requires regaining self-care abilities and learning new mobility techniques. In recovering from surgery and regaining mobility many issues may impact the recovery process. Although the character of the structural spine defects impact the outcome, the patient's expectations and attitudes are also important. It is becoming increasingly acknowledged that psychological parameters such as self-efficacy beliefs impact both pain perception and functional outcomes in persons with back pain (Altmaier, et al., 1993). Self-efficacy and social cognitive theory (Bandura, 1986) have been utilized by a number of researchers to demonstrate the importance of psychological factors in health behaviors.

Purpose of the Study

Self-efficacy is a construct within social cognitive theory that describes a person's belief about his or her ability to successfully execute behaviors (Bandura, 1986). Studies have demonstrated that self-efficacy beliefs and their component parts—outcome expectations and efficacy expectations--can be modified to influence behavior in orthopedic patients (Waldrop, Lightsey, Ethington, Woemmel, & Coke, 2001). The purpose of this study was to determine if preoperative scored values of self-efficacy would predict patient performance in the dependent variables. The measured dependent variables were: (a) length of hospital stay, (b) distance ambulated at discharge, (c) self-care abilities, and (d) discharge disposition.

CHAPTER 2

THEORETICAL FRAMEWORK AND LITERATURE

Self-efficacy and Social Cognitive Theory

Bandura's (1977, 1986) conceptualizations of self-efficacy and related concepts have been used in a number of studies that describe and predict outcomes in a variety of health behaviors such as postoperative exercises (Oetker-Black, Hart, Hoffman & Geary, 1992), narcotic use and pain control (Bandura, O'Leary, Taylor, Gauthier & Gossard, 1987), and physical rehabilitation in low back pain (Altmaier et al., 1993). Waldrop, et al. (2001) describe the role of self-efficacy in recovery from orthopedic surgery arising from acute fractures and chronic conditions such as degenerative joint disease. Self-efficacy was the sole predictor of performance of postoperative behaviors in the Walrop, et al. (2001) investigation. Additionally, Moon and Backer (2000) described the relationship between self-efficacy and postoperative behaviors in total knee and hip arthroplasty population; this study also found that self-efficacy measures were the single predictor of patient behavior.

Social cognitive theory (SCT) provides a theoretical framework to describe and predict behaviors of clients and the process of their recovery (Bandura, 1986). SCT (Bandura, 1986) is a grand theory born out of behavioral thought and the social learning theory that was developed throughout the early part of the twentieth century (Stone, 1997). Several concepts of SCT can be used to predict and explain behavior; two examples are outcome expectations and self-efficacy.

Self-efficacy is defined by Bandura (1986) as "a person's judgment of their [sic] capabilities to organize and execute courses of actions required to attain designated types of performances" (p. 391). Baranowski, Perry and Parcel (1997) restate Bandura's conviction that self-efficacy is the most important component of behavioral change. Self-efficacy is both a theoretical construct and a study variable to be measured. One important theoretical premise concerning the construct of self-efficacy is that self-efficacy is situation specific (Bandura, 1986). A person's sense of self-efficacy for one activity does not necessarily predict self-efficacy beliefs for another activity.

In Bandura's (1995) work, he suggests that self-efficacy is a critical element of motivation. The more a person believed that he/she would succeed at an activity the more likely he/she was to actually succeed. A corollary statement regarding self-efficacy is the idea of persistence in the face of obstacles. Individuals possessing low self-efficacy beliefs would be expected to give up easily in the face of obstacles; conversely, those with high self-efficacy beliefs would be expected to persevere in the face of adversity.

According to Bandura (1977), there are four sources of information used by people which influence self-efficacy beliefs. Information is received from passive attainment, verbal persuasion, vicarious experience and physiological arousal. Passive attainment, which is referred to by some authors as performance accomplishments (Fabian, 2000), refers to the history of personal successes or failures that a person experiences when attempting a behavior. Learning that arises from observations of others is considered vicarious learning; another factor that modifies self-efficacy is the persuasive effect of others. The final modifying factor for self-efficacy is the emotional

arousal, nervousness or anxiety that a person experiences when performing a behavior (Carpinello, Knight, Markowitz, & Pease, 2000).

Outcome expectancies are "beliefs that carrying out a specific behavior will lead to a desired outcome," (Bandura, 1986). In SCT , Bandura (1986) has called these beliefs "antecedent determinants." Outcome expectations are different from outcome expectancies in that they are intrinsic value scales that persons place on an outcome (Baranowski, 1997).

Review of the Literature

Introduction and Review Format

Current literature provides little direct information regarding self-efficacy and its role in predicting behaviors in individuals who have undergone spinal fusion. Nonetheless, there are a number of related studies that can be considered to support the relevance of the study question. Studies are available that address the role of self-efficacy in predicting postoperative behavior and functional rehabilitation outcomes. Rather than being conducted in individuals with degenerative spine conditions, they were completed with patients who have degenerative hip and knee conditions. Research has also been conducted that demonstrates the relationship between self-efficacy and outcome following cardiac surgery and during cardiac rehabilitation.

The literature review is presented in three sections followed by a summary. Literature focusing on recent studies that correlate self-efficacy to post-operative outcomes in orthopedic conditions is presented first. Since there are many postoperative behaviors that are common to all surgeries, a study correlating self-efficacy scores to

common postoperative behaviors (Oetker-Black et al., 1992) is presented. Secondly, two studies are presented that correlate self-efficacy to the ability of patients to persist in activities despite pain experiences. These studies are significant because of pain's disabling effect on mobility and ability to perform activities of daily living (Best, 2002). Finally, studies are reviewed that demonstrate the current literature focusing on the dependent variables. There is limited current literature regarding the role of self-efficacy in predicting the dependent variables, distance ambulated, self-care abilities, length of stay and discharge disposition. Nonetheless, a few studies exist that correlate other patient perceptions to the dependent variables.

Self-efficacy and Postoperative Behaviors

Moon and Backer (2000) used a descriptive correlational design to examine the relationship of self-efficacy and outcome expectancies as predictors of adherence to postoperative performances of leg exercises and ambulation in persons recovering from joint replacement surgery. Fifty patients receiving their first hip or knee arthroplasty received preoperative education and completed a self-efficacy questionnaire. Multiple linear regression was used to examine predictors of actual performance of postoperative exercise.

As independent variables, both self-efficacy and outcome expectancy were explored but only self-efficacy significantly predicted postoperative exercise performance. Self-efficacy accounted for 8 to 33 percent of the variance in each of the dependent variables—distance ambulated, frequency of exercises and number of repetitions of exercises. It was unclear if outcome expectancy is important in predicting

postoperative behaviors. An additional finding of this study was that preoperative education alone could not predict the dependent variables. The study methodology discussed the importance of measuring self-efficacy for and activity close to the time of the event to enhance measurement accuracy. One limitation of the study is the sample size of fifty was small to reliably perform a multiple regression.

Waldrop, Lightsey, Ethington, Woemmel, and Coke (2001) examined the relationships of self-efficacy, optimism, and health competence to recovery from orthopedic surgery. Unlike in the previous study, these researchers used a variety of concepts from a number of theoretical frameworks. Trait characteristics such as optimism, that are generalizable to a multitude of situations, situation-specific characteristics such as perceived health competence (PHC) and self-efficacy were examined in relation to rehabilitation outcome.

In two inpatient rehabilitation settings 105 men and women were recruited and assessed for measures of optimism, PHC and self-efficacy within 24 hours of admission. A situation specific self-efficacy scale called the Self-efficacy for Rehabilitation Outcome Scale (SER) was developed by the authors to measure the subjects' beliefs about their ability to perform rehabilitation behaviors common to hip and knee recovery. Multiple regression analysis revealed that neither optimism ($R^2 = .00$) nor PHC ($R^2 = .01$) predicted functional outcomes. Although the variance explained was small ($R^2 = .03$), only self-efficacy was shown to predict variance in functional recovery from orthopedic surgery. This study had a somewhat larger sample size than the Moon and Backer (2001) study for a hierarchical multiple regression analysis. The Waldrop et al. (2001) investigation is significant because it compares other psychological traits such as

optimism and health values that could potentially influence rehabilitation outcomes rather than only investigating the role of self-efficacy.

Oetker-Black, Hart, Hoffman and Geary (1992) explored the relationship between self-efficacy and postoperative behaviors and outcomes in 68 female cholecystectomy patients. A 16-item self-efficacy instrument titled the Preoperative Self-Efficacy Scale (PSES) was administered preoperatively and recall of expected events was measured postoperatively as a self-report. The postoperative outcome dependent variables were deep breathing, ambulation and requests for pain medication.

This study found a significant relationship between scores on the preoperative self-efficacy scale and postoperative deep breathing spirometry measures and ambulation distance. The self-efficacy scores were grouped into high, medium and low scoring groups, then a one-way analysis of variance (ANOVA) was performed with each of the dependent variables. There were significant differences ($F = 3.72, p = .05$) in the high scoring groups compared to the low scoring groups in their ability to ambulate and perform spirometry. Unlike in the Moon and Baker (2000) study, however, the timing of the self-efficacy scoring had no impact on postoperative behavior.

A correlation was found between preoperative self-efficacy and postoperative deep breathing ($r = .20, p < .05$), ambulation ($r = .22, p < .05$), pain medication requests ($r = .18, p < .05$) and recollection of preoperative education ($r = .24, p < .05$). Although the study participants experienced cholecystectomy procedures, many of the expected postoperative behaviors are similar in other surgical procedures. One limitation of this study is the sample size ($n = 68$). Since the study population was entirely female it would

be beneficial to repeat it in a male population because there may be differences between the sexes in self-efficacy and the degree to which it predicts postoperative outcomes.

Self-efficacy and the Pain Perceptions

Because of the role of pain in spinal pathology, the study by Bandura, O'Leary, Taylor, Gauthier, and Gossard (1987) was reviewed. In postoperative populations, pain can be a considerable obstacle to functioning. Self-efficacy is also related to the persistence that a person will demonstrate in the face of obstacles.

Before participating in cold pressor testing, 72 patients, with equal numbers of men and women, completed surveys of their perceived self-efficacy to withstand pain and perceived self-efficacy to decrease the pain experience. Subjects were randomly divided into three treatment categories: cognitive coping, placebo medication and control conditions. The cognitive coping group received education on cognitive methods to decrease pain such as diversion, imagery, and self-encouragement. The placebo group received placebo medication thirty minutes prior to intervention and the control group received standard instruction without intervention.

Pain was administered by a cold pressor test. The subject placed a hand in warm water for 3 minutes followed by emersion in 0°C water. The length of time the patient was able to keep the hand in water was considered a measure of pain tolerance. The participants' self-efficacy to withstand pain was compared to the results of their cold pressor test. Self-efficacy scores had a positive correlation to ability to tolerate pain no matter which treatment group the participant was in. The average correlation was reported as $r(70) = .75$ ($p < .0001$). The individual treatment correlations were cognitive ($r = .64$), placebo ($r = .61$) and control ($r = .90$).

Altmaier et al. (1993) explored the role of self-efficacy in rehabilitation outcomes in patients with chronic low back pain. This study used an experimental design to assess 45 men and women who participated in a three-week rehabilitation program. The patients were randomly assigned to one of two treatment conditions; they either received standard rehab including physical therapy and education or received standard rehabilitation along with counseling interventions. In addition to the intervention of counseling and physical therapy, self-efficacy measures were completed on admission, at discharge and six month follow up.

Pain experiences were evaluated using the Low Back Pain Rating Scale (LBPRS) and McGill Pain Questionnaire (MPQ). The LBPRS were designed to assess the effect of pain on patient functioning based on a list of twenty common activities. The MPQ consists of two subscales: Present Pain Intensity (PPI) and Pain Rating Index (PRI). PPI is designed to determine the patient's perception of pain at the time of the questionnaire. In developing the self-efficacy tool, care was taken to include questions that revealed the patient's perception of personal ability to participate in rehabilitation in the face of obstacles. A residual self-efficacy score was designed to "represent the change in the strength of self-efficacy from admission to discharge" (Altmaier et al 1993, p.337) then the score was used to compare to the dependent variables of pain and functioning.

Hierarchical multiple regression analysis revealed that gains in self-efficacy beliefs were associated with improved functioning, and fewer reports of pain at the six-month follow-up. Self-efficacy changes were compared separately to patient functioning (LBPRS) and patient pain perceptions (MPQ) to determine if either or both were affected

by changes in self-efficacy. LBPRS scores at admission and discharge from rehabilitation were significant predictors of LBPRS at six month follow up. Nonetheless, the change in strength of self-efficacy and self-efficacy residual, predicted greater gains in functioning ($F(1, 38) = 4.55, p < .05$). The self-efficacy residual had an even larger effect on pain perceptions with PPI scores ($F(1, 38) = 11.69, p < .01$). Similarly, PRI scores were predicted by increases in self-efficacy ($F(1, 38) = 8.54\ p < .01$). The significance of this study is the positive correlation between interventions to increase self-efficacy and their relationship to positive patient functioning and decreased perception of pain.

Studies Relating to Dependent Variables

Length of hospital stay (LOS) is explored in Deaton, Weintraub, Ramsay and Przykucki's (1998) study of the role of health perception in predicting LOS in patients after coronary artery bypass graft procedures (CABG). A descriptive correlational design was used to analyze the role of health perception in predicting LOS, readmission and patient functioning. A 100 patient convenience sample of women and men scheduled for elective CABG was selected. Baseline health perception measures were obtained using the Health Status Questionnaire 12 (HSQ12) followed by measurement of the dependent variables. A 3-month follow up health perception measure was completed and compared to the episodes of readmission and length of stay.

ANOVA and Chi-square analyses were used to describe the relationship between lower preoperative health status scores and longer LOS ($p = .310$). Also reported is a relationship between longer LOS and readmission to the hospital after the original CABG hospital stay. Limitations of this study are the scant details of statistical analyses.

Keating, Ranawat, and Cats-Baril (1999) conducted a study that assessed the postoperative functional activities of patients who had joint arthroplasties as measured by both patient and caregiver. Postoperative vigor, defined as "early postoperative recuperative power," was the independent variable that was correlated to postoperative functioning. Vigor was measured using a novel tool that contained items regarding energy level, simple physical abilities, well-being, readiness to resume activities, and caregiver perceptions of readiness.

After the instrument reliability was established, the survey was administered to 65 patients. Vigor scores were compared to distance ambulated, spirometry measures, hematocrit, and muscle strength. The objective measures of functioning, distance ambulated ($r = .11$) and muscle strength ($r = .40$), were positively correlated with the patient vigor score ($p < .01$, 1-tailed).

Implications for Study

Although a small number of persons with low back pain will progress to require surgical decompression and fusion, spinal decompressive procedures are rapidly increasing in prevalence. Spinal fusion procedures are also far more complex in both detail of surgical procedure and process of recovery than simple laminectomy procedures. In the current economic climate of health care, efficiency is required of today's complex care environment; identifying factors that may increase or decrease the length of stay can be helpful in devising mechanisms to reduce LOS and cost (Noetscher & Morreale, 2001). At least one study correlates patient health perception with length of stay. Self-efficacy has been previously defined as the patient's perception of his/her ability to execute behaviors. Since self-efficacy has been described as a personality characteristic

that can be modified, identifying persons with low self-efficacy and appropriately intervening could be shown to have significant effectiveness changing modifiable outcomes such as length of stay and functional independence.

Hypothesis and Research Question

Given the theoretical framework previously provided, the following research question was developed. In spinal fusion patients, what is the relationship between preoperative self-efficacy scores and the rehabilitation parameters of (a) length of hospital stay, (b) distance ambulated at discharge, (c) self-care abilities, and (d) discharge disposition? Hypotheses developed regarding this question are as follows: High scores on preoperative self-efficacy will positively relate with self-care abilities. Low scores on self-efficacy will relate to longer lengths of stay in the acute care hospital. Persons with high self-efficacy scores will discharge directly to home, rather than inpatient rehabilitation settings at a higher rate than those with lower scores.

Definition of terms

The major variables of this study are self-efficacy, length of stay (LOS), ambulatory distance, self-care abilities, and discharge disposition. Bandura's (1987) definition of self-efficacy will be used. He defines self-efficacy as "a person's judgment of their [sic] capabilities to organize and execute courses of actions required to attain designated types of performances" (p. 121).

Length of stay is defined as the amount of time a patient spends in an acute inpatient setting. Ambulatory distance is defined as the number of feet that a person can walk with or without assistive devices. Self-care abilities are the skills necessary to

perform activities of daily living such as personal hygiene, dressing, feeding and locomotion. Discharge disposition is defined as the physical location to which a person is discharged.

CHAPTER 3

METHODS

Design

This research was conducted using a descriptive correlational design to determine the relationship between pre-operative self-efficacy and the post-operative dependent variables. The study was accomplished using a preoperative survey of self-efficacy beliefs followed by a post-discharge chart review. Although descriptive correlational design cannot determine causal relationships, it can explore important relationships between variables. Correlational research was used because it is effective in evaluating groups that cannot be subjected to randomization; therefore, pre-existing differences may influence the outcome of the research (Polit &Hungler, 1999).

The threats to internal validity of this study exist in the complexities of human behavior and medical illness. One of the most important validity factors is that of the self-efficacy tool. The method and outcome of determining the validity of the self-efficacy tool is discussed in the *Instruments* section.

As was stated in the conceptual framework, self-efficacy measurement is time and context sensitive. To ensure reliable measurement, the self-efficacy survey was administered to each patient during his or her pre-admission education session.

Administering the test at the same time pre-operatively helped to control and provide consistency of conditions in the administration of this tool.

Because differences in knowledge and understanding of spinal fusion and postoperative expectations can explain variance in postoperative outcomes, all patients were recruited from the preoperative education class. The goal was to ensure that, in most cases, the baseline information available to the patient was consistent.

Spinal fusion procedures are performed by neurosurgeons, orthopedic spine surgeons and collaboratively with both specialties. There is also wide variation in the detail of spinal fusion procedures such as the number of spinal levels involved and the need for stabilizing instrumentation. This surgical detail information was collected so that in the event of statistically significant correlation, it could be utilized to determine if fundamentals of the surgical procedure itself were responsible for the correlation.

Similar to the surgical detail information variables above, there are many other health and demographic factors that could correlate with the dependent variables. Data were obtained regarding age, sex and major comorbidities that could influence the patient's functional outcome and discharge disposition. This information was retrieved from the medical record during post-discharge chart review. Like the surgical detail information, it was collected so that in the event of statistically significant correlation, it could be used to determine if demographic factors could reveal another possible explanation of the correlation.

Sample

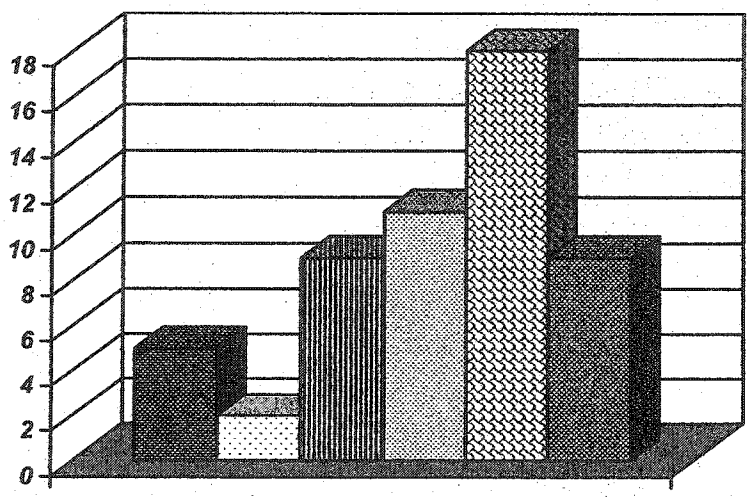
The setting for this study was a 220-bed urban community hospital with a neuroscience program that performs approximately 1100 spine procedures per year.

A convenience sample of 16 patients was obtained for the pilot portion of the study and 52 patients were recruited for the study portion.

The study sample consisted of 24 males and 28 females (n = 52). The patients ranged in age from 20 to 77 years (M = 57.16, SD = 61.50). The age distribution by decade is seen in Figure 1. The sample was 94.2 % Caucasian, 3.8 % African-American,

Figure 1

Age Distribution of Study Participants by Decade



20-30	5
31-40	2
41-50	9
51-60	11
61-70	18
70+	9

and 1.9 % Hispanic. Exploration of their educational backgrounds revealed that 51.9 % completed high school, 23.1 % completed four years of college, 21.2 % completed some college courses, and 3.8 % did not finish high school. In describing religious preferences, in this sample 57.7 % were Christian Protestant, 25 % had no preference and 17.3 % were Roman Catholic.

Advanced practice nurses, staff nurses, and rehabilitation professionals teach a well-established preoperative multidisciplinary spinal fusion class that was the source of prospective study participants. Approximately 45 to 90 lumbar fusion procedures are performed in a three-month period.

Because of the need to control for varying levels of knowledge about the surgical procedure, only those patients who attended the preoperative class were asked to participate in the study. Major neurological disease such as Parkinson's disease and multiple sclerosis were identified as exclusionary criteria prior to the study, but no patients fitting these criteria were offered spine fusion procedures during the study period. These comorbidities were excluded because it was anticipated that these patients would have much greater rehabilitation needs than the general population. Patients who are wheelchair-bound preoperatively were also excluded from the study because one dependent variable was measured by the ability to ambulate. Because of the nature of the preoperative survey, participants also needed to be able to read, write, and understand English.

Patients were informed about the opportunity to participate in the study when they were scheduled for the preoperative class by the scheduling coordinator. After the ninety-minute class, the registered nurse (R.N.) instructor requested that patients stay for a brief description of the study (Appendix A). The R.N. instructor read the verbatim, then patients were asked for signed consent (Appendix B). The verbatim contained information regarding the pilot and data collection portions of the study. Those who chose not to participate were excused and instruction for completing the survey began. The survey packet consisted of a cover sheet, followed by the consent (Appendix B), self-

efficacy survey (Appendix C) and self-report tool titled "Demographic and Functional Measurements Tool" (Appendix D). The self-efficacy survey and self-report tool are described in the *Instruments* section. Prior to implementation of the study, all RN instructors were educated in giving the verbatim and obtaining informed consent.

In April 2003, new patient privacy rules were implemented by the United States Department of Health and Human Services (2003) as part of the Heath Insurance Portability and Accountability Act (HIPAA) (1996). The legislation was designed to protect personal health information. To ensure that this study met the requirements of the new law, an additional consent was provided by the HIPAA coordinator at the research site. The institutional review boards of both the health care and academic institutions approved this consent. Once the consent process and privacy protection issues were clarified, the study could proceed. The second consent was added to the survey packet immediately following the consent and can be seen in Appendix E.

Instruments

Introduction to Instrument Structure

Four categories of variables were measured for this study, measurements of independent variable, measurements of dependent variables, demographic and functional measurements, and surgical procedures descriptors. The independent variable, self-efficacy, was measured with a tool designed specifically for this study which was developed using Bandura's (2001) guide for constructing self-efficacy scales. The independent variables, LOS, distance ambulated, self-care abilities, and discharge disposition were measured by retrospective chart review and collected in spreadsheet

format. The demographic, functional measurement and surgical procedures tools were designed to control for alternative explanations of correlation.

Independent Variable Measurement

As defined by social cognitive theory, self-efficacy perceptions are situation specific (Bandura, 1977). Measurement tools for self-efficacy therefore, need to be specific for the situation studied. According to self-efficacy theory (Bandura, 2001) there is some ability to generalize self-efficacy beliefs if the "activities are governed by similar subsets" (Bandura, 2001). Utilizing this thought, a review of the literature was conducted and four relevant studies were identified.

Oetker-Black and Taunton (1994) conducted a study to evaluate a self-efficacy scale for preoperative patients. Efficacy expectation and outcome expectations were tested in separate subscales. Consistent with Bandura's (2001) guide, the efficacy expectation scale statements in the Oetker-Black and Taunton (1994) study were stated as estimations of ability such as "I will be able to walk with assistance for ten minutes the day after surgery." Abilities were estimated on a scale of one through six with descriptors ranging from "very strongly agree" to "very strongly disagree." Since the Moon and Backer (2000) study demonstrated that the outcome expectancy subscale was not a predictor of postoperative behavior, only efficacy expectations statements were utilized in the development of the tool for evaluation of self-efficacy in spinal fusion.

A study by Lev and Owen (1996) evaluated a tool that was developed to measure self-care self-efficacy. Although the scale was developed to measure caregiver self-efficacy, it is significant to the current study because it demonstrates some important demographic concerns that can affect self-efficacy scores. It compared the perceptual

experience of self-efficacy to sex, ethnicity, religion, marital status and educational level as a method of controlling internal validity. It was shown that there was no significant correlation between these demographics and perceived self-efficacy for self care.

In 2000, Maurer and Andrews conducted a study comparing three different scales for measuring self-efficacy. Traditional measurement questions are stated by first asking the patient, in yes/no format, if he/she feels that he/she can execute a behavior. The yes/no questions are followed with a question regarding magnitude. For example, "I can walk independently (yes/no)" followed by a magnitude question such as, "I can walk 20, 40, 60 feet." Likert-type questions are formatted to measure both confidence and magnitude. An example of Likert-type question is "How confident are you that you can walk 40 feet independently?" A five-item scale that has descriptors ranging from "not at all confident" to "completely confident follows the question." Each descriptor is assigned an ordered numerical value. A simplified measure was developed by the authors of the study (Maurer & Andrews, 2000). The simplified measures were formatted similarly to the Likert-type questions but they changed the specificity. For example, rather than asking "How confident are you that you will be able to ambulate 40 feet independently?," the simplified scale would ask, "How confident are you that you will be able to ambulate independently?"

Maurer and Andrews (2000) demonstrated that traditional measurements, Likert-type measurement, and simplified measurements are highly correlated. This is significant to the current study because the simplified scale contained only three written items for each performance category compared with ten in the traditional methods. Additionally,

Maurer and Andrews (2000) demonstrated that Likert-type scales provided the most specific information regarding the magnitude of confidence that a person perceives.

Survey Development and Pilot

In reviewing this breadth of information, the following assumptions were utilized to generate the initial list of statements for the self-efficacy survey. First, the statements were constructed to be situation-specific to the postoperative experience of lumbar fusion. Secondly, statements were written to be estimations of what the patient believed could be achieved to establish self-efficacy expectations rather than values of importance, which would establish outcome expectations. Thirdly, demographics were collected to assess for social characteristics that may covary with the variables of interest. Data were collected regarding age, sex, educational status and religious affiliation. Although the Maurer and Andrews (2000) study suggests that three items are sufficient for each perceived behavior, a minimum of four were used in designing this scale with Likert-type scoring.

Reliability Testing

Stability was established by completing a 16 patient pilot study to create a correlation coefficient. This calculation was produced using the scores of the first and second time the patients took the self-efficacy survey. The first survey was done immediately following the pre-operative spine class. When the patient returned the survey, he/she was assigned a participant number and given a second survey with stamped return envelope. The patients received instruction to complete the second survey after class dismissal and return it by mail. The neuroscience clinical nurse specialist collected all surveys and return mail survey copies. An acceptable correlation

coefficient of .692 was calculated by the Statistical Package for the Social Sciences (SPSS).

As has been stated, the survey tool was designed according to Bandura's (2001) guide to developing self-efficacy surveys. The dimensions for the self-efficacy survey were chosen as representatives of key postoperative outcomes or goals in spinal fusion populations. Discharge disposition was chosen as an overall indicator of a patient's level of independent functioning at discharge. Length of stay was chosen because it can generally indicate the amount of inpatient nursing resources that a patient utilizes. Distance ambulated is a key discharge indicator related to independent functioning and is monitored closely in the postoperative period by physical therapy. Spinal fusion patients typically have a thoracolumbar orthotic (TLSO) that they must learn to apply in the immediate postoperative period. Donning and doffing the TLSO is a skill that is taught collaboratively by nursing and occupational therapy. These assumptions were reviewed for appropriateness, relevance, content clarity, and completeness by a neuroscience advanced practice nurse with extensive experience in spine surgery, one neurosurgeon, and two nurse researchers with experience in developing self-efficacy tools for preoperative patients. The self-efficacy scale for preoperative spinal fusion is seen in Appendix C.

Dependent Variable Measures

The dependent variables studied were length of hospital stay (LOS), distance ambulated at discharge (DAD), self-care abilities regarding brace application (DDB), and site of discharge disposition (DISP). LOS was measured as number of midnights spent

in the hospital after completion of the surgical procedure. This count was obtained from the post-discharge chart review.

DAD was measured as the distance ambulated in feet during the last physical therapy visit prior to discharge. DAD was also obtained from retrospective chart review. DDB was evaluated as a categorical measure from the occupational therapy notes. The categories were: completely dependent in application of brace, requires assistance to apply brace, and completely independent in applying brace. DISP information was obtained from the discharge disposition sheet in the chart. All discharges were coded by level of care delineated by Medicare guidelines. The categories utilized for this study were: home, home with homecare, acute inpatient rehabilitation, and subacute or skilled rehabilitation. The dependent variable data collection tool is shown in Appendix F.

Demographic and Functional Measures

To enhance the validity of the study, demographic data were collected to assure, in the event of significant relationship between self-efficacy and the dependent variables, that issues such as age and sex were not actually responsible for variation in the dependent variables. Self reported preoperative functional activities were also requested to compare to postoperative outcomes. The tool to collect demographic and functional data was administered after the self-efficacy tool. This survey can be found in Appendix D.

Surgical Procedures Tool

The Surgical Procedures Tool is a flowsheet designed to document the type of procedure and the type of surgeon performing the procedure. See Appendix G to

examine the instrument and an explanation of its use. This flowsheet was designed to organize data regarding the number of levels of the lumbar spine that the patient has had fused, the presence or absence of stabilizing instrumentation, and the type of surgeon performing the procedure. This information was obtained from the chart after the patient was discharged.

Test-retest Reliability

Test-retest reliability was established for all variables that were collected in the post-discharge chart review, utilizing the 16 charts in the pilot study. The included variables were: type of surgeon, number of surgical levels, presence of stabilizing instrumentation, length of stay, discharge disposition, distance ambulated, and ability to don/dof brace. The charts were reviewed and data were collected on the day of discharge. The charts were returned to the health information management (HIM) department. When the charts were completed by HIM, the researcher was notified and the charts were reviewed for the same elements. No discrepancies were noted and therefore the data collection was considered reliable.

CHAPTER 4

RESULTS

Process of Statistical Analysis

After data collection was completed, the Statistical Package for Social Sciences (SPSS) software (ver. 11.5) was used to complete the statistical analysis. First, descriptive statistics were obtained for each item of the self-efficacy survey. Secondly, descriptive statistics were obtained for each of the subscales. The subscale scores were obtained by summing the responses for each item in the subscale. Reliability coefficients were calculated for each subscale prior to determining the correlations between independent and dependent variables. The descriptive statistics were then calculated for the dependent variables, and finally, for the control variables. Care was taken to analyze the effect of gender on the outcomes by examining descriptive statistics and correlations. After the descriptive statistics were determined, the relationship between the self-efficacy questionnaire subscales and their accompanying dependent variables were explored.

Descriptive Statistics

Independent Variables

Brace Subscale. The first four questions of the survey relate to the patients' estimations of their ability to don and dof their braces. All questions had the same range, minimums and maximums. None of the respondents selected response 1 or 2 which indicated a response of "not at all confident." A summary of the descriptive

Table 1

Descriptive Statistics for Items of Brace Subscale of Self-Efficacy Survey

Level of Confidence	Question 1[a] Apply Brace		Question 2[a] Readjust Brace		Question 3[b] Skin Care		Question 4[b] When to Wear Brace	
1 Not Confident at all	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)
2	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)
3 Not Very Confident	4	(8.0)	5	(9.6)	5	(9.6)	3	(5.3)
4	5	(9.6)	9	(17.6)	9	(17.6)	3	(5.3)
5 Fairly Confident	27	(51.9)	26	(50.0)	25	(41.8)	17	(32.7)
6	1	(1.9)	3	(5.8)	7	(13.5)	7	(13.5)
7 Very Confident	13	(25.0)	8	(15.4)	5	(9.6)	21	(40.4)
Mean(SD)	5.28	(1.196)	5.04	(1.106)	4.96	(1.058)	5.78	(1.222)

[a] $n = 50$. [b] $n = 51$

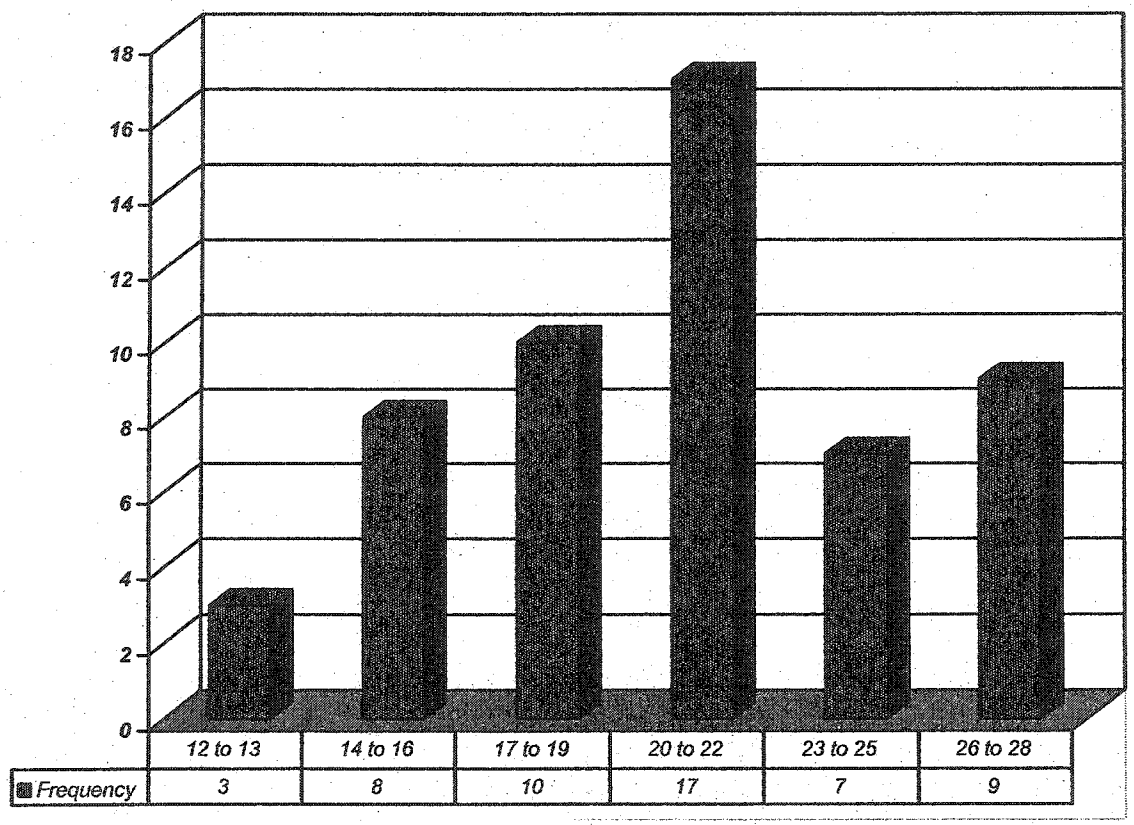
statistics for the brace subscale can be seen in Table 1. The brace subscale was summed and descriptive statistics were developed for the entire scale. The reliability coefficient alpha was calculated as .872 indicating satisfactory reliability for the subscale. A summary of the score distribution for the brace subscale can be seen in Figure 2. Within this subscale, the mean score was 21.06 (SD = 3.92). The range was 16, with the minimum summed score of 12 and the maximum, 28.

Descriptive statistics were also calculated for the brace subscale to compare differences between genders. For females participating in this study, the mean subscale

score was 21.11 (SD = 3.74). The males in this study demonstrated similar statistics with a mean subscale score of 21.00 (SD = 4.23). The difference between the group means for males and females in this subscale did not yield significant differences when compared by *t*-test.

Figure 2

Distribution of Subscale Scores for Brace Self-efficacy



Disposition Subscale. The purpose of the disposition subscale was to determine the patients' estimation of their abilities to be independent enough at the end of their hospital stays to discharge directly home. The descriptive statistics for each discharge disposition item are summarized in Table 2. The disposition scores were summed and a total score for the subscale was calculated. A summary of the range and distribution of

Table 2

Self-Efficacy Survey Descriptive Statistics for Items of Discharge Disposition Subscale

Level of Confidence	Question 5 Home Discharge		Question 6 No Need for Inpatient Rehab		Question 7 Adequate help at Home		Question 8 No Rehab Services	
1 Not Confident at all	1	(1.9)	2	(3.7)	0	(0.0)	1	(1.9)
2	1	(1.9)	1	(1.9)	1	(1.9)	1	(1.9)
3 Not Very Confident	4	(7.7)	4	(4.4)	3	(5.8)	6	(11.5)
4	3	(5.8)	6	(11.5)	1	(1.9)	4	(7.7)
5 Fairly Confident	21	(40.5)	14	(26.9)	9	(17.3)	14	(26.9)
6	9	(17.3)	10	(19.2)	12	(21.3)	14	(26.9)
7 Very Confident	13	(25.0)	15	(28.8)	26	(50.0)	12	(23.1)
Mean (SD)	5.33	(1.396)	5.29	(1.588)	6.04	(1.267)	5.29	(1.473)

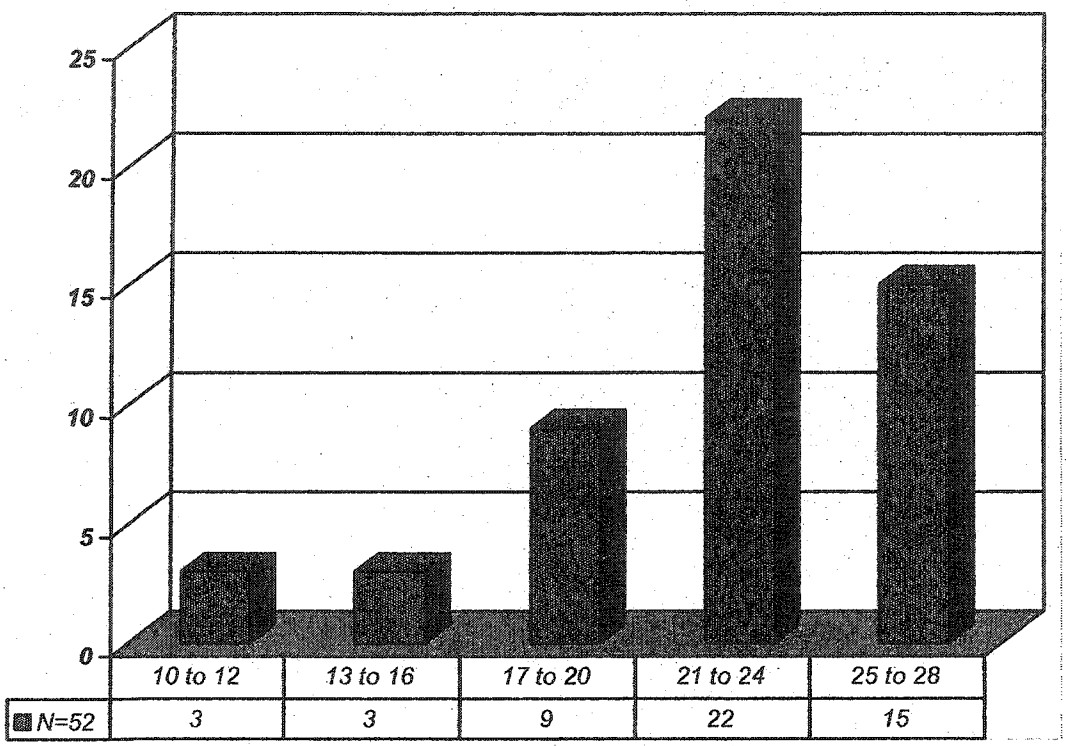
Note: n =52

the discharge disposition subscale scores can be seen in Figure 3. When the entire discharge disposition subscale is considered, the mean score was 21.94, (SD = 4.51). The range was 18 with a minimum summed score of 10 and a maximum of 28. A Cronbach's alpha was calculated as .795 for the four question subscale.

Descriptive statistics were also generated to explore the differences between genders in the discharge disposition subscale. The females in this study demonstrated a mean subscale score of 21.82 (SD = 5.41). The dispositions subscale score for males

Figure 3

Distribution of Subscale Scores for Discharge Disposition Subscale



did not differ (M = 22.08, SD = 5.41). When compared by t-test a no significant difference was demonstrated.

Ambulation Subscale. The purpose of this four-item subscale was to determine the patients' estimation of their ability to ambulate postoperatively. The descriptive statistics for each item in this ambulation subscale are seen in Table 3. The distance ambulated scores were summed and a total score for the subscale was obtained. The descriptive statistics are summarized in Figure 4. When the ambulation subscale is considered in its entirety, the mean was computed at 21.12 (SD = 4.55). The range was 16, with a minimum total score of 12 and a maximum of 28. The Cronbach's alpha for internal consistency of the ambulation subscale was calculated at .9001.

Table 3

Self-Efficacy Survey Descriptive Statistics for Individual Items of Distance Ambulated Subscale

Level of Confidence	Question 9 Walk to Bathroom Independent		Question 10 Walk to room door with assist		Question 11 Walk in hallway with assist		Question 12 Will not need assistive device	
1 Not Confident at all	0	(0)	0	(0)	0	(0)	2	(3.8)
2	0	(0)	0	(0)	0	(0)	1	(2.9)
3 Not Very Confident	5	(9.6)	1	(1.9)	2	(3.8)	10	(19.2)
4	8	(15.4)	5	(9.6)	7	(13.5)	12	(23.1)
5 Fairly Confident	18	(34.6)	20	(38.5)	23	(44.2)	12	(23.1)
6	11	(21.2)	7	(13.5)	4	(7.7)	5	(9.6)
7 Very Confident	10	(19.2)	19	(36.5)	16	(30.8)	10	(19.2)
Mean (SD)	5.25	(1.219)	5.73	(1.122)	5.48	(1.180)	4.65	(1.607)

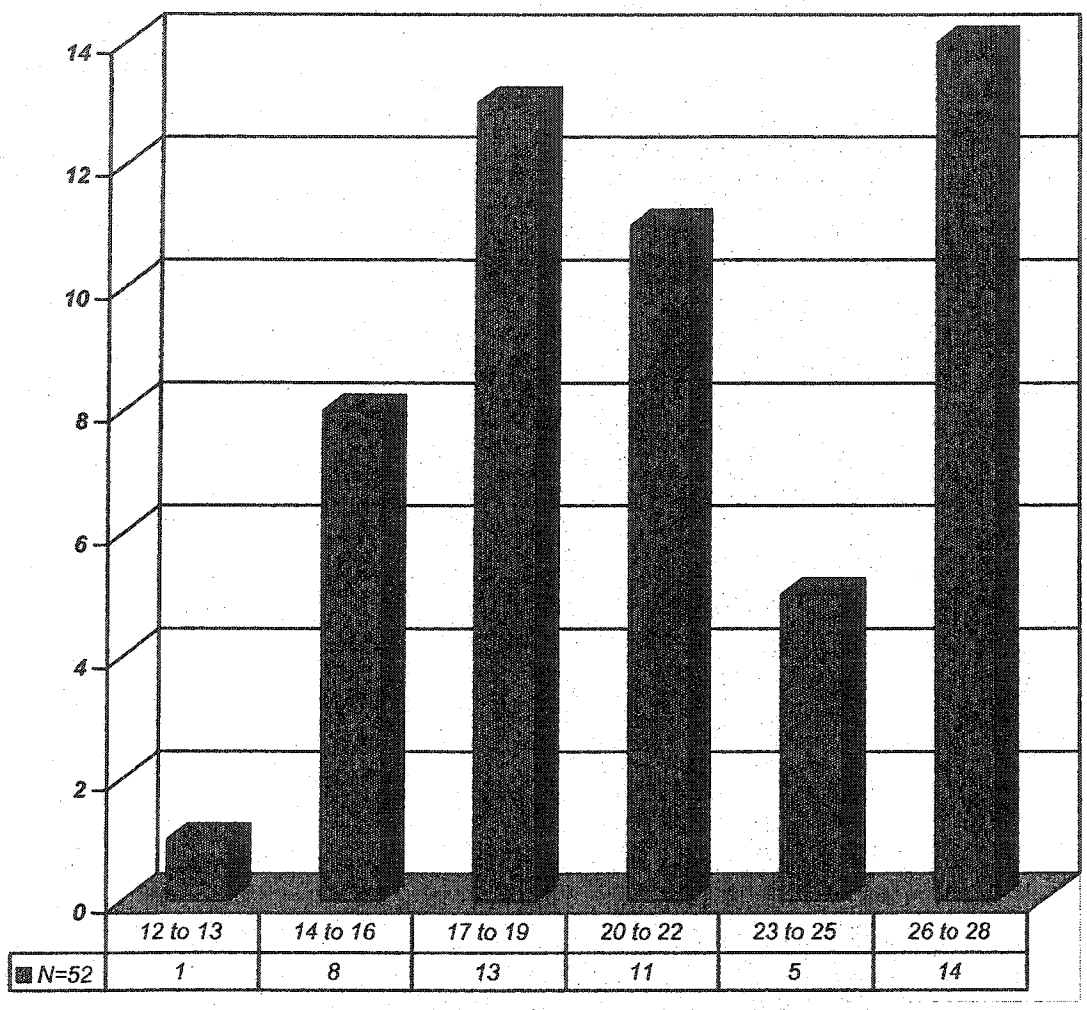
Note: $n = 52$

Descriptive statistics were calculated to compare the subscale scores by gender. Females ($M = 20.82$, SD = 4.91) and males ($M = 21.46$, SD = 4.17) participating in the study demonstrated a similar mean subscale score . A *t*-test was performed to compare the means between genders and no statistically significant difference was found.

Length of Stay Subscale. The length of stay subscale differs from the other subscales. In the other subscales, the questions were formulated so that higher numbers would measure increased independence or increased functioning. The length of stay

Figure 4

Distribution of Subscale Scores for Distance Ambulated



questions were designed to measure expectations rather than self-efficacy, meaning that the researcher was attempting to understand exactly how many days the patient expected to be in the hospital. (For clarification, the questions for this subscale can be viewed in Appendix C.) The descriptive statistics for this four-item subscale were obtained and they can be see in Table 4. Questions 13 and 16 displayed statistics that were markedly different from the other subscales. All other questions had a mean between 4 and 5. The mean of question 13 was less than 4.58 and question 16 was much lower at 1.67. Since

Table 4

Self-Efficacy Survey Descriptive Statistics of Individual Items of Length of Stay Subscale

Level of Confidence	Question 13 Discharge 3rd day		Question 14 Discharge 5th day		Question 15 Discharge 7th day		Question 16 Discharge Day After	
1 Not Confident at all	1	(1.9)	5	(5.8)	4	(7.7)	35	(67.3)
2	1	(1.9)	0	(0)	0	(0)	5	(9.6)
3 Not Very Confident	9	(17.3)	2	(3.8)	3	(5.8)	8	(15.4)
4	13	(25.0)	1	(1.9)	4	(7.7)	2	(3.8)
5 Fairly Confident	18	(34.6)	13	(25.0)	10	(19.2)	2	(3.8)
6	4	(7.7)	15	(28.8)	2	(3.8)	0	(0)
7 Very Confident	6	(11.5)	18	(34.6)	29	(55.8)	0	(0)
Mean (SD)	4.58	(1.348)	5.65	(1.545)	5.65	(1.865)	1.67	(1.115)

Note: $n = 52$

the questions were not formulated to provide scoring in a similar manner as the other subscales, this subscale was not summed as was the case with the other subscales.

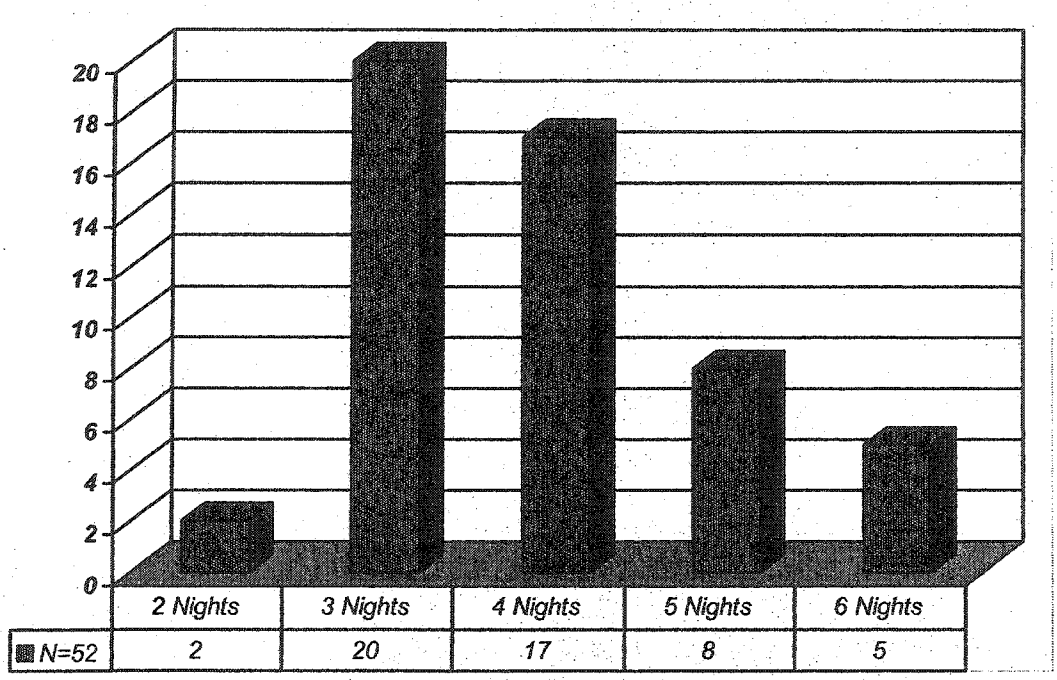
Control Variables

Age. In summary, the mean age of the 52 patients in this study was 57.63. The range was 57 years. Among the women participating in this study, the mean age was 60.07 (SD = 15.241). For the males participating in the study, the mean age was 54.75 (SD = 11.80). The youngest patient was 20 years and the oldest was 77. The data regarding age are also reported in the *Population* section of Chapter 3.

Expected Number of Nights. The patients were asked to predict the number of nights that they would spend in the hospital. The mean number of nights predicted was 3.88 with a (SD = 1.04). The minimum number of nights predicted was 2, and the maximum number of nights predicted was 6 (range = 4). A summary of the distribution of the patient prediction of number of nights can be seen in Figure 5. For females participating in the study, the mean number of nights predicted was 3.96 (SD = 1.170).

Figure 5

Distribution of Responses for Predicted Length of Stay in Nights



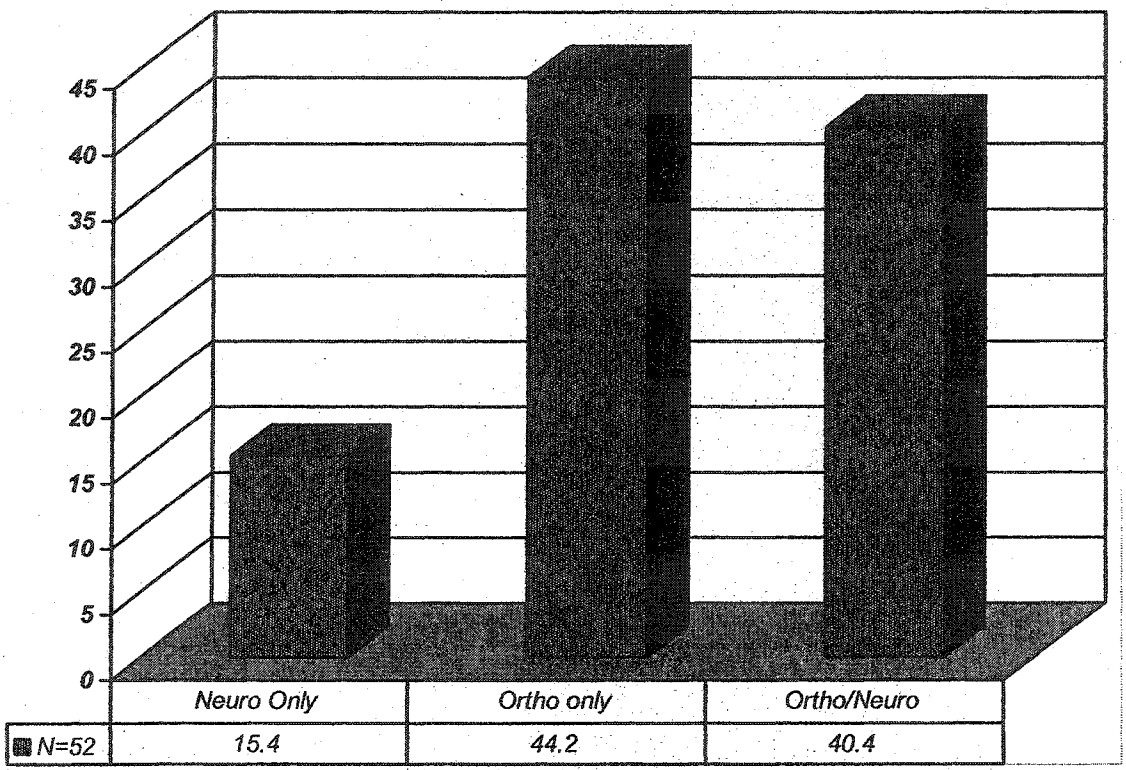
For males participating in the study, the mean predicted number of nights was 3.79 (SD = .884). A *t*-test was completed to compare the means of the genders but no statistically significant difference was noted.

Surgical Procedures Variables. Both orthopedic surgeons and neurosurgeons perform spinal surgeries, but cases performed by orthopedics alone were the most frequent type performed on the patients in this study ($n = 23$). A summary of numbers of

surgeries performed by each surgeon type can be seen in Figure 6. Collaborative cases involving both specialties were the next most frequent type of surgery ($n = 21$). A small number of cases ($n=8$) were done by neurosurgery alone.

Figure 6

Percentage of Spinal Fusion Surgeries by Surgeon Specialty



Of the 52 surgical procedures performed, the number of spinal levels varied, with a range of 4 ($M = 2.52$, SD = 1.196). For females participating in the study, the mean number of levels was 2.75 (SD = 1.266). The number of levels was similar in men. ($M =$ 2.25, SD = 1.073). A summary of the number of levels affected by the surgeries can be seen in Table 5. Stabilizing instrumentation was used for more than two-thirds of the sample ($n = 36$, 69.2%). The rest of the sample ($n=16$) did not receive instrumentation.

Table 5

Distribution Table of the Number of Levels Affected in Spinal Fusion Procedures

Number of Levels	*n* (%)					
	Total		*Males*		*Females*	
1	10	(19.2)	5	(20.2)	5	(17.9)
2	20	(39.5)	12	(50.0)	5	(17.9)
3	12	(23.1)	5	(20.8)	7	(25.0)
4	5	(9.6)	0	(0)	5	(17.9)
5	5	(9.6)	2	(8.3)	3	(10.7)
Mean (SD)	2.52	(1.196)	2.25	(1.073)	2.75	(1.226)

Note: N = 52

Dependent Variables

Actual Length of Stay. Actual length of stay (ALOS) for the majority of the sample was 4 days or less (M = 4.12, SD = 1.15). For women participating in this study, the mean ALOS was 4.32 (SD = 1.219). Men in this study differed in ALOS (M = 3.88, SD = 1.035). The distribution of the total actual days of hospitalization is summarized in Table 6.

Distance Ambulated. The distance ambulated on the day of discharge as documented on the final physical therapy note ranged from 2 to 500 feet (M = 109.65, SD = 112.42). Figure 7 depicts the maximum number of feet ambulated by the patients falling in each quartile of the distribution. The test of normality for this data was not met

Table 6

Distribution of Actual Length of Stay (ALOS) for Spinal Fusion Procedures

Number of Days	*n*(%)					
	Total		Males		Females	
2	1	(1.9)	0	(0)	1	(3.6)
3	18	(34.6)	11	(45.8)	7	(25.0)
4	16	(30.8)	7	(29.2)	9	(32.1)
5	9	(17.3)	5	(20.8)	4	(14.3)
6	7	(13.5)	0	(0)	7	(25.0)
7	1	(1.9)	1	(4.2)	0	(0)
Mean(SD)	4.12	(1.149)	3.88	(1.035)	4.32	(1.219)

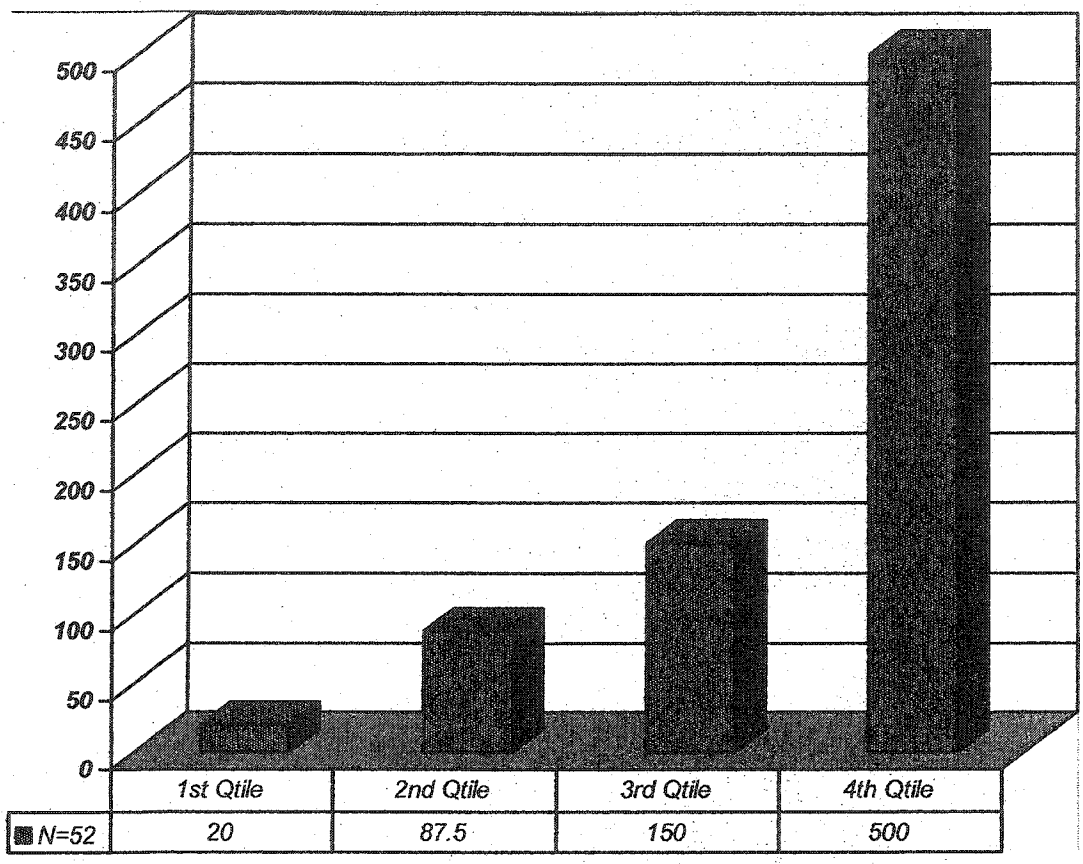
Note: $n = 52$

as skewness was calculated to be 1.416 and kurtosis was 1.996. This is evident by the wide difference in feet ambulated by the 3rd quartile (150 feet) as compared to the 4th quartile (500 feet).

Don and Dof Brace. The categorical variable of brace application was measured with a scale of 1 to 3 with lower numbers indicating less independence than higher numbers. Forty-five percent of the patients *(n=23)* required assistance with brace application (response category 2). The remainder of the patients were evenly distributed between being fully independent *(n=13)* and completely dependent *(n=13)*. There was no significant difference between the genders for this variable for both the median was 2 and the mode was 2.

Figure 7

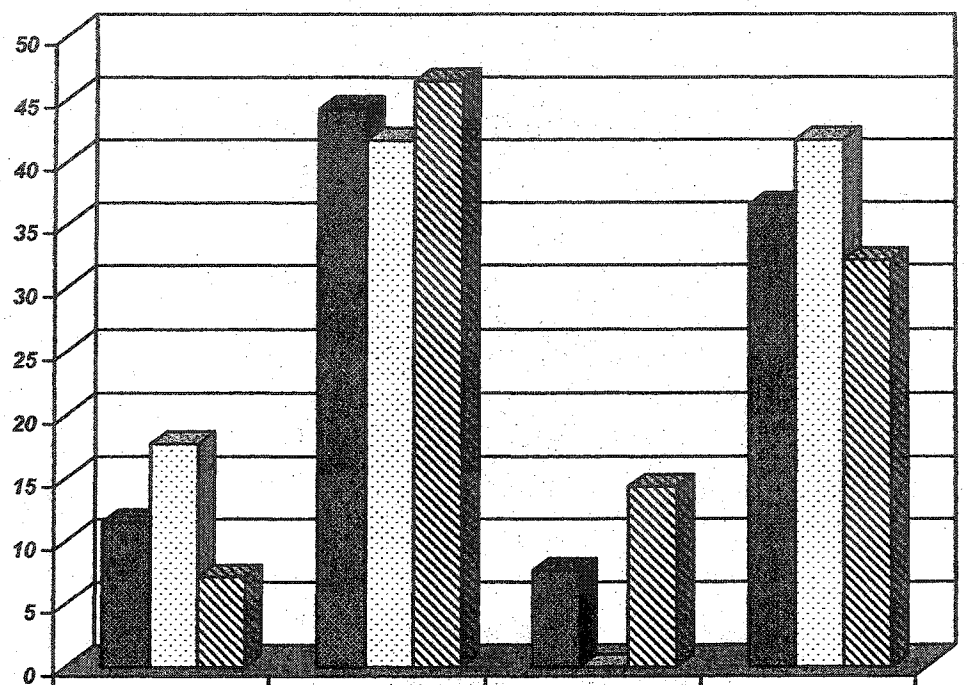
Feet Ambulated at Discharge by Quartile



Discharge Disposition. Discharge disposition was a ranked categorical variable; increasing values, to a maximum of 4, indicated increased independence of the patient. A summary of the descriptive statistics can be seen in Figure 8. Nearly 45% of the patients were discharged to acute rehabilitation. The next most frequent discharge disposition was home. Subacute rehabilitation was next in frequency for discharge disposition; home with homecare was the least frequent discharge disposition. This large number of discharges to acute rehabilitation was unexpected. The most notable difference between the genders for this variable was that males discharged home independently (41.7%) much more frequently than females (32.1%).

Figure 8

Percentages of the Total Sample, Males, and Females Discharged to Each Disposition Location



	1-Subacute	2-Acute Rehab	Home with Homecare	Home
Entire Sample	11.5	44.2	7.6	36.5
Males	17.7	41.7	0	41.7
Females	7.1	46.4	14.3	32.1

Correlational Statistics

To answer the study questions, each of the dependent variables of interest were correlated to their corresponding self-efficacy subscale. Because the brace and discharge disposition outcomes were ordinal variables, Spearman's rho was used for these correlations, and Pearson's *r* for the ambulation analysis. Differences between males and females were then considered. The predicted length of stay was then correlated to the actual length of stay (ALOS). Finally, a regression analysis was attempted to determine if the independent variables were predictors of dependent variables.

Brace Correlation. Calculations were completed to determine the relationship between brace self-efficacy and levels of independence in brace application postoperatively. No relationship was established by Spearman's rho ($r = -.18$). The lack of relationship was confirmed by completing chi-square tests. A summary of the frequency statistics can be seen in Table 7. In the calculation, $X^2 = 9.032$ with 6 degrees of freedom. However, ten cells had expected frequency of less than 5, which indicated that the X^2 may not be a reliable result.

Correlations were obtained between brace self-efficacy and the patient's ability to don and dof his or her brace by gender. Spearman's rho was not significant for males ($r = -.293$) or females ($r = .166$).

Disposition Correlations. The variables disposition self-efficacy and discharge disposition were examined for covariance through the use of Spearman's rho statistic. No correlation was found ($r = .106$, $p = n.s.$).

Because the disposition categories could be thought of as discrete, additional analysis using chi-square was performed. A crosstabulation table for chi-square statistics is seen in Table 8. Because there were more than 20% of the cells with an expected frequency of less than 5, patients with high disposition self-efficacy and those with low disposition self-efficacy were divided into 2 groups. The patients with scores above the 50th percentile were placed in the high self-efficacy group, and those below the 50th percentile were placed in the low self-efficacy group. Chi-square was performed ($X^2 = 9.678$) with 3 degrees of freedom ($p = .022$). Although significant relationship was established, the accuracy of this relationship is questionable because 50 percent of the cells still had a frequency of less than 5.

Table 7

Crosstabulation Table for Level of Independence with Braces and Quartiles of Brace Self-Efficacy

		Brace Response Categories			
Quartiles of Brace SE		1 Dependent	2 Requires Assistance	3 Independent	Total
1	Frequency	1	9	1	11
	Expected Frequency	3.1	4.9	2.9	11
2	Frequency	4	6	4	14
	Expected Frequency	4.0	5.3	3.7	14.0
3	Frequency	5	3	5	13
	Expected Frequency	3.7	5.8	3.4	13.0
4	Frequency	4	4	3	11
	Expected Frequency	3.1	4.9	2.9	11.0
Total	Frequency	14	22	13	49
	Expected Frequency	14.0	22.0	13.0	49.0

Note: $n = 49$ due to missing data

Table 8

Crosstabulation Table for Discharge Disposition Report Categories and Quartiles of Disposition Self-Efficacy

		Discharge Disposition Response Category				
Quartiles of Disposition Self- Efficacy		1 Subacute	2 Acute	3 Homecare	4 Home	Total
1	Frequency	1	8	0	4	13
	Expected Frequency	1.5	5.8	1.0	4.8	13.0
2	Frequency	1	9	0	8	18
	Expected Frequency	2.1	8.0	1.4	6.6	18.0
3	Frequency	4	2	2	1	9
	Expected Frequency	1.0	4.0	.7	3.3	9.0
4	Frequency	0	4	2	6	12
	Expected Frequency	1.4	5.3	.9	4.4	12.0
Total	Frequency	6	23	4	19	52
	Expected Frequency	6.0	23.0	4.0	19.0	52.0

After completion of the discharge disposition correlations and chi-square analysis for the entire sample, the sample was then analyzed by gender. The Spearman's rho to compare discharge disposition self-efficacy and the patient's disposition discharge was significant for the female portion of the sample ($r = .504, p = .006$), while the rho was not significant for the males ($r = .222, p = n.s$).

Ambulation Correlations. Pearson's r was calculated to test the relationship of ambulation self-efficacy and distance ambulated the day of discharge. This correlation was significant ($r = .37, p = .001, n = 52$), but the strength of this relationship was weak Correlations were also significant for both genders. (females' $r = .393, p = .039$; males' $r = .413, p = .045$).

Length of Stay Correlations. The relationship of actual length of stay to the patient predicted length of stay was considered. No discernible correlation could be established ($r = -.106$). Additionally, no significant relationship was established for these variables when females ($r = -.251, p = n.s.$) and males ($r = .113, p = n.s.$) were considered separately .

Regression Analysis

A regression analysis of the variables was attempted using brace self-efficacy, ambulation self-efficacy, length of stay self-efficacy, and disposition self-efficacy as predictors of ability to don/dof brace, distance ambulated, actual length of stay, and discharge disposition. The F statistic for the regression equation was not significant in any of the four regression equations, therefore no significant relationship could be determined.

CHAPTER 5

DISCUSSION AND IMPLICATIONS

Discussion

Findings of this study are interesting in that some are consistent with existing literature and some are not. The initial step of the study, the self-efficacy tool development, was consistent with both the theoretical framework and the literature search. The pilot study revealed acceptable reliability and validity of the tool. In the formal study, the four dependent variables, distance ambulated and discharge disposition were the only ones to show any relationship to self-efficacy. In this Chapter, the research questions, limitations of the study, implications for practice and recommendations for further study are addressed.

Distance ambulated at discharge had a weak ($r = .370$), but significant relationship to ambulation self-efficacy when the sample is considered as a whole. When the correlation between distance ambulated and self-efficacy subscale score was considered for females only, the correlation remained significant ($r = .393$, $p = .039$). Similarly, for males, the correlation also remained significant ($r = .413$, $p = ,045$). This finding is consistent with other studies regarding functional ambulatory status such as the Moon and Backer (2000) investigation which showed a relationship between preoperative self-efficacy and postoperative ambulation ($r = .41$, $p < .05$) in orthopedic populations. The study findings are also consistent with the findings of Oetker-Black, et al. (1992),

who also correlated preoperative self-efficacy with postoperative distance ambulated (r = .22, $p < .05$).

Although discharge disposition and self-efficacy were not related when the entire sample was considered, it appeared that there was a trend toward significance. When the sample was divided by gender, there was a significant relationship for this variable found in the female patients. When reviewing literature regarding gender differences in self-efficacy, no studies were found that directly addressed the differences in self-efficacy between males and females. Review of 's Bandura's work (1986, 1995, &1997) yielded little insight into the differences in experiencing self-efficacy between genders in health behaviors. This literature gave considerable attention to the role of sex role socialization and its impact on educational performance and career choices. From that information, a postulate could be developed that females are socialized for planful caregiving roles and therefore are more likely to be able to predict their place of discharge.

A physician practice of referring his/her large surgical cases for inpatient rehabilitation referral, which was seen in nearly 45% of the sample, can significantly alter the outcome of discharge disposition. Additionally, there are great differences in the inpatient rehabilitation admission criteria between commercial and governmental payers. Few patients will select to private pay an inpatient stay for physical rehabilitation, therefore patients may have the same physical outcome from their surgical procedure, but reimbursement availability may sometimes influence discharge disposition.

Length of stay had no significant correlation to self-efficacy, but it must be considered that discharge disposition may impact length of stay. In this study setting, registered nurses, case managers, advance practice nurses, physical therapists and

medical staff develop the discharge plan of care. When a patient is identified as having a low probability of discharge to home, a referral for evaluation for inpatient rehabilitation care is initiated. The flow of the discharge evaluation process functions in such a way that patients who are identified early in his/her hospital stay as having a lower functional level may discharge sooner because they are discharged to another level of care rather than to home. Patients who discharge home need to meet more physically demanding discharge criteria than those who discharge to an alternate level of care (McKesson, 2003). Thus, in the study, ALOS may not have appropriately represented the patient's level of independence.

Self-care abilities were measured by the ability of the patient to don and dof his/her brace. There was no relationship when the entire sample was considered and no relationship when the genders were considered separately. It is possible to glean understanding of the difficulty in establishing a relationship between brace application and self-efficacy by understanding the process of rehabilitation from surgery. Since the mean length of stay was only 4.12 days for study participants, it is reasonable to suggest that on their discharge day, patients are still experiencing a significant amount of pain from a highly traumatic spinal surgical procedure. Independent brace application requires the patient to have the ability to move his/her arms and torso in such a way as to reach the straps to apply and adjust the brace. Fully, 40 of 52 subjects (77%) required either moderate or maximum assistance with brace application. This may have not been a function of self-efficacy but rather the patient's pain experience.

Although only distance ambulated had significant correlation for the entire sample, the findings regarding gender differences was surprising. Spinal surgery, in general is an extremely complex process with many variables to consider.

Limitations

When evaluating this study a number of limitations were identified. Descriptive correlational design intends to provide information regarding the relationship between variables rather than stating causal relationships. Although the pilot portion of the study provided reasonable assurance that the self-efficacy tool was valid, the length of stay subscale was problematic. The researcher was unable to determine if it measured length of stay self-efficacy or length of stay outcome expectations. Outcome expectations were defined in the conceptual framework as the value that a person places on any given outcome. Because the patients were asked to predict their length of stay, it is difficult to assess with complete accuracy, which of the concepts was measured.

The sample size was limited (n = 52), therefore some of the statistical calculations, such as chi-square and regression equations, could not be reliably performed. The correlations shown in the discharge disposition portion of the *Results* section demonstrate this problem.

The sample was relatively culturally homogenous, as 94.2 percent were Caucasian. Individuals of the other ethnic backgrounds were not well represented. The religious backgrounds were predominantly Christian, showing a sample similarity in belief systems.

Significant correlations between self-efficacy and the dependent variables distance ambulated and discharge disposition were established for females, while only

distance ambulated was correlated with self-efficacy in males. The small number in each gender subset is a clear limitation of the study, however the difference between genders is an important finding.

An unusual situation regarding the ways that patients were handled for discharge existed in this research. The medical center that participated in this study has a unique relationship with the facility that provides most of the inpatient rehabilitation for the spinal fusion population. The two facilities are physically connected and share a number of inpatient services, such as physical therapy, occupational therapy, nutrition services, and respiratory therapy. It is unknown how this collaborative relationship influences clinical decision making regarding the need for inpatient rehabilitation care. As was indicated earlier, this issue alters the chances that this study was able to determine the "true" relationship between self-efficacy and self-care capacity.

Postoperative outcome measures were collected on the day of discharge. The median length of stay was 4.12 days, but the length of stay range was 6 with a minimum stay of 1 day and a maximum of 7. With this great variability in the number of days post surgery that the data were collected, it would be interesting to consider how arbitrarily assigning a particular postoperative day or time (i.e. postoperative day 3) to collect outcome data would have affected the study. An example of this idea can be conceptualized in distance ambulated. Distance ambulated was measured on the day of discharge. Since the length of stay had a range of 6 days, the amount of postoperative recovery allowed for each patient varied significantly prior to measurement.

Lastly, this study was suspended for about six weeks in data collection because of the implementation of new patient privacy laws as described in Chapter 3. It is unknown

if this changed, in any way, the outcome of the study. When data collection resumed, the changed consent process was reviewed with the nurses who taught spine class. The teachers incidentally reported an increase in the number of patients who refused to participate with the increase in paperwork.

Implications

As has been demonstrated by other studies (Moon & Backer, 2000), self-efficacy can predict mobility outcomes in surgical populations. Early identification of patients at risk for suboptimal outcomes can be beneficial to both the patient and the health care system. Since self-efficacy is a modifiable attribute, identifying and intervening with patients who have decreased self-efficacy could modify and improve their postoperative outcomes.

In this study, distance ambulated at discharge was the only variable significantly correlated with self-efficacy for the entire sample. Don and dof brace and discharge disposition correlated significantly with self-efficacy in the females of the sample. Distance ambulated is significant in that it is a key marker of patient independent functioning. Focusing on activities that promote functional mobility outcomes can help patients achieve mobility skills necessary to meet hospital discharge criteria. In an era of increased importance of appropriate resource utilization, identification of patients who are likely to have greater utilization needs could be helpful in care planning.

Recommendations

This study yielded a number of suggestions for improvement. For correlational and statistical purposes, the study would be improved with a larger sample size. Because of the relationship between discharge disposition and length of stay, it would be a better

design to eliminate the length of stay self-efficacy questions and focus on the discharge disposition issue.

The pilot portion of the study was completed with only 16 patients. To confirm and strengthen instrument reliability and validity, the pilot should be repeated with a larger sample. A larger sample is also necessary to enable testing of the construct validity of the self-efficacy instrument through factor analysis.

The interesting finding of differences between genders concerning the relationship of postoperative outcomes with self-efficacy needs further exploration. The reason that the genders differed in their outcomes is unknown.

The outcome measures should be assessed at a standardized postoperative time points. The third postoperative day seems the most logical time to measure postoperative functional abilities because it is close to the mean ALOS and the patient predicted length of stay. Those few patients who are discharged prior to the third postoperative day could be assessed at discharge.

Further examination of the factors that influence the level of care and discharge disposition appears necessary. Some payors and providers, as guidelines for admission and discharge, utilize the Interqual criteria. The Interqual level of care criteria (McKesson, 2003), is a widely used set of criteria for admission to and discharge from health care facilities. The McKesson Corporation writes these criteria for inpatient, rehabilitation, and skilled nursing facilities. Interqual was the only identified source of discharge criteria in this study group. Exploration of the consistent utilization of these criteria and its role in discharge disposition could also yield useful information.

Since self-efficacy is a modifiable characteristic, a study that performs an intervention to impact self-efficacy would be worthwhile. A researcher could explore patient outcomes with and without self-efficacy intervention in a manner similar to the Altmaier, et al. (1993) study.

Summary

This study was an attempt to utilize the concept of self-efficacy from Social Cognitive Theory (Bandura, 1986) to predict selected outcomes in spinal fusion patients. The tool used to measure self-efficacy was developed through a pilot study prior to gathering postoperative data. Distance ambulated at discharge was the only outcome significantly related to self-efficacy for the entire sample. The self-efficacy scores for females in this sample demonstrated a correlational relationship with outcome variables for distance ambulated, and discharge disposition while the scores for males demonstrated a correlation only for distance ambulated. It is recommended that further investigation in the role of self-efficacy be conducted to clarify the issues identified in this study.

Appendix A

Verbatim for Study Participation

Directions to the nurse obtaining consent:

1) Please read this statement aloud to prospective participants.

Thank you for considering participation in the spinal fusion outcomes study. This research is designed to compare the results of the survey you are asked to take today with the results of your hospital stay here at Saint Mary's. This survey will take about 15 minutes.

You will be asked to fill out a survey regarding your thoughts about your surgery and expectations after surgery. On the back of the survey are a 7 questions about your condition before surgery. After you are discharged, information will be collected from the chart regarding your ability to walk, the place you are discharged to, your ability to put on your brace, and the length of time you are in the hospital.

This study is being conducted by Karen Burritt RN as part of her education at Grand Valley State University. She is the nurse manager of the inpatient unit where you will receive care after surgery. She will not know if you have not agreed to be in the study until after your hospital discharge, so you can feel confident that your care will be optimal if you choose not to participate. The review boards at both St. Mary's Mercy Medical Center and Grand Valley State University have approved this study.

To protect your privacy, the information regarding your answers on the survey will not be compared to your hospital stay until after your discharge. You will need to read and sign the consent for study participation prior to participating in the study. Please read the consent before signing. Do you have any questions?

2) After questions are answered, thank the participants.

3) Pass out the consent packets which contain:
   a) Cover Sheet
   b) Consent
   c) Self-efficacy survey
   d) Functional self report tool

4) Ensure that each participant has signed the consent before proceeding with the self-efficacy survey and self-report tool. You will need to sign as witness on each consent.

5) Collect completed surveys and dismiss the patients. Completed surveys and consents are stored in the Nursing Administrative Offices library.

Appendix B

Consent and Participation in Research Study

Participant #_____

Perceived Self-efficacy in Spinal Fusion

By signing this form, I, _____(print name) am giving my consent to participate in the research study conducted by Karen Burritt RN, BSN nursing student at Grand Valley State University. I understand that I am expected to complete a survey regarding how I feel about my upcoming surgery. The survey will be written and is expected to take 15 to 30 minutes. I will also be asked to complete a second survey when I get home from class and mail it back to the hospital in the provided envelope.

I understand that I was selected to participate in this study because I am scheduled for spine surgery with fusion. I understand that I am free to decide not to participate in this study and may withdraw at any time without adversely affecting the relationship with the investigator or Grand Valley State University. The decision to withdraw will not result in any loss of benefits to which I am otherwise entitled. I understand that I can withdraw my consent and participation at any time by informing Karen Burritt RN. She can be contacted at (616) 752-6637 or burrittk@trinity-health.org. If you have questions about your rights as a research participant that have not been answered by the investigator, you may contact the Grand Valley State University Human Subjects Review Committee Chair, telephone (616)-895-2472.

The purpose of this study is to determine the relationship between beliefs about surgery and outcome of hospital stay. I understand that participation in this study will not change the care I receive in the hospital. I understand that measurements will be recorded throughout my hospital stay regarding how I am progressing in my recovery. These measurements will be compared to my survey results before surgery.

I understand that the results of my performance and survey results will be kept entirely confidential. I understand that my identity will be kept confidential by keeping information regarding my identity separate from the results of my survey. The records will be stored in the nursing administrative offices at St. Mary's Mercy Medical Center for a period of 5 years. The results of this study will be published in manuscript format and submitted to Grand Valley State University. I understand that I may ask any questions or obtain research results by contacting Karen Burritt RN at (616) 752-6637. Additional information regarding my rights at a participant can be obtained by calling Professor Paul Huizinga at Grand Valley State University (616) 895-6611 or Sr. Myra Bergman at St. Mary's Mercy Medical Center (616) 752-6090.

_____	_____
Participant's Name(printed)	Witness Name(printed)
_____	_____
Participant's Signature and Date	Witness Signature and Date

Appendix C
Survey for Preop SE evaluation

Please read the following instructions:
-**Circle** the answer that most closely describes how confident you are that you can do the following things.
-Please read and make sure that you understand the definitions in the box below

Brace-cloth or plastic device that supports your low back
Rehabilitation Services-the care of physical or occupational therapists
Home Discharge-to go home after surgery without assistance of nurses or therapists

1. How confident are you that you will be able to put on your brace while you are in the hospital?

1	2	3	4	5	6	7
not confident at all		not very confident		fairly confident		very confident

2. How confident are you that you will be able to readjust your brace once it is on?

1	2	3	4	5	6	7
not confident at all		not very confident		fairly confident		very confident

3. How confident are you that you will be able to perform skin care under your Brace?

1	2	3	4	5	6	7
not confident at all		not very confident		fairly confident		very confident

4. How confident are you that you will be able to follow instructions about when to wear your brace?

1	2	3	4	5	6	7
not confident at all		not very confident		fairly confident		very confident

5. How confident are you that you will be discharged to your home after surgery?

1	2	3	4	5	6	7
not confident at all		not very confident		fairly confident		very confident

6. How confident are you that you will **NOT** require a stay somewhere else for rehabilitation in following your hospital stay?

1	2	3	4	5	6	7
not confident at all		not very confident		fairly confident		very confident

7. How confident are you that you will have adequate help in your home after discharge?

1	2	3	4	5	6	7
not confident at all		not very confident		fairly confident		very confident

8. How confident are you that you will **NOT** require rehabilitation services at home after discharge from the hospital?

1	2	3	4	5	6	7
not confident at all		not very confident		fairly confident		very confident

9. How confident are you that you will be able to walk to the bathroom and back independently 3 days after surgery?

1	2	3	4	5	6	7
not confident at all		not very confident		fairly confident		very confident

10. How confident are you that you will be able to walk to the doorway of your hospital room and back to bed three days after surgery with someone's assistance?

1	2	3	4	5	6	7
not confident at all		not very confident		fairly confident		very confident

11. How confident are you that you will be able to walk from your bed out into the hallway and back three days after surgery?

1	2	3	4	5	6	7
not confident at all		not very confident		fairly confident		very confident

12. How confident are you that you will **NOT** require an assistive device such as a walker to walk three days after surgery?

1	2	3	4	5	6	7
not confident at all		not very confident		fairly confident		very confident

13. How confident are you that you will be discharged on the third day after surgery?

1	2	3	4	5	6	7
not confident at all		not very confident		fairly confident		very confident

14. How confident are you that you will discharge on the 5th day after surgery?

1	2	3	4	5	6	7
not confident at all		not very confident		fairly confident		very confident

15. How confident are you that you will be discharged the 7th day after surgery?

1	2	3	4	5	6	7
not confident at all		not very confident		fairly confident		very confident

16. How confident are you that you will be discharged the day after surgery?

1	2	3	4	5	6	7
not confident at all		not very confident		fairly confident		very confident

Appendix D

Demographic and Functional Measures tool

Please answer the following questions to the best of your knowledge

Circle the one best answer or fill in the blank

1. How old are you? _____
2. Are you male or female? **male** **female**
3. Did you walk from the parking lot to class today? **yes** **no**
4. Do you any type of assistive device such as a walker? **yes** **no**
5. How many overnights do you expect to spend in the hospital?_____
5. What ethnic group to you belong to?
   African-american
   Caucasian- nonHispanic
   Hispanic
   Native American
   Asian
6. What is your religious preference?
   Jewish
   No Preference
   Christian-Roman Catholic
   Christian-Protestant
   Islam
7. What is your highest level of education?
   Grade School
   Some High School
   High School completed
   Some College
   College Graduate
   Post college graduation

Appendix E

SAINT MARY'S MERCY MEDICAL CENTER AUTHORIZATION FOR USE OR DISCLOSURE OF HEALTH INFORMATION FOR RESEARCH STUDY

Completion of this document authorizes the disclosure and/or use of individually identifiable health information, as set forth below, consistent with state and Federal law concerning the privacy of such information. **Failure to provide all information requested may invalidate this authorization.**

USE AND DISCLOSURE OF HEALTH INFORMATION:

I hereby authorize the use or disclosure of my health information as follows:
Name of individual: _____ Date: _____

Address: _____

Telephone: _____ Social Security #: _____ Date of birth: _____

(Optional)

Persons/Organizations at Saint Mary's Mercy Medical Center authorized to *use or disclose* the information: _Karen R. Burritt RN, BSN_____

Persons/Organizations at Saint Mary's Mercy Medical Center authorized to *receive* the information: ____
_____Karen R. Burritt_____

My health information will be used for the following research study(s):_____
__The Role of Self Efficacy in Predicting outcomes in Spinal Fusion_____

This authorization applies to the following information (select *only one* of the following):

- ☐ **All health information pertaining to any medical history, mental or physical condition and treatment received. Except (optional):** _____
- ☐ Only the following records or types of health information (including any dates): _____

EXPIRATION:

This Authorization expires [insert date or event]:
_____1/1/2004_____

- ☐ Check here if this Authorization for Research Use and Disclosure of PHI does not have an expiration date. Reason: _____

YOUR RIGHTS:

I understand that I may refuse to sign this authorization and that my refusal to sign will not affect the use or disclosure of my protected health information for purposes of treatment, payment or health care operations. I may inspect or copy any information used/disclosed under this Authorization.

I understand that if the person or entity that receives the information is not a health care provider or health plan covered by federal privacy regulations, the information described above may be redisclosed and no longer protected by these regulations.

I understand that I may revoke this limited authorization in writing at any time at the address found below, except to the extent that action has been taken in reliance on this authorization. This authorization is in effect until revoked by me or until it expires under applicable laws.

I understand Saint Mary's Mercy Medical Center may condition the provision of research-related treatment on the provision of this Authorization for the use or disclosure of PHI for such research.

_____

Signature of Patient or Representative Date

_____

Relationship to the Patient

_____

Signature of Workforce Member Date

Appendix F

Dependent Variable Data Collection Tool

Pt Id number	LOS	DAD	DDB	DISP

Pt ID #- Number pt is assigned correlates with number on consent form
LOS-Number of midnights spent in the hospital after surgical procedures
DAD-Number of feet ambulated in last Physical Therapy visit before discharge.
DDB-functional independence in don and dof brace:

- I- fully independent- able to apply brace if it is handed to patient
- A-requires assist- able to assist caregiver in placing and adjusting brace
- D-dependent- unable to assist in brace application other than lifting arms and rolling to side.

DISP-Discharge disposition

- H-Home
- HHC-Home with home health care nursing and/or therapy services
- AR-Acute rehabilitation
- SR-Subacute or skilled rehabilitation in skilled nursing facility

Appendix G

Surgical Procedures Tool

Pt Id Number	# of Levels	Instrumentation	Type of Surgeon

Id number- Pt Identification number obtained from the study consent.
Number of levels- Whole numbers, obtained from operative report
Instrumentation- Yes or No, obtained from operative report
Type of surgeon:

- O- Orthopedic Spine
- N- Neurosurgery
- C- Combined Orthopedic and Neurosurgery

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