

SELF-MANAGEMENT AND SELF-MANAGEMENT SUPPORT
ON FUNCTIONAL ABILITY IN CHRONIC LOW BACK PAIN

by

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A thesis submitted to the
Faculty of the Graduate School of the
University of Colorado in partial fulfillment
of the requirements for the degree of
Doctor of Philosophy
College of Nursing
2011

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Self-Management and Self-Management Support on Functional Ablement in Chronic Low Back Pain

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The pervasiveness of chronic low back pain and its subsequent disability are alarming in today's healthcare. Although literature is beginning to explicate the impact of self-management (SM) and self-management support (SMS) in other chronic illnesses, there remains limited understanding on whether SM and SMS influence functional ablement in chronic low back pain patients. This study examined whether SM and SMS significantly influenced functional ablement after controlling for mental state and demographic characteristics, examined whether SM mediated the SMS-functional ablement relationship, and described patient perceptions of their SM, SMS, and functional ablement. The adapted Chronic Care Model guided this study.

A non-experimental, cross-sectional, descriptive design utilizing mediation analysis and qualitative content analysis addressed the study purposes. Through convenience sampling, 110 participants were recruited from two pain centers employing multimodal pain management. Findings showed lack of significant statistical influence of SM and SMS on functional ablement in chronic low back pain patients. Through mediation approach, SM and SMS were strongly correlated, however, other required regression equations were not significant. Therefore, SM did not mediate the SMS-functional ablement relationship. This maybe related to several factors including the possibility that participants had better-managed pain and functional ablement levels in the pain centers.

Participant responses to the open-ended questions provided significant themes. Taking medications and maintaining physical activity were dominant SM activities. Major participant-perceived SMS activities were prescribing medications, providing treatments other than medications, and giving encouragement. Participants' concerns regarding their functional ablement centered on anxiety and fear.

This study assisted in advancing knowledge and contributing towards understanding SM, SMS, and functional ablement in chronic low back pain. Findings are important to the health of individuals and families affected by the chronic low back pain epidemic. It is important to continue to engage patients and healthcare providers in SM and SMS.

The adapted Chronic Care Model needs further evaluation to enlighten nursing science with potential significance to clinical practice. More exploration is necessary to assess the influences of SM and SMS towards improving outcomes in the complex care of chronic low back pain. Findings support a step towards experimental research in the future employing SM and SMS interventions.

The form and content of this abstract are approved. I recommend its publication.

Approved: Teresa J. Sakraida

DEDICATION

To my beautiful daughter who has stayed steadfast in her understanding despite the amount of time my doctoral education has taken away from our life together, I hope that you continue to do very well in life. This is for you.

To my parents who have ingrained the value of education and have made sure that they raised their children well, I thank you both so much. This is also for both of you.

ACKNOWLEDGMENTS

My dissertation journey has been influenced by several people along the way. Without their unwavering support and guidance, this would have been even more challenging. First, I would like to thank my advisor, Dr. Teresa Sakraida, who has worked with me tirelessly in the development and progress of my dissertation. My committee (Chair: Dr. Paula Meek, Dr. Leli Pedro, Dr. Regina Fink, and Dr. Jason Krutsch) has also given me their much needed time, feedback, and encouragement throughout my dissertation process.

Critical to the success of a research study is the availability of the setting and participants. I would like to extend my deepest appreciation to Dr. Godwin Maduka who has made the pain centers accessible for me to conduct my research. He has also been an excellent mentor in my practice as a Nurse Practitioner specializing in chronic pain, opening my eyes to the realities and complexities of care required in this patient population. Dante Famy, MSN, FNP-C, and Maria Vinagre, CST, have been highly instrumental in assisting me and my research assistants (Jennifer Orozco and Lucas Wassira) during the data collection process. In my data analyses, I have been lucky to have received the assistance of not one, but two excellent biostatisticians, Dr. Paul Cook and Dr. Chad Cross. My data collection process was also supported in part by the University of Nevada Las Vegas School of Nursing Faculty Doctoral Project Award. I am grateful for the support extended to me by my School of Nursing Dean, Dr. Carolyn Yucha, and the Associate Dean for Research, Dr. Barbara St. Pierre Schneider.

Lastly, I am fortunate to be grounded and surrounded by wonderful parents, a very bright daughter, and highly intellectual and supportive sisters, with their brilliant

families. They have inspired me to do more, to push the boundaries, and to contribute beyond what I can. I hope that I, in turn, will be able to influence our children towards excelling in their own futures.

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CHAPTER I

BACKGROUND

The increasing pervasiveness of chronic low back pain is alarming in today's health care clinic environments. Estimates specify that 80% of the U.S. population experience low back pain (Hellman & Imboden, 2009) in their lifetime. The National Institute of Arthritis and Musculoskeletal and Skin Diseases (NIAMS) stated that 25% of adults in the United States experience at least one day of back pain in a three-month period (2009). The Centers for Disease Control and Prevention (CDC) National Center for Health Statistics (NCHS) noted that 53.7% of adults reporting pain suffer with a duration of pain that lasts for at least three months to one year or more (2006). Consequently, about 28% of adults with low back pain suffered from limitations in functional ability and/or disability (NCHS, 2006).

Low back pain presents as the most common reason for a clinic visit so that in a given year, about 12-15% will see their health care provider due to this problem (AAOS: American Academy of Orthopedic Surgeons, 2008). Health care costs related to chronic low back pain range from \$12.2 to \$90.6 billion annually (Haldeman & Dagenais, 2008). Chronic low back pain is pain persisting in the low back area for a period over three months (NIAMS, 2009).

The high prevalence and disability from chronic low back pain have not improved. The pain management goal is to return the patient to a pain level that permits the capacity to function better in their daily lives (Last & Hulbert, 2009). Many patients express frustration with the management of their chronic low back pain (Eisendrath & Lichtmacher, 2009). In addition, there remains limited consensus on appropriate low

back pain management (Chou, et al., 2007). The deficiencies in standardized practice furthers the risk for under-service of the patient and promulgating the sequela of functional ability limitations and disability, diminished quality of life, limited work productivity, and ultimately, increased health care costs (van der Roer, Goossens, Evers, & van Tulder, 2005).

Patients' self-management (SM) experience in chronic low back pain frequently includes coping with pain of varying intensity (Crowe, Whitehead, Gagan, Baxter, & Panckhurst, 2010). The pain interferes with physical activity and performance of activities of daily living. Although pain does not necessarily lead to psychological disorders, it can interact with patients' physical and mental state thereby affecting pain perception and recovery (NCHS, 2006). Self-management behaviors and actions are further limited by deficits in general knowledge about chronic low back pain and inadequate information on independent actions to employ for pain management as well as other tangible chronic low back pain resources (Crowe et al.). It is reasonable that patient SM activation may be an important factor to achieving *functional ablement*, defined as the personal capability in response to environmental demand (Verbrugge & Jette, 1994).

Clinical practice guidelines for low back pain jointly established by the American College of Physicians and the American Pain Society highly recommended education about effective self-care options (Chou et al., 2007). Orem described self-care as the performance of actions by an individual to maintain his or her health and well-being (1991). Self-management is a broader concept that includes demonstration of tasks and skills with self-efficacy so that patients can make decisions and engage in behaviors to adequately manage their chronic illness (Lorig & Holman, 2003). Patients make choices

in activating SM (Hibbard, Stockard, Mahoney, & Tusler, 2004). The desired action from health care providers is to influence patient activation through self-management support (Wagner et al., 2001). Quality health care for patients with chronic low back pain entails demonstrating self-management support (SMS). It is timely to examine SM and SMS in patients with chronic low back pain especially in potentially influencing a key outcome of improved functional ability.

The nursing discipline views the human being as desiring to achieve their optimum potential so that a primary nursing goal is to render patients capable in meeting their needs towards reaching optimal health (Orem, 1991). This view of the human as being capable is in juxtaposition with the negative connotation suggested by the terms disability and disablement. For this research study, the positive outcome examined was termed functional ability; a perspective that challenges the limited views of capacity and optimizes the opportunity for self-management. Nursing remains a valued member of the health care team managing the patient's chronic low back pain and offers a philosophical perspective of optimism that recognizes that in the presence of chronic low back pain, there is a potential to maximize functional ability.

This study defines chronic low back pain as a medically diagnosed intermittent or continuous discomfort in the low back area that lasts longer than three months unrelated to a malignant cause. The health care provider refers to any member of the health care team involved in managing the patient's chronic low back pain (i.e. doctors, nurse practitioners, physician assistants, nurses, therapists, case managers, social workers, dietitians).

Statement of the Problem

Management of chronic low back pain is challenging and frustrating for both patients and health care providers alike. Improving functional ability through existing therapies remains inadequate. The resulting disability affects patients' quality of lives and their productivity, contributing to the alarming health care costs. In other chronic illnesses, studies on SM and more currently, SMS, have shown some success in improving outcomes such as positive health-directed behaviors, more symptom-free days, and better quality of life (Pearson, Mattke, Shaw, Ridgely, & Wiseman, 2007). Although literature is beginning to explicate the nature of chronic care practices for patients with chronic low back pain, there remains limited understanding as to whether SM and SMS influence functional ability in patients with chronic low back pain. Further, the role of SM in explaining the relationship of self-management support to functional ability remains unknown. Understanding patients' perceptions about their SM, SMS, and functional ability prepares a foundation for development of SMS interventions meaningful to symptom management and self-management of chronic low back pain.

Theoretical Orientation

The Chronic Care Model was the overriding theoretical orientation for this research study. The Chronic Care Model includes the SM concept to describe the patient response and the concept of SMS that describes the health care provider response. The concept of self-management draws upon the work of Dr. Kate Lorig. The Disablement Model recognizes that disability includes a gap between environmental demands and personal capability. Presented is an overview of the Chronic Care Model with a focus

upon the concept of self-management support, the concept of self-management, the Disablement Model, and the concept of functional ablement.

Chronic Care Model

A multidisciplinary group of chronic illness experts through the Improving Chronic Illness Care organization with support from the Robert Wood Johnson Foundation devised the Chronic Care Model (Wagner et al., 2001). This organization proposed health care system changes to improve practice standards and care outcomes in chronic illness care. The Chronic Care Model specifies that if patients are activated (engaged in self-management), and health care teams have established a working partnership, are prepared, and proactive (demonstrating self-management support), then patient outcomes improve (Wagner et al.). Wagner et al. emphasized the patients' central role in their own health care, the fundamental basis of SM. This research study examined the relationship of SM and SMS to the outcome of functional ablement in chronic low back pain patients and identified whether SM mediates the SMS-functional ablement relationship.

SMS includes empowering and preparing patients to manage their health through effective strategies including assessment, goal setting, action planning, problem solving, follow-up, and organization of individual and community resources (Wagner et al.). Wagner et al. also pointed out the important influence of SMS to SM. Effective SMS interventions enhance patient activation to self-manage, ultimately improving patient outcomes in chronic illnesses. The Institute of Medicine (IOM, 2003) defined SMS as a systematic process whereby health care providers provide education and supportive

interventions to increase the skills and confidence of patients in managing their health problems.

SMS is one of the six elements of the CCM: (1) an organized health system that promotes safe and quality care, (2) effective and efficient delivery system design, (3) decision support through evidence-based guidelines, (4) organized patient data through clinical information systems, (5) SMS, and (6) mobilized community resources for patients (Wagner, 1988). A meta-analysis of 112 studies with randomized controlled trials (RCTs) to improve chronic illnesses showed that interventions containing one or more of the CCM elements resulted in improved processes of care and clinical outcomes (Tsai, Morton, Mangione, & Keeler, 2005). Majority of these chronic illnesses included diabetes, depression, asthma, and congestive heart failure, with some studies on chronic pain. SMS was the Chronic Care Model element that was most used. The Chronic Care Model involves a health system change. This research study focused on the SMS element of the Chronic Care Model.

Self-management support integrates adequacy in knowledge, skills, and attitudes in supporting patients to self-manage (Pols et al., 2009). SMS resulted in positive outcomes of fewer hospitalizations and improved quality of life (Wagner et al., 2001). SMS-specific activities include demonstrating advanced communication skills to motivate and activate patients to self-manage, collaborating with patients and significant others, providing SM education beyond the traditional means, assisting in procuring tools for SM (i.e. blood pressure cuffs, glucometers, community referrals), routinely assessing patients and their SM abilities, addressing barriers to SM, and having an attitude of

respect, among others (Boxer & Snyder, 2009; Coleman & Newton, 2005; Pols et al., 2009; Simmons, Baker, Schaefer, Miller, & Anders, 2009).

Emerging evidence demonstrates that SMS can improve patient outcomes and control costs (Pearson et al., 2007). Patient behavior change in self-management is a crucial endpoint. However, there is yet a limited evidence base about the impact of SMS although there is much enthusiasm from policymakers, insurers, health care providers, and patients regarding SMS (Pearson et al.). The Agency for Healthcare Research and Quality, a federal agency leading the improvement of quality, safety, efficiency, and effectiveness of health care, emphasized the importance of further research into SMS programs for chronic illness care (Pearson et al.). Moreover, the relevance of SMS especially in the area of chronic low back pain needs further inquiry. Study of the complexity in managing symptoms in chronic pain, and the disability consequences are more challenging compared to clearer and more objective outcomes in other chronic illnesses like diabetes and asthma (Newman, Steed, & Mulligan, 2004).

This research study examined the influence of SM and SMS in relation to functional ablement, a significant focus in today's health care. Based on the Chronic Care Model (Wagner et al., 2001), activated patients are engaged in self-management, prepared and proactive health care teams are providers that deliver self-management support, and both SM and SMS are fundamental to effective chronic illness care and positive patient outcomes (Coleman & Newton, 2005).

Self-management

Lorig and Holman (2003) operationalized SM in terms of six skills and three tasks in making decisions and engaging in health-directed behaviors for improved chronic

illness management. SM has a more encompassing definition that goes beyond self-care, to having adequate knowledge and six core skills: problem solving, decision making, utilizing resources, forming patient-provider relationships, action planning, and self-tailoring or applying SM skills as appropriate to oneself (Bodenheimer, Lorig, Holman, & Grumbach, 2002; Lorig & Holman, 2003). Self-efficacy is an essential facet of SM (Bodenheimer, et al.; Lorig & Holman). Bandura (1995) defined self-efficacy as an individual's belief in his or her abilities to perform actions needed to manage a situation. Self-efficacy refers to an individual's confidence to execute a course of actions needed to achieve the goal in order to self-manage.

Lorig and Holman adapted Corbin and Strauss' (1988) qualitative work and described the following three tasks as essential to SM: (1) medical management or the work to care for the disease including taking medications, visiting physicians, adherence to treatment regimen, exercising or maintaining a special diet, (2) role management or the work to maintain one's normal life, changing life roles and behaviors to adapt to situations, including doing chores, maintaining social contacts and hobbies, and (3) emotional management or the work required by an individual to deal with feelings like coping with anger or depression. Other patient SM-specific skills include consistently monitoring one's illness, utilizing community resources, acquiring assistance when needed, with essential active/proactive and lifelong patient involvement (Bodenheimer, Wagner, & Grumbach, 2002; Boxer & Snyder, 2009).

SM behaviors can take various forms and levels; patient activation refers to the level of SM an individual is engaged in based on his/her knowledge, skills, beliefs, confidence, and behaviors (Hibbard et al., 2004). Four levels of activation in self-

management include starting to take a role, building knowledge and confidence, taking action, and maintaining behaviors (Insignia Health, 2009). SM levels can help guide what SMS is needed for the specific patient. Activated patients are self-managed patients; patients with higher levels of activation or engagement, and those who are more informed, skilled, and confident have greater capabilities for SM, resulting in improved outcomes (Dixon, Hibbard, & Tusler; Hibbard, Mahoney, Stock, & Tusler, 2007; Mosen et al., 2007). In relation to this research study, self-managed chronic low back pain patients can potentially influence functional ablement.

In summary, the preparation of both patients and providers in accepting their roles to facilitate SM continues as an immense challenge (Lorig & Holman, 2003). Integrating SM into the health care system needs support; SM alone has not been sufficient in sustaining effective care for patients with chronic illnesses. The concept of SMS addresses this gap in care process. It is highly likely that SMS will positively influence SM towards improving patient outcomes.

Disablement Model

The disablement model influenced nursing research studies actively over the years (Roy & Jones, 2007). Disablement originated from the seminal work of Nagi in his disabling process theory, one of the well-known midrange theories from the psychosocial disciplines that influenced nursing studies (Roy & Jones, 2007). Saad Nagi is a sociologist who first introduced the disablement model and provided conceptual clarification on disability and its associated concepts (1965). He also recognized the important influence of environmental factors on disability. Nagi noted that one's functioning can be affected by four core concepts in a pathway: (1) active pathology

(interruption of normal cellular processes), (2) impairment (abnormality at the tissue, organ, or body system level), (3) functional limitations (restriction in performance), and (4) disability (physical or mental limitation in a social context). Impairments do not have to result to functional limitations and functional limitations do not have to lead to disability. Nagi explained that disability results from changes in the interactions between the individual and his environment. The Institute of Medicine adapted Nagi's work in presenting the published report on disability prevention and policy (Pope & Tarlov, 1991). The institute emphasized that conditions affecting functioning can develop and progress towards disability, but appropriate interventions can reverse this disablement process.

Lois M. Verbrugge PhD, MPH, and Alan M. Jette PhD, MPH, developed the disablement process to improve on Nagi's model. Verbrugge is a senior Distinguished Research Scientist at the University of Michigan and Jette is a director of the Health and Disabilities Research Institute at the Boston University of Public Health. Verbrugge and Jette retained Nagi's original concepts and added social, physical environment, and personal factors that can speed up or slow down disablement (1994). They defined disablement as the impact of chronic (and acute, although primarily chronic) conditions on the functioning of body systems and people's abilities. Disablement covers all the consequences of pathology for functioning or negative functional outcomes (impairments, functional limitations, and disability).

Verbrugge and Jette referred to disablement as a process because it is dynamic and because the functional consequences can vary over time as influenced by other factors. These factors are: (1) risk factors (predisposing characteristics that can affect

disablement or its severity), (2) interventions to reduce difficulties or influence functional outcomes (either intra-individual or coming from within and extra-individual or performed outside the individual), and (3) exacerbators (factors that maintain dysfunction, i.e. interventions that turn askew, societal impediments). A particular concern is the influence of mental health state upon an individual's functional ability. Mental well-being, anxiety, and depression pose significant roles in the management of patients with chronic low back pain (Last & Hulbert, 2009).

Verbrugge and Jette (1994) hypothesized that risk factors and interventions (intra- and extra-individual factors) can serve to mediate or moderate the associations among pathology, impairment, functional limitation, and disability. In this research study, SM is a primary intra-individual factor while SMS is an extra-individual factor. SM and SMS interventions operate on all of the four components of disablement to affect functioning. A primary goal in the disablement process is to sustain and restore functional ability (Verbrugge & Jette).

Jette (2006) reinforced that the four components of disablement do not occur in a linear process. It is dynamic and it fluctuates in breadth and severity. Although the title of the model suggests a pathogenic or deficit orientation, the disablement model also allows a perspective on disability in the biopsychosocial framework integrating the medical model (disability as a personal characteristic caused by a disease) and the social model (disability as a social issue resulting from an inflexible environment). Nursing focuses on promoting optimal health by helping the person to perceive their strengths, and views individuals as able to influence their environment. Persons perceived as being "abled" or "having the ability" denotes a positive outlook about developing potential

functioning and having capacity. With this consideration, the term functional disability was reframed in this research study to a more encouraging term of *functional ablement*.

Summary

The CCM highlighted the importance of patients' SM of their chronic illness experiences together with health care providers' SMS for the improvement of health care outcomes. Health care providers who demonstrate SMS are prepared and proactive in encouraging patients to assume primary responsibility in their own care. Lorig emphasized the role of adequacy of patients' knowledge, skills, and tasks in the SM of chronic low back pain. The disablement model reinforced that extra-individual factors (i.e. SMS) and intra-individual factors (i.e. SM) influence the disablement process to impact functional ablement. This research study examined the influence of SM and SMS with functional ablement. The impact of risk factors (i.e. mental state, applicable demographic variables) was also considered.

Figure 1 shows the primary concepts in this research study and their linkages. This figure indicates the focus of the study and shows the relationships of the concepts based on the theoretical frameworks discussed.

Statement of the Purpose

The study purposes were to : (a) examine whether SM and SMS significantly influence functional ablement, after controlling for mental health state and demographic characteristics (age, sex, ethnicity, race, educational attainment, income, duration of chronic low back pain, overall health, social support, and number of medical conditions), (b) examine whether SM mediates the relationship of SMS and functional ablement in patients with chronic low back pain, and (c) describe patient perceptions of their SM,

SMS, and functional ablement. In order to address the research purposes, the study employed a non-experimental, cross-sectional, descriptive design to examine SM, SMS, and functional ablement in chronic low back pain patients.

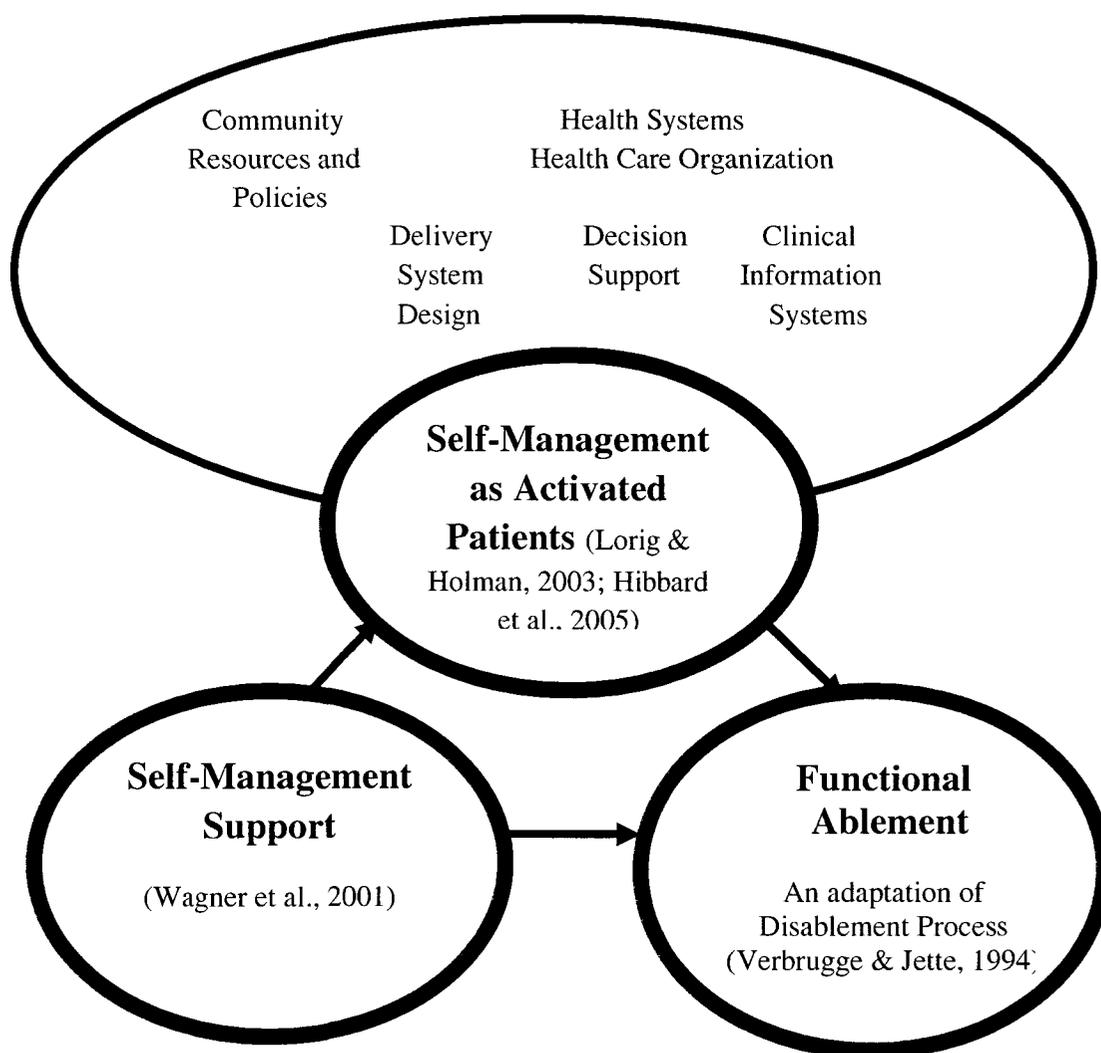


Figure 1. Adaptation of the Chronic Care Model to define activated patient as Self-Management and Functional Ablement as a patient outcome. Chronic Care Model Copyright 1996-2010, The MacColl Institute. The Improving Chronic Illness Care program is supported by The Robert Wood Johnson Foundation, with direction and technical assistance provided by Group Health's MacColl Institute for Healthcare Innovation. Adapted with written permission.

Mediation analysis was utilized to determine whether SM mediates the relationship between SMS and functional ablement. In order to understand the perceptions of patients about their SM, SMS, and functional ablement, open-ended written responses provided rich descriptions of their experiences. The variables, SM and SMS potentially are contributing factors to variation in functional ablement of chronic low back pain patients. These established the direction for research and identified the major intent of this study.

Research Questions

The following questions were posed to understand the research problem and address the research study purposes:

1. What are the: (a) level of self-management, (b) amount of perceived self-management support, (c) mental health state, (d) functional ablement score, and (e) mean pain intensity in chronic low back pain patients?
2. Does self-management significantly influence functional ablement in chronic low back pain patients after controlling for relevant covariates including mental health state? Potential demographical covariates are age, sex, ethnicity, race, educational attainment, income, duration of chronic low back pain, overall health, social support, and number of medical conditions.
3. Does perceived self-management support significantly influence functional ablement in chronic low back pain patients after controlling for relevant covariates including mental health state? Potential demographical covariates are age, sex, ethnicity, race, educational attainment, income, duration of chronic low back pain, overall health, social support, and number of chronic medical conditions.

4. Does self-management mediate perceived self-management support and functional ablement in patients with chronic low back pain?

5. What do patients describe as: (a) ways they manage their chronic low back pain, (b) ways health care providers give patients support in chronic low back pain management, and (c) patient concerns about functional ablement?

Definition of Terms

The theoretical and operational definitions for this research study are as follows:

Functional Ablement

Functional ablement refers to an individual's capacity to perform an activity and participate in personal, physical, and social life situations despite the chronic low back pain. It is equally important to recognize that functional ablement is highly influenced by risk factors, especially mental health state. Mental health state describes patients' emotional function (i.e. happy, calm, nervous, down, depressed) between the states of psychological well-being and distress.

Functional ablement was operationalized using the Oswestry Disability Index, Version 2.1a (Fairbank & Pynsent, 2000). This index measures pain intensity, impairment, functional limitations, and disability components. Mental health state was operationalized through the Mental Health Inventory (MHI-5) (Veit & Ware, 1983) and of study interest were two variables, specifically psychological well-being and distress.

Self-management

This refers to patients' knowledge, beliefs, confidence, skills, and behaviors in managing their own chronic low back pain condition. This was operationalized using the

short form of the Patient Activation Measure (PAM) by Hibbard, Mahoney, Stockard, and Tusler (2005).

Self-management Support

This refers to how health care providers prepare and empower patients in managing their individual chronic low back pain condition emphasizing the patients' fundamental role in their own care. This was operationalized using the Patient Assessment of Chronic Illness Care (PACIC) by Glasgow, et al. (2005).

Assumptions

Assumptions are statements not scientifically tested although they are considered true to a large degree (Silva, 1981) and stem from theories, previous research, practice, thoughts, and behaviors (Burns & Grove, 2009). Assumptions when explicitly stated bring clarity to the intent of science. With these considerations, the following were assumptions in this study.

1. Chronic illnesses (i.e. chronic low back pain) are complex disorders requiring improved management.
2. Management of chronic illnesses necessitates involvement of both patients and providers.
3. Patients have a fundamental desire to be healthy.
4. Activated patients are self-managed patients.
5. Chronically ill patients need support in managing their health problems.
6. Health care providers aim for patients to take primary responsibility for their health.

7. Health care providers endeavor to assist patients in managing their chronic illness.

8. Functional ablement is affected when chronic illness results in impairment, limitation, or disability.

9. Functional ablement is influenced by mental health state.

10. Disablement can be limited with adequate management of chronic illnesses.

Significance of the Study

The United States Congress established the period of January 1, 2001 to January 1, 2011 as the Decade of Pain Control and Research (NCHS, 2006). There has been an increased prevalence of chronic conditions and their associated pain and disability (NCHS). NCHS noted that pain is oftentimes discussed as a consequence of another condition and rarely viewed as a problem in and of itself which tends to minimize the issue of pain.

The issue of pain featured in the 2006 NCHS publication highlighted the dire need to improve pain management and the increasing direct and indirect health care costs of pain. Direct costs (i.e. health care provider and hospital visits, drugs, therapies) and indirect costs (i.e. lost work, productivity, and concentration) of pain management have been escalating. Direct and indirect costs of low back pain surpassed \$100 billion per year in the United States (Katz, 2006). About 33% of these costs are indirect due to decreased wages and productivity (Katz). Heightened use of health care resources has been evident both in the ambulatory area (i.e. medications, rehabilitation) and in the hospital setting (i.e. surgeries).

Lower back pain problems accounted for approximately 19 million medical office visits every year (Katz, 2006). Pain lasting for over a year consistently remains reported despite these visits and regardless of increased health care management. Twenty six percent of Americans age 20 and above reported experiencing pain persisting over 24 hours in a one-month period, while 10% claim that the pain lasted for a year or more. Low back pain was the most common among these pain experiences (NCHS, 2006).

Nurses and nurse practitioners figure prominently in the care of chronically ill patients especially in the areas of SM and SMS (Watts et al., 2009). This research study assists through addressing a gap in nursing science by building knowledge about SM and SMS in chronic low back pain patients. The adaptation of the Chronic Care Model to include functional ablement in this study presents a new view that enlightens theory and the work of nursing through potential significance in clinical practice. This research study is relevant not only to the nursing discipline but also to other health care professionals and to all stakeholders in the care of patients with chronic low back pain.

Summary

Subsequent study findings are important to the health of individuals, families, and communities affected by the epidemic of chronic low back pain and the disability that ensues. The information gained can be critical to future health care planning and policy (Altman & Bernstein, 2008). A study on family practice providers identified the great need for SMS in improving chronic nonmalignant pain management in primary care (Clark & Upshur, 2007). SMS can facilitate SM towards improving chronic illness outcomes. Chief concerns for public health include improving functional ability, quality

of life, and health status for large segments of the population afflicted with chronic low back pain (CDC, 2006).

The cost of chronic pain has posed a major burden on the health care system with low back pain being the most common problem. The efficacy and cost effectiveness of treatments for low back pain, including both non-surgical and surgical options, have been a major focus of research by the NIAMS in recent years (2009). Goals of current research include improving management and addressing functional ablement for chronic low back pain patients. This study assisted in addressing the NIAMS' research focus and goals in relation to non-surgical options towards improving the functional ablement outcome in chronic low back pain.

Inadequately managed chronic low back pain commonly limits functional ablement and affects the quality of life while continuing to push direct and indirect health care costs higher. There is a need for studies like this one to examine the influence of SM and SMS on functional ablement in chronic low back pain patients. It is equally important to identify whether SM mediates the relationship of SMS and functional ablement. Empirical studies focused on SM and preliminary studies on SMS suggest improved outcomes on other chronic illness, however these studies remain small in number with even fewer studies in the area of SMS and chronic low back pain. The state of the science warrants an exploration of SM and SMS and their influence upon functional ablement for chronic low back pain patients.

CHAPTER II

REVIEW OF RELATED LITERATURE

Patients, their significant others, and health care providers are facing difficult challenges in the adequate management of chronic low back pain. Since the health care system is increasingly placing the responsibility on patients to manage their own health conditions, the concepts of self-management (SM) and self-management support (SMS) are now more significant in today's health care especially in addressing functional ablement for chronic low back pain patients. The threefold purpose of this research study was to: (a) examine whether SM and SMS significantly influence functional ablement after controlling for mental health state and relevant demographic characteristics, (b) examine whether SM mediates the relationship of SMS and functional ablement in patients with chronic low back pain, and (c) describe the patient perceptions of their SM, SMS, and functional ablement. The adapted Chronic Care Model and the Disablement Model guided this non-experimental, cross-sectional, descriptive study.

Chronic Low Back Pain

Low back pain is a variable condition that can be a constant ache, dull discomfort, or a sharp, radiating pain that is incapacitating, occurring either suddenly from injury, or gradually from causes like degenerative changes (NIAMS, 2009). Muscular strain, primary spine disease like disc herniation, systemic diseases like cancer, and regional diseases like aneurysm are other causes of low back pain (Hellman & Imboden, 2009). Disc degeneration and back injury are the major classifications for the diagnosis of nonmalignant low back pain (AAOS, 2008). However, health care providers have a difficult time making a precise diagnosis for the majority of the cases (Hellman &

Imboden). These cases are called nonspecific low back pain, a large percentage of low back pain visits (85%) where there is no clear and definite link between patient signs/symptoms and findings from diagnostic tests (Weiner and Nordin, 2010). This leads to increasing difficulty in management and subsequent disability. As the discomfort becomes long term, those remaining out of their jobs have a high probability of never returning to work (Katz, 2006).

Approximately 20% of patients with acute low back pain develop chronic pain (Weiner & Nordin, 2010). Acute pain occurs quickly and lasts for less than six weeks while chronic pain is a condition that may start either quickly or gradually, become persistent or fluctuating, but lasting for more than three months (Last & Hulbert, 2009; NIAMS, 2009). Others consider chronic pain to last more than six months beyond the expected healing time (Nelsen-Marsh & Banasik, 2009). As time progresses, chronic low back pain can result in limitations in functional ability.

Many modifiable factors contribute to chronic low back pain and include low fitness level, inactive lifestyle, high dietary fats and carbohydrates, occupational risks, and cigarette smoking (NIAMS, 2009). Non-modifiable risk factors include a genetic component (i.e. ankylosing spondylitis, a chronic inflammation primarily affecting the spine), race (i.e. African American women tend to develop a low back pain condition two to three times more than Caucasians), increasing age, and the presence of other conditions like arthritis, (NIAMS, 2009). A literature review supported by the NIAMS also noted that psychosocial and economic factors are important risk factors (i.e. anxiety, depression, job-related concerns, low educational attainment) in back pain and disability (Katz, 2006).

Pathophysiology of Pain

The physiologic mechanism of nociception explains the pain phenomenon. Nociception includes four stages: transduction, transmission, perception, and modulation (Nelsen-Marsh & Banasik, 2009). Pain results from stimulation of free nerve endings called nociceptors whether due to direct damage or release of chemicals at the site of injury. The presence of chemical mediators of pain changes the membrane potential (electrical/voltage difference inside and outside of a cell) of the pain receptor. This results to the conversion of the painful stimuli to a neuronal action potential, a brief electrical charge activating the nerve cell (transduction stage). The painful stimuli then moves from the periphery to the spinal cord and then to the brain (transmission stage). The third stage (perception) occurs when the brain receives the pain signal, becomes aware of the pain, and processes or interprets the meaning of the sensation. Although pain is a physical sensation, it is always subjective, influenced by individual characteristics and the context of its occurrence (NCHS: National Center for Health Statistics, 2006). The fourth stage is modulation which refers to how the pain signal can become altered at multiple areas along the pain pathway (i.e. rubbing a painful area decreases pain perception, release of endorphins can inhibit transmission of pain impulses). These four processes are clinically important because each stage offers an opportunity for pain management (Nelsen-Marsh & Banasik).

Management of pain is a challenge especially in chronic pain situations. Recent evidence demonstrated that consistent changes and reorganization occurs within the cortex of the brain in patients with chronic low back pain (Wand & O'Connell, 2008). This alteration caused increased reactivity and cortical sensitivity as well as centrally

generated pain when patients simply move their back (Wand & O'Connell).

Consequently, even in the absence of clear spinal pathology, pain still exists and persists resulting to the increased complexity in chronic pain management.

Current Management for Chronic Low Back Pain

The NIAMS (2009) classified chronic low back pain management into two major categories: non-surgical and surgical. Non-surgical management include hot or cold packs, exercise, traction, corsets/braces, behavioral modification, medications, injections for pain relief (i.e. steroids), and complementary and alternative medicine (i.e. manipulation, acupuncture, acupressure, transcutaneous electrical nerve stimulation, massage). Non-surgical management is the treatment of choice unless the pain becomes excessively disabling (AAOS, 2008). Surgical management for specific low back pain conditions (i.e. herniated disks, spinal stenosis, degeneration, fracture) include the following: spinal fusion, laminectomy, discectomy and microdiscectomy, disc replacement, laser surgery to reduce the size of herniated discs, vertebroplasty and kyphoplasty to stabilize the spine after fractures, and intradiscal electrothermal therapy using heat to address disc-related pain (NIAMS, 2009).

Non-surgical management. The American Pain Society and American College of Physicians commissioned an extensive evidence review to establish guidelines for the management of low back pain. As part of this review, Chou and Huffman evaluated current evidence on non-surgical options (2007a) and found that cognitive-behavioral therapy, exercise, spinal manipulation, and multidisciplinary rehabilitation are moderately effective in managing chronic low back pain. However, there were some methodological discrepancies documented in the various trials reviewed limiting

consistent conclusions on efficacy (Chou & Huffman, 2007a). Further, except for multidisciplinary programs whose benefit can persist up to five years, the other modalities tend to be effective for the short term (Last & Hulbert, 2009).

Despite the moderate effectiveness noted with some modalities, the incidence and consequences of chronic low back pain continue to rise. Chou and Huffman (2007a) noted that evidence has been insufficient in relation to tailoring treatments to individual patients. These same authors also reinforced the necessity for further research on optimal and sustained management for low back pain that is practical for both patients and providers.

In another study, Chou and Huffman (2007b) summarized current evidence evaluating the efficacy of medications used for acute and chronic low back pain. However, many of the systematic reviews and randomized clinical trials addressed short durations of pain that does not attend to the chronicity of low back pain. Outcomes in relation to functional ablement, quality of life, and decreased depression were minimally addressed. The reviewed studies also did not adequately discuss long-term consequences of medications especially in relation to tolerance and adverse reactions. According to the NCHS (2006), there has been a wide and increasing use of narcotics for pain management; health care providers administered or prescribed narcotic analgesics to 23% of patients who visited the emergency department. Walker (2008), in his commentary to Chou and Huffman's pharmaceutical article, highlighted the importance of the biopsychosocial perspective in addressing chronic low back pain taking into account the patients' concerns and activity patterns based on the context of their daily lives.

Medications are more useful if they enhance an increase in self-management, improving patients' ability to function (Walker).

Surgical management. When conservative nonsurgical treatments are ineffective, more invasive procedures become the alternative. Steroid injections are common interventions for low back pain patients. However, epidural steroid injections have documented mixed results (Last & Hulbert, 2009). The next major step is surgery. Unfortunately, majority of patients with chronic low back pain do not benefit from surgery (Last & Hulbert, 2009). According to the NCHS (2010), the efficacy of spinal fusion surgery, a common surgical option, remains in question with concerns about the increased procedure rates motivated by technology advances and financial incentives. The incidence of hospital discharges from spinal fusion increased by 82% and the combined health care costs increased by 189% in 2006 (NCHS).

A systematic review conducted by van der Roer, Goossens, Evers, and Tulder (2005) to evaluate the most cost-effective treatment for low back pain yielded non-conclusive results. In the review of 17 studies found, limited economic evaluations and methodological variability especially in the interventions, controls, and samples used prevented a definite conclusion on the cost-effectiveness of treatments. Ultimately, the economic impact of chronic low back pain is evident in today's health care resulting from extended loss of patient function and work productivity, soaring costs of treatment, and high disability payments (Last & Hulbert, 2009). Staggering estimates of these costs range from \$12.2 to \$90.6 billion annually (Haldeman & Dagenais, 2008).

The limited success and high health care costs associated with the current management of chronic low back pain prompts the need to identify more effective, less

costly, and more sustainable interventions. Studies focusing on the physical aspects of chronic pain management disregard the other components of care necessary in the complexity of chronic illnesses. Self-management and most recently, self-management support offer opportunities to develop interventions salient in the management of chronic illnesses (Pearson et al., 2007). Clarifying the aforementioned concepts in chronic pain management especially in examining their relationships to functional ablement portend an enhanced understanding of the patient experience.

Functional Ablement

In discussing functional ablement, the literature on disability is essential because this is where fundamental information on functional ablement lies. Pain has a direct relationship to the health status measure of disability (NCHS, 2006). Disability limits an individual's ability to perform an activity due to the presence of physical or mental impairments with the use of or need for accommodations or interventions in order to improve function (NCHS). The CDC (2006) defined disability to include any limitation in function from physical, mental, or emotional problems. From an international perspective, the World Health Organization (WHO, 2010) described disability as a complex phenomenon that includes impairments in body function or structure, activity limitations in performing a task, and difficulties in participating in life situations. Despite the lack of a standardized definition and measurement for disability, there are similarities in understanding activity limitations in terms of basic actions difficulty and complex activity limitations (NCHS, 2006). The former refers to limitations in movement, sensation, emotional, or mental functioning related to a health issue. The latter involves restrictions in activities of daily living (i.e. bathing, dressing, toileting, etc.) and

instrumental activities of daily living (i.e. managing money, housekeeping, making meals, etc.), including work, social, and self-care limitations.

The CDC published the Disability and Health State Chartbook in 2006, the first in a planned series to provide data on the health of people in the United States with disabilities according to each state. Approximately 50 million American adults who suffer from disability concurrently experience a poorer state of health than those without functional limitations (CDC, 2006). From 2001-2005, almost 30% of the US population suffered from basic actions difficulty primarily in movement, while 23 % indicated complex activity limitations especially in work-related activities (Altman & Bernstein, 2008). In 2007, the NCHS (2010) documented basic actions difficulty to be at 59% while complex activity limitation was at 34% (NCHS, 2010). The leading causes of disability are arthritis and musculoskeletal disorders (NCHS, 2010). More specifically, 28% of adults with low back pain suffered limitations in functional ability (NCHS, 2006). All of these data provide startling information prompting a need to improve the management of chronic low back pain patients.

The outcome of functional ability and addressing disability in chronic low back pain patients are of key concerns to health care providers who frequently manage low back pain (Covington, 2007). Due to the high non-specificity of the definitive cause for a majority of chronic low back pain cases, management must be directed less towards identifying the pathology and more focused upon addressing the functional limitations and disability that ensue and their sequelae (Covington). Allen and Hulbert (2009) reinforced this point when they discussed the management of chronic low back pain in primary care stating that assessing patient response to therapy should focus largely on

pain, function, and mood. In this research study, functional ablement was the outcome studied to reflect the chief outcome that needs to be evaluated in chronic low back pain patients. As derived from Verbrugge and Jette's Disablement Model (1994), functional ablement encompasses the concepts of functional ability and expresses a positive view of disability. This term has a nursing orientation towards optimal health that stays away from the negative pathological connotation in disability. SM and SMS with patients and health care providers who are active, proactive, informed, and supportive can potentially influence functional ablement

Self-management and Self-management Support

Lorig and Holman (2003) operationalized SM in terms of tasks and skills with self-efficacy so that patients can make decisions and engage in behaviors towards managing their chronic illness state. This is necessary in the current health care system where chronically ill patients need to take control and manage their own health conditions (Pearson, Mattke, Shaw, Ridgely, & Wiseman, 2007). SM is a major element in many programs geared towards chronic illness management. However, integrating SM into the health care system needs support (Lorig and Holman), hence the term, SMS.

Improving Chronic Illness Care (ICIC), an organization supported by the Robert Wood Johnson Foundation and composed of a multidisciplinary group of chronic illness experts, devised the Chronic Care Model to advance quality improvement and science in chronic illness. The premise of the Chronic Care Model is that effective SMS interventions enhance patient activation to self-manage, which ultimately improve patient outcomes in chronic illnesses (Wagner et al., 2001). SMS is a major concept in the ICIC's mission. Wagner et al. described SMS as empowering and preparing patients to

manage their health, beyond giving advice and education towards emphasizing the patient's fundamental role in their own care.

The concepts of SM and SMS acknowledge that living with chronic illness challenges patients, their families, and health care providers in managing the complex care that requires ongoing personal adjustments, navigating plans of care, and concurrently managing interactions within the health care system (Wagner, 1998). Based on the adaptation of the Chronic Care Model, this research study examined the influence of SM and SMS on the functional ability of chronic low back pain patients, and identified whether SM mediated the SMS-functional ability relationship.

Several researchers highlighted the importance of SM and SMS in the care of patients (Clark et al., 2008; Jerant, von Friederichs-Fitzwater, & Moore, 2005; Lawn et al., 2009; Rosland et al., 2008). Empirical studies for the present study's main variables of SM and SMS were reviewed to evaluate what is currently known and identify the gaps in current research. This review validated the need for this research study, add specificity to the knowledge base, and potentially prepare a foundation for future research.

Included in this literature review were studies about chronic low back pain. Empirical studies for other chronic illnesses were also included based on their relevance to allow for depth and breadth of discussions. Chronic low back pain with its complexity includes various psychosocial and comorbid factors. Within the chronicity, the symptom experiences invites consideration of management approaches that are effective in other like illnesses (Ritzwoller, Crouse, Shetterly, & Rublee, 2006). There was also considerably less empirical research found published on SMS for chronic low back pain patients.

In this literature review, no timeframe limitations were set in order to increase opportunity for retrieval. Only a few studies were relevant to this research study. Majority of the relevant studies found were published in 2005 to present. Retained were a few older studies due to their explanatory value. Appendix A documents the empirical studies used in this literature review.

Self-management and Chronic Illnesses

Several studies on SM focused on diabetic patients (Norris, Engelgau, & Narayan, 2001; Norris et al., 2002). Others involved heart failure patients (Jovicic, Holyroyd-Leduc, & Straus, 2006). SM interventions commonly included educational programs and information on satisfactory lifestyle behaviors, mechanical, and coping skills in practice environments. Systematic reviews of SM randomized controlled trials (RCTs) indicated that self-managed patients experienced significant improvements in outcomes (Jovicic, Holyroyd-Leduc, & Straus, 2006; Norris, Engelgau, & Narayan, 2001; Norris et al., 2002). These outcomes included increased knowledge, frequency and accuracy of blood glucose monitoring, self-reported dietary habits, short-term glycemic control, less hospital readmission rates, better quality of life and mortality numbers, and demonstrable health behaviors, with subsequent cost savings. However, many of these positive effects were short-term. Increased involvement and collaboration with patients tended to facilitate positive results (Norris et al., 2001; Norris et al., 2002). This highlights the potential significance of SMS in enhancing SM towards favorable outcomes.

Key SM programs addressed arthritis and the sequelae of pain and disability. In 1979, the Stanford Patient Education Research Center and Kate Lorig with the Stanford

University developed the Arthritis Self-Management Program (ASMP), the prototype of SM programs (Stanford School of Medicine, 2010). In a seminal 12-year review of SM studies utilizing the ASMP, Lorig and Holman (1993) noted improvements in pain, self-efficacy, and SM behaviors, with decreased health care utilization, resulting to cost savings. However, the authors noted that physical disability increased. A much more recent RCT evaluating ASMP in comparison to a more generic SM intervention called the Chronic Disease Self-Management Program (CDSMP) found that both programs resulted in significant improvements with less disability (Lorig, Ritter, & Plant, 2005). Even more recent was a study conducted by Yip et al. (2007) on osteoarthritis patients utilizing the ASMP. The authors reported reductions in pain and fatigue, and improvements in range of motion, exercise, and functional status, without significant changes in muscle strength.

Lorig et al. (1999) evaluated the CDSMP through a RCT focused on patients with heart disease, lung disease, stroke, and arthritis. The authors found improvements on several outcomes (i.e. length and frequency of exercise, symptom management, communication with physicians, self-rated health, health distress, fatigue, disability, social/role activities limitations, hospitalizations). However, there were no differences noted on pain, shortness of breath, or psychological well-being. A two-year follow-up to this RCT was conducted by Lorig et al. (2001), this time with improvements in self-efficacy, and reduction in health distress and provider visits, but with no significant changes on self-rated health, disability, activity limitations, and fatigability.

Derived from the Stanford's ASMP and the CDSMP, Sandra LeFort developed the Chronic Pain Self-Management Program (CPSMP) in 1996, in conjunction with Lorig

and the staff of the Stanford Patient Education Research Center. LeFort, Gray-Donald, Rowat, & Jeans (1998) evaluated the CPSMP through a RCT noting significant improvements in pain, dependency, vitality, aspects of role functioning, life satisfaction, self-efficacy, and resourcefulness. Just as with previous studies, the long-term impact needed to be evaluated. Ersek, Turner, Cain, and Kemp (2004) proposed a RCT study protocol utilizing the CPSMP on a target of 273 older adults in comparison to an education only control group. Outcome measures proposed were disability, depression, pain intensity, and pain-related interference with activities. Findings and conclusions have yet to be published in relation to this study protocol.

Other pain-related SM studies were conducted on osteoarthritis patients through a RCT by Buszewicz et al. (2006) and a meta-analysis of RCTs by Warsi, LaValley, Wang, Avorn, and Solomon (2003). The former noted reduction in anxiety and improvement in self-efficacy, without significant changes on pain, physical function, or primary care provider visits. The latter did note decreases in pain and disability, however, the effect sizes were small.

Studies related to SM, commonly implemented through patient education and other individual management skills, improved health behaviors and outcomes in various chronic illnesses. However, based on the above studies, no significant changes occurred in some outcomes and only short-term improvements for others. The findings about pain and functional ability were conflicting among the different studies.

Norris et al. (2001) and Norris et al. (2002) noted the relevance of SMS in facilitating SM towards positive outcomes. Bair et al. (2009) reinforced this point in a study of patients with musculoskeletal pain and depression when they identified patient-

perceived barriers and facilitators to chronic pain SM. The barriers to SM were disability, depression, ineffective pain-relief strategies, limited resources, lack of family and friend support, no individualized care, and difficult patient-physician interactions. The facilitators to SM were improvement of depression with treatment, encouragement from nurse care managers, supportive family and friends, having options for SM strategies, being a proactive patient, and having a positive attitude. Findings point to the association of SM and SMS as well as the potential impact of mental health on chronic pain outcomes. This research study considered the mental health state of chronic low back pain patients, examined the influence of SM and SMS on functional ablement, and identified whether SM influences the relationship of SMS to functional ablement.

Self-management and Chronic Low Back Pain

Fewer studies were retrieved that focused on SM and chronic low back pain. Non-experimental and qualitative studies on SM and chronic low back pain were found that evaluated patient experiences and perceptions relevant to this research study (Cooper, Smith, & Hancock, 2009; Liddle, Baxter, & Gracey, 2007; Townley, 2010). Patients verbalized multiple failed treatment approaches and acknowledged poor adherence to advice and performance of SM strategies (i.e. exercise). These are due in part to inadequate knowledge, recurrence of symptoms, and lack of precise diagnosis affecting long-term SM strategies (Cooper, Smith, and Hancock, 2009; Liddle, Baxter, and Gracey, 2007). Patients expressed the need for SMS and individually tailored programs to meet functional ablement outcomes. Patients also sought for better understanding on the part of providers regarding the impact of chronic low back pain (Liddle, Baxter, & Gracey, 2007; Townley, 2010). These findings highlight the

importance of providing adequate SMS to enhance SM towards potentially improved outcomes.

Schulz, Rubinell, and Hartung (2007) and Sokunbi, Cross, Watt, and Moore (2010) conducted SM studies that supported the positive impact of SM. Patients expressed increased confidence, formulated self-help strategies, and took better control over their chronic low back pain (Sokunbi et al.). They also noted decreased back pain intensity, increased physical activity, reduction in medical consultation, less use of pain medications, and increased knowledge (Schulz, Rubinell, & Hartung). Less favorable findings were noted by May (2010) from a systematic review of SM programs involving patients with chronic low back pain and osteoarthritis. Although pain and function improved, the effect sizes were small. May also recommended that exercise with advice and education are chief strategies for chronic low back pain and osteoarthritis. This further calls attention to SMS in facilitating SM for potentially better outcomes.

Some SM studies on chronic low back pain patients documented contrasting results. Escolar-Reina et al. (2009) found that patients adhered to nonpharmacologic SM strategies. However, they did not find any significance on the outcome measure of back care in activities of daily life. Haas et al. (2005) used the CDSMP on chronic low back pain patients in a RCT and noted positive influences on the emotional well-being and energy level for these patients. Although positive benefits occurred on the disability measure, this was not appreciated at the follow-up. There were also no differences noted on self-efficacy, pain days, general health, and self-care attitudes. On the other hand, Coudeyre et al. (2006) found a significant impact on patient disability and knowledge despite nonsignificant effects on fear-avoidance beliefs after a RCT on a SM program.

Lastly, Zufferey and Schulz (2009) found positive improvements on self-comprehension, argumentative abilities, orientation, self-confidence, and attention in chronic low back pain patients after utilizing a patient-centered SM website. However, patients reported some confusion and discouragement emphasizing the need for tailoring the program and providing a supportive SM program.

Based on the above studies, common SM programs for chronic low back pain were focused on education, but they go beyond the traditional informational sessions, with the use of variable delivery methods including the internet and patient-centered strategies. Typical outcome measures were pain level and disability or function. Contrasting and conflicting findings on chronic low back pain outcomes were noted from SM strategies although the need for SMS towards enhancing SM was reinforced. No SM studies found directly examined the focus of this research study especially on the mediating influence of SM on the SMS-functional ablement relationship.

Self-management Support and Chronic Illnesses

More recently, SMS strategies have been applied in the management of various chronic illnesses (Krieger, Takaro, Song, Beaudet, & Edwards, 2009; Schillinger et al., 2008; Schillinger, Wang, Handley, & Hammer, 2009; Su, Lu, Chen, and Wang, 2009; Tang, Funnell, Brown, & Kurlander, 2009). Improvements in SM, self-efficacy, engagement, participation, quality of life, health behaviors, use of health services, and physiologic parameters were noted on patients with asthma, end-stage renal disease, and diabetes. SMS programs included nurse-provided asthma education with community referrals, support, and environmental assessments (Krieger et al., 2009). Others used a multidisciplinary team to support SM with group discussions and individual health

consultations (Su et al.). Schillinger et al. (2008) and Schillinger et al. (2009) employed patient-centered SMS, weekly telephone calls using communication strategies, and multilingual health information. Tang et al. conducted health education and weekly sessions focusing on experiential learning, coping, problem solving, and goal setting, with major emphasis on empowerment. These reflect a wide variety of strategies and the multiple health care providers involved in SMS.

A study conducted by Matthias et al. (2010) on chronic pain utilized samples that are similar to participants in this research study. In evaluating patient perceptions of their communication with health care providers, Matthias et al. found that nurse care managers supported, encouraged, and listened to patients more than primary care physicians. These findings emphasized the role of nurses in SMS.

Research studies on SMS are considerably less than studies on SM. Comparable to the SM studies in various chronic illnesses, the SMS studies in chronic illnesses also produced improvements on health care outcomes. The literature search did not find published studies that focused on the mechanism by which SMS influenced functional ablement.

Self-management Support and Chronic Low Back Pain

Even fewer empirical studies examined SMS interventions with chronic low back pain patients. Liddle, Gracey, and Baxter (2007) conducted a systematic review of 39 RCTs on the use of advice interventions on low back pain patients. Advice in addition to exercise was found to be very common and the most effective SMS strategy in decreasing pain and improving back-specific function and disability in chronic low back patients. Strong evidence was noted for the use of advice as a SMS strategy to promote SM.

Another systematic review evaluated various interventions for improving adherence to exercise and physical activity from 42 trials on patients with spinal pain and osteoarthritis (Jordan, Holden, Mason, & Foster, 2010). Interventions utilizing supervised or individualized exercise regimen and SM techniques enhanced adherence to exercise. However, results from some of the reviewed trials showed inconsistencies in the interventions used and the results on adherence, pain and function outcomes.

Only the two studies focused on SMS and chronic low back pain patients. However, not all of the study participants were chronic low back pain patients. It is also evident that there is a strong need for other substantive research on SMS in the population of chronic low back pain patients.

Self-management, Self-management Support, and Chronic Illnesses

Some researchers utilized both SM and SMS strategies in their chronic illness studies. A review of systematic reviews on integrated care programs for chronically ill patients identified that common components for successful programs included SM and SMS interventions resulting in improved quality of care (Ouwens, Wollersheim, Hermens, Hulshar, & Grol, 2005).

Harvey et al. (2008) surveyed both patients and health care providers to evaluate a variety of SM education and SMS options for patients with diabetes, cardiovascular disease, and arthritis. Results revealed that both provider and patient self-reports noted increased patient knowledge and ability for SM. As well, Allen (2008) used the principles of self-management to engage and empower patients to collaborate with their health care providers in managing their chronic state. Patients with chronic pain, depression, and impaired mobility developed increased active participation in their care

and improved patient-clinician partnerships towards better disease management. These studies included arthritis and chronic pain patients and considered both the primary variables of SM and SMS. However, further research is needed to elucidate the relationships of SM, SMS, and functional ablement in chronic low back pain patients.

Faul et al. (2009) conducted a quasi-experimental study that included a SM care plan intervention and telephone support for community-dwelling older adults. Although there were improvements in self-efficacy, self-rated health, functional state, physical mobility, mental health, and incidence of falls, the addition of a SMS intervention via telephone support did not demonstrate additional improvements. This stresses that telephone support alone cannot constitute the multifaceted strategies that exist in SMS.

Interesting findings were also noted in a RCT conducted by Crotty et al. (2009) on osteoarthritis patients. After a 6-week SM course with SMS strategies (individualized phone support and goal setting), modest improvements on health-directed behaviors and skill and technique acquisition for SM were noted, but no changes were found on pain, disability, quality of life, and depression outcomes. Damush et al. (2003) had more encouraging findings after a RCT on low back pain patients utilizing a SM program that is coupled with physician letters of support and telephone follow-ups. The intervention group noted decreased low back pain, less fear of physical activity and movement, improved anxiety and depression, and increased confidence in managing symptoms. However, these patients only included those with acute occurrence of their low back pain. The impact of similar interventions on chronic low back pain patients was not addressed.

Self-management, Self-management Support, and Chronic Low Back Pain

Crowe, Whitehead, Gagan, Baxter, and Panckhurst (2010) conducted a study evaluating chronic low back pain patient SM strategies and provider SMS roles. They found that most common patient SM strategies used were medications, exercise, and heat application. The main physiotherapists' strategy was exercise, and the primary general practitioner roles in SMS were prescribing pain medications, dispensing sickness certificates, and referral to specialists. This is the only published study found that included SM, SMS, and chronic low back pain pointing to the dearth of research in this area. There is a very apparent need to examine SM and SMS, their relationships to functional ability, and identify the mediating effect of SM on the relationship of SMS to functional ability in chronic low back pain patients.

Other Intervening Factors

There were also relevant concepts as follows that were considered due to their potential influence to the findings of this study.

Psychosocial Factors

As much as pain is a physical sensation, it is always subjective and highly influenced by social, cultural, and psychological factors (National Center for Health Statistics (NCHS, 2006). Socioeconomic and psychological components become flags and risk factors affecting low back pain and contribute to subsequent disability (Katz, 2006; Mallen, Peat, Thomas, Dunn, & Croft, 2007). The joint clinical practice guidelines for low back pain strongly recommended that adequate history and assessment of psychosocial risk factors be evaluated due to these patients' high risk for chronic disabling back pain (Chou et al., 2007). Although evaluating and understanding patient

psychosocial factors are important in any chronic illness, it is even more significant in chronic low back pain. Chronic low back pain waxes and wanes frequently. Pain perceptions differ based on the context of its occurrence in each individual with a high recurrence rate that is greatly disabling (Weiner & Nordin, 2010).

The National Institute of Arthritis and Musculoskeletal and Skin Diseases (NIAMS, 2009) highlighted socioeconomic factors relating to the management of back pain as an important area of research. As an example, an empirical study conducted by Ang et al. (2010) emphasized the need for a bio-psychosocial model of patient pain management due to the considerable impact of sociodemographic variables on pain-related outcomes. The bio-psychosocial model includes actions descriptive of SM and SMS (Weiner & Nordin). Patients seek support to meet their diverse needs (Sarkar et al., 2008) especially in SM. To reflect SMS, health care providers are also prompted to acknowledge the social determinants of health (psychosocial, economic, political) in the delivery of care (Lawn & Schoo, 2010). For this research study, the relevant psychosocial factors included mental health state and demographic variables

Mental Health State

Mental health state is associated with chronic pain and functional ablement. Mental illness among adults aged 18-44 years was the second leading cause of disability, the first one being arthritis or musculoskeletal conditions (NCHS, 2010). The estimated prevalence of depression in chronic pain patients is anywhere from ten to 83%; this wide variation is due to differences in patient demographic factors (Covington, 2007). Other major psychological concerns like anxiety and anger tend to amplify pain and result in a vicious cycle, each one aggravating the other (Covington).

vanWijk et al. (2008) looked at the psychological predictors of pain reduction after treatments for chronic low back pain patients and found that those with decreased sense of control, negative self-efficacy, and mental health disorders (i.e. high anxiety levels, disturbed mood, poor mental health) did not respond well to pain management. In a related group of patients, a systematic review of primary care studies by Mallen et al. (2007) noted that anxiety and/or depression were among major factors that affected the prognosis of patients with musculoskeletal pain. These emphasize the association of patients' mental health state in chronic low back pain management.

In a study of SM practices, Damush, Wu, Bair, Sutherland, and Kroenke (2008) noted that pain patients with clinical depression tend to exercise less, although those with higher levels of pain and depression actually utilized more cognitive strategies to manage their symptoms. Kroenke et al. (2009) also found that when there is optimal management with antidepressant therapy and a SM pain program, there were significant improvements noted in depressive symptoms as well as pain intensity and functional ability. These studies highlight the necessity of identifying the mental health state of chronic low back pain patients which was considered in this research study.

Demographic Variables

The incidence of low back pain is highest among young adults and the middle-aged group (BMUS, 2008). The NCHS (2006) noted that adults who are 45-64 years of age tend to report pain that lasted more than 24 hours, although 57% of older adults indicated that pain lasted for over a year. Among adults 20 years and above who reported pain, 42% said that pain lasted for more than a year (NCHS). Consequently, this

contributes to decreased work productivity, loss of wages, and high indirect health care costs.

Based on the most recent statistics from NCHS (2010) on low back pain, females reported low back pain more than males, and those of non-Hispanic white adult origin complained of low back pain more than other ethnicities. Those living in the west geographic region as well as those without high school diploma or GED also reported pain more than others. Financially, adults with much lower incomes also reported pain more than those with higher incomes. These variations in pain prevalence among different demographic factors are important to consider in SM and SMS in relation to disparities of care.

Summary of Review of Related Literature

The literature supports the significance of SM and SMS in chronic illness in general. An abundance of empirical literature prevails about SM in various chronic illnesses and a growing body of research on SMS exists. However, it was clear that some outcomes measured in various chronic illnesses did not show significant improvements. Significant SM outcomes were short-term especially from SM interventions that did not include SMS. The empirical literature review suggests the relevance of SMS intervention to facilitate positive SM outcomes and provides the rationale for the descriptive design with a mediational approach. It is hypothesized that SM mediates the relationship between SMS and functional ablement in patients with chronic low back pain.

The empirical literature review about SM found few studies focused upon chronic low back pain patients. SMS is an emerging concept in the evolving chronic care paradigm and a very early concept, yet to be clarified as it applies to patients with chronic

low back pain. Particularly, SMS interventions for this population are under development. Further, with current contrasting, conflicting, and varied results on the reduction of pain and disability in the previously reviewed studies, there is a strong need to examine the relationships of SM, SMS and functional ablement. It is possible that improving functional ablement is more challenging in patients with chronic illnesses like osteoarthritis due to the progressive degenerative nature of this condition that naturally occurs with age (Hellman & Imboden, 2009). In patients with chronic low back pain with conditions that are of largely nonspecific causes, these patients tend to respond well to the bio-psychosocial model in clinical care (Weiner & Nordin, 2010).

Although some studies discussed SM, SMS, and functional ablement, none explored the mechanism by which SM influenced the SMS-functional ablement relationship in chronic low back pain patients. The literature search did not find published studies that focused on the mediating influence of SM on the SMS-functional ablement relationship. It is important to understand whether SM impacts the relationship between SMS and functional ablement. This research study also examined the influence of SM and SMS on functional ablement in chronic low back pain patients. These areas are new to nursing science and to health care providers involved in the management of chronic low back pain patients.

Further, it is important to recognize that chronic nonmalignant low back pain is not just a symptom but a disease experience in itself. Understanding patients' perceptions about their SM, SMS, and functional ablement is necessary to provide a richer description and understanding into chronic low back pain. Although there were some qualitative studies on SM and chronic low back pain, these are still small in

number. No qualitative studies were found that focused on SMS and functional ablement in chronic low back pain.

It is quite remarkable that the current evidence-base for SM and SMS for chronic low back pain patients is largely lacking in the areas addressed in this research study. In evaluating current research and SM programs, Glasgow et al. (2008) noted that further studies on SM and support of SM are strongly needed because current evidence is insufficient and under-developed. This is even more prominent in chronic low back pain patients. This establishes the great need for this research study with a huge potential to contribute to nursing knowledge required for evidence-based practice in an area where management needs to be significantly improved. This research study sought to begin to address the gap in the knowledge and science of SM and SMS in chronic low back pain patients and their functional ablement.

CHAPTER III

METHODOLOGY

The three-fold purpose of this research study was to: (a) examine whether SM and SMS significantly influence functional ablement after controlling for mental health state and relevant demographic characteristics, (b) examine whether SM mediates the relationship of SMS and functional ablement in patients with chronic low back pain, and (c) describe the patient perceptions of their SM, SMS, and functional ablement. This chapter presents the research design, setting, population and sample, ethical considerations, measures, data collection procedures, and data analysis procedures. This chapter concludes with the study limitations.

Improving functional ablement through existing therapies remains inadequate. The resulting disability affects patients' quality of lives and their productivity, contributing to the alarming health care costs. In other chronic illnesses, studies on SM and more currently, SMS, have shown some success in improving outcomes such as positive health-directed behaviors, more symptom-free days, better quality of life (Pearson, Mattke, Shaw, Ridgely, & Wiseman, 2007). Although literature is beginning to explicate the nature of chronic care practices for patients with chronic low back pain, there remains limited understanding as to whether SM and SMS influence functional ablement in patients with chronic low back pain. Further, the role of SM in explaining the relationship of self-management support to functional ablement remains unknown.

The following research questions were answered in this study:

Research Question 1- What are the level of self-management, amount of perceived self-management support, mental health state, functional ablement score, and mean pain intensity in chronic low back pain patients?

Research Question 2- Does self-management significantly influence functional ablement in chronic low back pain patients after controlling for relevant covariates including mental health state?

Research Question 3- Does perceived self-management support significantly influence functional ablement in chronic low back pain patients after controlling for relevant covariates including mental health state?,

Research Question 4- Does self-management mediate perceived self-management support and functional ablement in patients with chronic low back pain?

Research Question 5- What do patients describe as: (a) ways they manage their chronic low back pain, (b) ways health care providers give patients support in chronic low back pain management, and (c) patient concerns about functional ablement?

Research Design

A non-experimental, cross-sectional descriptive design utilizing the mediation approach and qualitative content analysis addressed the study purposes and answered the research questions. This design examined the influence of selected variables on the outcome of functional ablement and descriptively characterized the participants' experiences and perceptions. Generating a rich and greater understanding, this design built a foundation for developing future interventions for chronic low back pain management and generated questions for future inquiry.

Methods

Mediation Approach

A mediator is a variable that accounts for the relation between an independent variable and an outcome. The mediator variable “represents the generative mechanism through which the focal independent variable is able to influence the dependent variable of interest” (Baron & Kenny, 1986, p. 1173). A variable functions as a mediator when the following conditions are met: (a) variations in the independent variable significantly account for variations in the mediator variable, (b) variations in the mediator significantly account for variations in the outcome, and (c) the addition of the mediator significantly decreases the previously significant relationship between the independent variable and the outcome after controlling for (a) and (b) (Baron & Kenny, 1986).

In this research study, the mediation approach consisted of a series of steps: (a) to examine whether the independent variable (SMS) significantly contributes to the outcome of functional ablement, (b) to examine whether SMS significantly contributes to the mediator (SM), (c) to examine whether SM significantly contributes to functional ablement, and (d) to examine whether SM mediates the SMS-functional ablement relationship. Figure 2 presents the mediation model in this study.

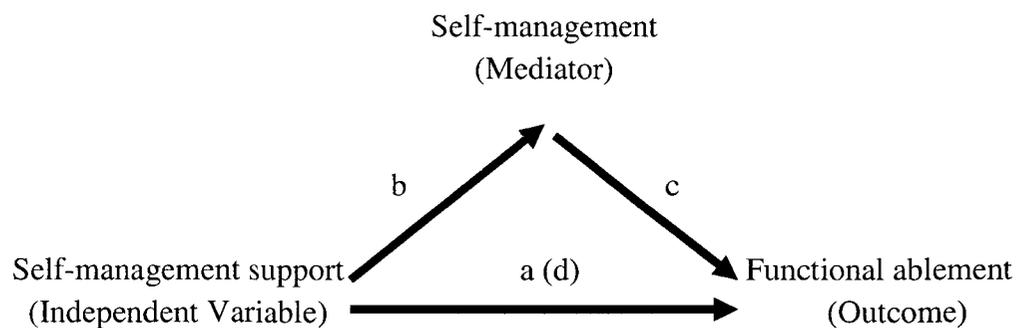


Figure 2. Mediation Model

The mediation process answered the first two purposes of this research study. The first three steps (a, b, c) necessary in testing mediation answered the first purpose, while the final step (d) answered the second purpose.

Qualitative Descriptive Approach

The qualitative descriptive approach incorporated in this quantitative study addressed the third research purpose. Qualitative description using qualitative content analysis presents a summary of information regarding a phenomena using everyday language (Sandelowski, 2000). There is no attempt to re-present or deeply interpret the data towards more abstract conceptualizations. Instead, a straight description of the data is performed leading to fundamental information relevant to the study (Sandelowski). The qualitative descriptive approach is derived mostly from the Naturalistic Inquiry based on the belief that the research process itself will present the data as if the phenomenon was not under study, hence the term “natural” (Lincoln & Guba, 1985).

The research design in this study cannot ascertain causality as determined in experimental designs. However, the research design is appropriate for the purpose of understanding a relatively new area of research in chronic low back pain. Previous research studies have minimally examined the three-way purpose in this study. The mediation approach examined the theoretical premise about the proposed mechanism by which SMS affects functional ablement. The qualitative findings provided groundwork for topics that need further detail according to patient perceptions and lay a foundation for future studies. Overall research findings have potential significance to building knowledge and improving practice in the clinical area. Findings can also be vital to

clinical decision-making processes with potential implications to effective and quality patient care (Portney & Watkins, 2009).

In the area of nursing and social sciences where some questions are not readily amenable to experimental studies, research experts proposed approaches to inferring causation like the mediation model (Sobel, 2000). Together with the qualitative findings, significant results in this research study can support a step towards conducting future research including an experimental design in the future. This study also stimulated additional scientific query into the nature of SM, SMS and nursing care models for chronic low back pain, as well as informed the design of potential collaborative research studies.

Procedures

Setting

This research study was conducted in two pain centers in the state of Nevada to allow for diversity, one is located in the city of Las Vegas (designated as Pain Center #1), and another in the city of Henderson (or Pain Center #2). These two cities may differ in some demographic variables like age, educational level, and income. Data will be examined, compared, and analyzed between the two settings to evaluate for any significant differences. The two pain centers are approximately 15 miles apart employing multimodal pain management, each consisting of a pain clinic, rehabilitation department (physical therapy, massage), diagnostic capabilities, and fully accredited, licensed, and Medicare-deemed surgery centers.

The primary medical staff in these two pain centers are board certified health care providers who rotate and see patients in both pain centers. No specific patients are seen

by only specific providers. There are four full time physicians with specialties in anesthesia and pain management. There are two full time, pain-specialty trained midlevel providers: a board certified nurse practitioner and a physician assistant. The centers also employ a part time board-certified nurse practitioner with an administrative role having less direct patient contact. In addition, patients are commonly in contact with nurses in the surgical areas, physical therapist in the rehabilitation department, as well as consulting providers in other facilities involved in pain management.

The health care providers in the two centers have similar pain management practices. The pain centers emphasize evidence-based practices and use of clinical guidelines primarily based on the standards set forth by the American Society of Anesthesiologists. These standards aid in decision-making practices in the evaluation and management of chronic low back pain patients. The health care providers also highly encourage patients to assume a key role and responsibility for their own care. The health care providers emphasize SM strategies which commonly include: adequate practice of health promotion activities (i.e. exercise, proper nutrition, stress management, coping skills), adherence to use of medications especially narcotics, close monitoring of pain levels, acquiring assistance as needed, and visiting primary health care and consulting providers as recommended.

The Chronic Care Model elements are evident in the philosophy and practice in both pain centers. Providers demonstrate SMS through adequate knowledge, culturally sensitive attitudes, and therapeutic communication skills. Providers partner with patients in planning, goal-setting, and problem-solving. Specifically, the health care providers provide pain-focused education and support through verbal, written, or online modalities,

encourage health-directed behaviors, tailor plans according to individual patient activation levels, perform close follow-ups and evaluations, provide community referrals and consults as needed, collaborate with other providers, and organize health care and documentation for safe, effective, efficient, and quality care.

The current pain management practices in both facilities provided a setting conducive to this research study. The multimodality and multidisciplinary set-up in both facilities could have been a potential weakness in carrying out this research owing to the very busy practice sites and presence of constant activities. However, the high patient flow actually facilitated sampling. Approximately, there was an average of ten patients per day seen in each center with chronic low back pain.

Population and Sample

The target population was adult patients with chronic low back pain who met the sample criteria and consented to participate in this research study. Inclusion criteria were: 18 years old and above, being a patient in the Las Vegas Pain Institute, having a doctor-diagnosed non-malignant chronic low back pain, and able to read, write, and understand English in order to answer the data collection tools. There were no exclusions based on gender, ethnicity, or other demographic variables. This study excluded patients complaining of acute pain from other conditions.

Power analysis calculation is necessary in estimating adequate sample size (Cohen, 1992; Portney & Watkins, 2009). Obtaining sufficient power needs consideration of several factors including the determination of effect size. A desirable source of effect size comes from evidence based on previous studies (Burns & Grove, 2009). Fairbank and Pynsent (2000) conducted a systematic review of studies that

utilized the Oswestry Disability Index as a measure for the outcome of functional ablement. Calculation of the effect sizes for the chronic low back pain population revealed a Cohen's d range from 0.59 to 1.5, medium to large (Cohen, 1992). In order to examine whether self-management mediates the relationship between self-management support and functional ablement, this power analysis will assume a medium effect size. Cohen noted that for multiple correlation tests which were employed in this research study, effect sizes (f^2) are small (0.02), medium (0.15), or large (0.35). Based on the least detectable effect size of 0.15 (medium using Cohen's f^2 classification), 92 participants was a sufficient sample size to detect statistical significance with power set at 0.80 and an alpha level of .01. The level of significance (alpha) was set at .01 to control for the possibility of inflated Type 1 error and power was set at .80 to control for the possibility of a Type 2 error. Given a 20% allowance in sampling for attrition or missing data, a total of 110 participants was the target sample size in this study.

Sampling was conducted through a nonprobability convenience method. This was a potential weakness due to lack of randomization although there was sufficient diversity in demographics from participants in both pain centers. A major strength in the sampling process was the moderate number of patients seen in the two facilities that facilitated ease in obtaining participants. There were no difficulties encountered during sampling. One participant changed her mind during data collection because of time constraints, while two participants were dropped from the list of participants because they did not in fact meet all of the inclusion criteria. In effect, a total of 110 participants were sampled, 58 from Pain Center #1 and 52 from Pain Center #2.

Ethical Considerations and Procedure

The Colorado Multiple Institutional Review Board (COMIRB) provided expedited review for the protection of human subjects. The research study was initiated after obtaining COMIRB approval and after the Medical Director of both facilities granted written approval for conduct this study (see Appendices B1 and B2). In addition, the health care providers and managers provided their verbal approval. All of the patients agreeing to participate were provided informed written consent that included authorization to use and release health information (see Appendix C). Patient signatures were obtained on the consent forms. Patient rights were protected during the conduct of this study.

Risks and benefits of study participation were carefully weighed by the researcher. Potential risks were mild anxiety in completing the pencil and paper survey measures. Otherwise, there were no anticipated risks beyond what is minimally expected in a clinic visit. The potential benefits from this research study were sense of satisfaction as a volunteer participant and the possibility of some increased self-awareness about self-management and self-management support. No unforeseen events occurred (i.e. extreme anxiety, panic, depression) during the completion of the surveys that required reporting to the patient's provider, Medical Director of the setting, COMIRB, and major advisor.

Measures

This research study required completion of two demographic surveys and four self-report instruments. The demographic surveys were in the form of a patient self-report survey (see Appendix D1) and a two-question form for the researcher to review medical records (see Appendix D2). The demographic surveys aided in describing the

sample. Review of medical records assisted in validating information regarding patients' comorbid conditions and pain management modalities.

The four study instruments were: (a) short form of the Patient Activation Measure (PAM), (b) Patient Assessment of Chronic Illness Care (PACIC), (c) Oswestry Disability Index (ODI) Version 2.1a, and (d) Mental Health Inventory (MHI-5) from the RAND Medical Outcomes Study: 36-Item Short Form Survey.

Patient Activation Measure

The Patient Activation Measure (PAM) is a self-report instrument that evaluates a broad range of elements involved in SM (Hibbard, Stockard, Mahoney, & Tusler, 2004). The measure includes knowledge, skills, beliefs, and behaviors that a patient needs in order to manage his/her chronic illness (Hibbard et al.). The PAM is a unidimensional, Guttman-like measure, with a 4-point Likert scale: strongly disagree, disagree, agree, and strongly agree (later scored from one to four points, respectively). It is structured developmentally in a hierarchical order with four stages: the first includes items on beliefs about the importance of the patient's primary role, the second includes confidence and knowledge about self-care, the third involves taking action, sustaining health care behaviors, and preventing further problems, and the last (highest activation) includes the ability to stay within course and maintain one's health even under stress (Hibbard et al.).

Conceptual validation of the PAM originated from a review of published articles relating to those items that patients need to successfully manage their chronic illness. Information from systematic consultations with experts and individuals with chronic illnesses assisted in conceptualizing items for the measure. The authors used the Rasch

psychometric method in developing and testing the PAM with values between .5 and 1.5 considered as acceptable. After a preliminary scale development and pilot survey, the instrument was refined to 22 items and then finally tested with a national sample of 1515 individuals (79% had at least one chronic condition, 25% had chronic pain, and 38% had arthritis) (Hibbard et al., 2004).

The infit values ranged from .71 to 1.44 with outfit statistics mostly ranging from .80 to 1.34. Reliability was stable in those without any chronic condition or across different chronic conditions (.9-.91), between different responses to self-rated health (.87 to .91), and among other variable demographic factors. Construct validity was evaluated through comparison with outcomes that are hypothesized to result from activation (Hibbard et al., 2004). The authors reported that patients with higher activation levels were found to have significantly better health as evidenced by the Short Form 8 Health Survey (SF-8) showing $r = .38$, $p < .001$. In addition, those with higher activation levels also performed health-directed behaviors more (i.e. exercised regularly, ate healthy food, did not smoke), utilized health care resources less (i.e. doctor visits), exercised more control over their health (less health fatalism), and performed disease-specific SM behaviors (i.e. arthritis patients performed more regular exercise) (Hibbard et al.).

In order to improve the feasibility of PAM and cause fewer burden to patients, the instrument was re-evaluated to reduce the number of items without loss of precision. This resulted to the short form 13-item PAM (Hibbard, Mahoney, Stockard, & Tusler, 2005). The authors performed a secondary data analysis on the previous sample used in the 22-item PAM. Using the Rasch method iteratively, items were deleted using similar benchmark infit values between .5 and 1.5 considered as adequate. The resulting infit

values were .92 to 1.05 and outfit values were .85 to 1.11. As with the 22-item PAM, the 13-item showed similar construct validity with preventive behaviors and disease-specific SM behaviors being strongly related with higher activation scores.

The 13-item PAM (short form) has satisfactory psychometric properties and the content items relate to evaluating SM (Appendix D3). Scoring involved adding all the raw scores (from one to four points for each of the 13 items) and converting these scores into a preset table of activation or SM scores ranging from 0 to 100, with 100 being the maximum score. The activation scores were divided into four specified cut-off points that correspond to SM levels in a hierarchical order: starting to take a role (Level 1), building confidence and knowledge (Level 2), taking action (Level 3), and maintaining behaviors (Level 4). Hibbard et al. (2005) did not indicate a completion time but the instrument format was reasonable. The directions were clear and understandable with usable scales and manageable length. Flesch-Kincaid readability test shows seventh grade level.

Patient Assessment of Chronic Illness Care

The Patient Assessment of Chronic Illness Care (PACIC) was developed to gather information congruent with the Chronic Care Model (CCM) regarding patient's perspectives on their chronic illness care over the past six months especially geared towards evaluating self-management support (Glasgow et al., 2005). It is a self-report instrument containing the following subscales: Patient Activation, Delivery System Design/Decision Support, Goal setting, Problem-Solving/Contextual Counseling, and Follow-up/Coordination. It is structured in a 5-point Likert scale format, numbered from

one to five and identified as none of the time, a little of the time, some of the time, most of the time, and always, respectively.

Glasgow et al. (2005) validated the content of the measure based on a national pool of experts in chronic illness care and the CCM. The authors initially pilot tested the PACIC to 130 patients, revised from 46 to 20 items, and then tested on 266 participants with one or more chronic illnesses. Arthritis was one of the most common chronic illnesses, followed by pain, and other chronic problems.

Glasgow, et al. (2005) documented a median subscale alpha of 0.84 (range = .77-.90) with .93 overall internal consistency. Stability of the instrument was tested after 12 weeks with an overall test-retest reliability of .58 (range = .47-.68). The authors also compared the PACIC to two instruments, the Ambulatory Care Experience Survey (ACES) and the 22-item PAM version. The ACES is a 47-item self-report instrument with 11 subscales and two domains (quality of physician patient-interactions and organizational features of care). The authors evaluated concurrent validity between subscales of these three instruments. There were moderate to strong correlations between the PACIC (ranges = .42-.60), selected ACES subscales, and the PAM, after controlling for age, gender and comorbidities (Glasgow et al.).

Glasgow et al. (2005) performed confirmatory factor analysis resulting to 20 items generally loading high on the five subscales previously noted. Five items loaded between .5 to .6, and the rest loaded over .70 with nine items greater than .8. Variance extracted ranged from .62-.74 with values over .5 considered adequate. For goodness of the fit, non-formed fit index was .87 and comparative fit index was .89 (Glasgow et al.).

The content items of the PACIC (Appendix D4) best relate and represent the essential variable of SMS. Due to the moderate to high intercorrelations between the subscales (0.49-0.80), Glasgow et al. (2005) recommended that it was best to interpret the overall PACIC score instead of the subscales. To obtain the overall PACIC score, all scores across the 20 items were averaged (from one to five) resulting to a maximum score of five. The authors did not specify the length of time for administration but it was reasonable given the simple presentation and formatting of the 20-item measure. Flesch-Kincaid readability test approaches sixth grade level.

Oswestry Disability Index

The Oswestry Disability Index (ODI) is highly recognized in the spine and pain research community as a strong, valid tool in measuring disability with a wide variety of applications (Fairbank & Pynsent, 2000). The ODI evaluates pain-related disability or the extent to which functional level is affected by disablement specifically in low back pain patients (Fairbank, Couper, Davies, & O'Brien, 1980). The target population includes acute, subacute, and chronic back pain conditions. It was initially developed in 1976, published in 1980 as a self-report instrument, and it continues to be a valuable and principal condition-specific outcome measure in spinal disorders (Fairbank & Pynsent).

The most current version is the ODI Version 2.1a which contains 10 sections with six statements each. The sections concern impairments like pain intensity, and abilities like personal care, lifting, walking, sitting, standing, sleeping, sex life (if applicable), social life, and traveling, all of which allowing evaluation of impact to activities of daily living. For each section, subjects chose the statement that best described their status, scored from zero to five, with higher values indicating more severe impact. Each

category is ordinal but these were converted to quantitative data by summation (dimensional scales) (Fairbank & Pynsent, 2000).

The experiences and expertise of the authors led to the content development of the ODI (Fairbank et al., 1980). The authors tested the measure on 25 low back pain patients and reported a very high test-retest reliability ($r = .99$) although patients were retested in 24 hours. More current and comprehensive information about the psychometric properties of the ODI came from Fairbank and Pynsent (2000) who reviewed subsequent versions of the instrument used in several studies. Fairbank and Pynsent reported a test retest reliability of $r = .83$ after one week. Internal consistency published in various studies ranged from .71 to .87. The receiver operating characteristic (ROC) index was acceptable at 0.76, indicating the ability of the ODI to detect change. The ODI Version 2.1a is the most recent version recommended for use after word changes to enhance clarity.

ODI was validated with several instruments including the Short Form (SF) 36, McGill Pain Questionnaire, and the visual analogue scale with moderate correlations showing $r = .62$. Concurrent validity with the Roland-Morris Questionnaire, another common disability and health status instrument showed strong correlation, $r = .77$ (Fairbank & Pynsent, 2000).

The items in the ODI Version 2.1a (Appendix D5) are consistent with the definition of functional ablement in this research study. It includes an item on pain intensity and activities of daily living, and it is specific to patients with low back pain compared to other instruments measuring disability, functional ability, or general quality of life. For scoring, all of the raw scores (zero to five) for each of the 10 items were

added, the sum was divided by 50, then multiplied by 100%. Cut-off points were as follows: 0-20% (minimal disability), 21-40% (moderate disability), 41-60% (severe disability), 61-80% (crippled), and 81-100% (bedbound or exaggerated symptoms). Completion time was less than 5 minutes. Flesch-Kincaid readability test is at fourth grade level.

Mental Health Inventory

The RAND Medical Outcomes Study: 36-Item Short Form Survey, developed as part of the national health insurance study, resulted to the derivation of the Mental Health Inventory (MHI-5) (Veit & Ware, 1983). The MHI-5 is a 5-item self-administered questionnaire that evaluates the positive and negative aspects of mental health state from psychological well-being to distress. Questions reflecting positive affect, anxiety, and depression were included. The MHI-5 is structured in a 6-point likert scale format: all of the time, most of the time, a good bit of the time, some of the time, a little of the time, none of the time.

The content of the MHI was based primarily on the General Well-Being Schedule developed in the early 1970's to measure psychological distress and well-being constructs including anxiety, depression, loss of emotional control, general positive affect and emotional ties (Veit & Ware, 1983). There were thirty-eight items tested on a representative sample of 5089 respondents in the RAND Health Insurance Experiment. Exploratory and confirmatory factor analyses determined that items measuring anxiety, depression, and loss of emotional control correlated highest with the psychological distress factor. On the other hand, items measuring positive affect and emotional ties correlated most with the psychological well-being factor. Cross-validation and

combined-sites analyses led to the conclusion that the MHI contained a large mental health factor where a single summated score was able to delineate psychological distress from well-being. The MHI is a hierarchical factor model composed of two factors that are both unipolar in nature (Veit & Ware).

The reliability scores for the 38-item MHI were .83 to .91 for the lower order scales, .92 to .96 for the higher order scales, and .96 for the overall MHI score. The stability coefficient was .56 to .64, with .64 as the overall score over a 1-year interval testing 3525 respondents.

Due to the increasing need to decrease respondent burden, authors of the MHI developed a 5-item version based on single items best representing the total score of the longer version (Berwick et al., 1991). The MHI-5 had overall .82 reliability, ranging from .66-.90 for the five items. Berwick et al. compared the MHI-5 to three common mental health screening questionnaires: 18-item MHI, 30-item General Health Questionnaire (GHQ) version, and 28-item Somatic Symptom Inventory (SSI). The authors found that the MHI-5 was superior to the SSI and comparable to the 18-item MHI and the GHQ in detecting anxiety, depression, and any Diagnostic Interview Schedule (DIS) disorder. The DIS was a diagnostic gold standard in the psychological assessment of various mental disorders (Berwick et al.).

Based on the excellent detection capabilities of the MHI-5, Berwick et al. (1991) also applied the receiver operating curve (ROC) method to the individual items in the MHI-5 to identify how well the items delineated individuals with psychological distress or psychological well-being. They found that each of the five items were able to provide diagnostic information on any DIS disorder, affective disorder, anxiety, and depression.

The one specific item, “feeling downhearted and blue” was most significant in detecting major depression. This single item had an area under the curve (AUC) value of .840. The overall AUC value for MHI-5 was .897, while AUC was .739 for anxiety disorders and .892 for major depression. The cutoff score used was 16/17 based on the response frame for each item. Berwick et al. highly recommended the use of the MHI-5 as an effective screening tool especially to facilitate efficient completion of the measure compared to much longer tools with similar psychometric properties.

The MHI-5 (Appendix D6) has well-documented reliability and validity, it is practical for use in chronic low back pain patients, and it is a very brief addition to allow evaluation of the mental component necessary for consideration in this research study. For scoring, each choice in the 5-item MHI was scored from one to six with reverse scoring necessary for the questions asking about “Have you felt calm and peaceful?” and “Have you been a happy person?” Item scores were transformed into a prescribed common metric ranging from 0-100 and then transformed scores were averaged based on the five items. A possible average score of one to 100 results, with 100 as the highest and most favorable mental health state. Kelly, Dunstan, Lloyd, & Fone (2008) compared different methods of evaluating cutpoints for the MHI-5 and other psychiatric screening tools. They documented an optimal cutpoint of 60 based on the method of minimizing misclassification rate especially for purposes of identifying cases in a given sample. Scores at or under 60 point to psychological distress, while scores above this cutpoint direct towards a better psychological state or well-being. The researcher used the cutpoint of 60. Completion time for the MHI-5 was less than five minutes. Flesch-Kincaid readability test approaches fourth grade level.

Open-ended Questions

In order to gather information beyond pre-set answers in the measures, three open-ended questions were included to gather patient perceptions relevant to this research study. The questions were: (a) What are ways you manage your chronic low back pain?, (b) What are ways your health care providers give you support in your management of your chronic low back pain?, and (c) What are your concerns about your functional ablement (ability)? The first open-ended question was added after the self-management measure (PAM), the second question was added after the self-management support measure (PACIC), and the third question was added after the functional ablement measure (ODI). Discovering the “what” is a typical fundamental direction in data collection for qualitative description (Sandelowski, 2000).

Summary

The four measures have previously acceptable documented reliability and validity results for the purpose of this research study. The reliability coefficients after using the measures in this study are as follows: Patient Activation Measure (PAM) for SM (.91), Patient Assessment of Chronic Illness Care (PACIC) for SMS (.95), Oswestry Disability Index (ODI) for functional ablement (.86), Mental Health Inventory (MHI) for mental health state (.80). All results are acceptable supporting reliability of the measures in this study. Values above .75 indicate good reliability (Portney & Watkins, 2009).

The addition of the open-ended questions provided rich qualitative data to add to the relevant findings in this study. While five measures (including the demographic survey) might be burdensome to chronic pain patients, these instruments are generally

brief, simple, and easy to complete. It took approximately an average of 20 minutes for the participants to complete all study measures.

There are very minimal published studies to date utilizing the PAM and none with the PACIC dedicated specifically to chronic low back pain patients. However, the development of these instruments included content items from patients with chronic pain. The items contained in all of the instruments are applicable to chronic low back pain patients and consistent with the definition of the variables under study measuring the intended construct. The researcher evaluated the reliability of these instruments through statistical analysis of Cronbach's alpha.

Data Collection

A complete Data Collection Protocol (Appendix E1) outlined the specific processes for consistent data collection. All of the steps in the data collection protocol were followed. A Data Collection Form (Appendix E2) documented and tracked the completed surveys received. All raw data will be stored and secured for seven years, including consent forms stored in a locked file cabinet at the researcher's personal office. For recruitment, advertisement flyers (see Appendix E3 and E4) were posted in both centers after COMIRB approval and prior to data collection to increase the number of participants for this research study. Copies of the flyers (E3) were given to patients coming into the pain centers for their clinic visits to aid in recruitment.

Data Analysis

This research study utilized a codebook to define and label variables. Raw data were checked for errors before entering into a data file. Recoding was performed for some demographic variables (i.e. number of medical conditions) to make the information

amenable to statistical analysis. Reverse scoring was also performed for two items in the Mental Health Inventory as previously noted.

Data were entered into a secured computer for analysis using the software, Statistical Package for the Social Sciences (SPSS). Descriptive statistics were initially run (i.e. minimum, maximum, mean, standard deviation) to identify data entry errors and the amount of missing data for consideration. No data entry errors and very minimal missing data were noted.

Pre-analysis Data Screening

Screening data prior to analysis is a necessary step to enhance accuracy of the study findings. Pre-analysis was conducted and involved evaluation of missing data, identification of outliers, as well as evaluation of the assumptions of normality, linearity, and homoscedasticity or homogeneity of variance.

The pattern of missing data is more crucial than the amount of missing data (Tabachnick & Fidell, 1996). If missing data is not randomly scattered throughout a data set, accuracy of subsequent analysis can be questionable. To evaluate whether missing data is random, dummy coding allows for comparison of participants with missing data and those with values on a given item (Mertler & Vannatta, 2002). Independent samples t test can determine any significant mean differences between these two groups which indicates a relevant pattern in the missing data. If a pattern is identified and there are only a few cases with missing data, these cases are deleted from the data file without compromising adequacy of the sample size. If there are more than 5% cases that are missing, statistical calculation and replacement of the means are appropriate for quantitative data while recoding for additional categories are suitable for categorical

variables (Mertler & Vannatta). For large number of cases with missing data that are significant, multiple imputation (MI) is also recommended using the NORM software appropriate for continuous data (Schafer, 1999). MI involves numerous simulated statistical analytic processes predicting missing values using existing values from other variables (Rubin, 1987). MI ultimately produces an overall multiple imputed data set that incorporates the variability in the original data (Rubin).

Another important reason for screening is due to outliers. These extreme scores can distort statistical data. Review of stem-and-leaf plots and boxplots assisted in inspecting for outliers or extreme scores. If necessary, outliers are eliminated or transformed. Performing data transformation is also a consideration in order to enhance normality if the extreme values are relevant and maintained in the analysis.

A basic assumption evaluated during pre-analysis screening of data is normality. Distribution, skewness and kurtosis were evaluated. Histograms and normal probability plots (Q-Q plots) were also helpful in evaluating for normal distribution of scores including the Shapiro-Wilks test for normality. If the data does not meet normality, data transformation is a recommendation based on the extent of deviation from normal in the original raw data. A square root transformation is applicable for moderate deviations, more substantial deviations may necessitate a log transformation, while an inverse transformation is appropriate for data that is severely deviated from normal (Mertler & Vannatta, 2002).

Evaluating for linearity is also necessary as a second basic assumption prior to data analysis in this study to minimize errors in statistical decision making. Linearity assumes that there is a straight-line relationship between two variables (Mertler &

Vannatta, 2002). Elliptical bivariate scatterplots indicate linearity. A less subjective determination is the examination of residual plots. If the standardized residual values plotted against predicted values cluster around the horizontal zero line in a rectangular pattern, the data does not violate the linearity assumption.

Another basic assumption in data analysis is homoscedasticity. Homoscedasticity occurs when the variability in scores for one continuous variable is roughly consistent at all values of another continuous variable (Mertler & Vannatta, 2002). Typically, if there is multivariate normality, then the two variables are homoscedastic (Tabachnick & Fidell, 1996). Other than evaluating bivariate scatterplots, assessing for homoscedasticity includes using the Levene's test of homogeneity of variance which is appropriate in univariate analysis. If there is no significance (p is not $< .05$), homogeneity of variances exists.

Demographic Variables

The researcher examined demographic information through descriptive statistics (i.e. percentages for dichotomous variables, means, standard deviations, variance, and range for continuous data). Demographic similarities or differences were assessed between the two pain centers using t-tests for interval level variables and chi-square for nominal level variables. Any demographics that differed significantly between the two pain centers were evaluated.

Research Questions and Data Analysis

Five research questions guided this study. Each question and the accompanying analysis strategy are described. The first research question was, "What are the: (a) level of self-management, (b) amount of perceived self-management support, (c) mental health

state, (d) functional ablement score, and (e) mean pain intensity in chronic low back pain patients?” Descriptive statistics (means, standard deviations, variance, and range) answered this research question.

The second research question was, “Does self-management significantly influence functional ablement in chronic low back pain patients after controlling for relevant covariates including mental health state?” Potential demographical covariates were age, sex, ethnicity, race, level of educational attainment, income, duration of chronic low back pain, overall health, social support, and number of chronic medical conditions. General Linear Modeling utilizing regression analysis was conducted to explore the influence of the covariates to functional ablement. Any demographic variable (including mental health state) with significant influence to the outcome of functional ablement was added as a covariate during the final analysis. Level of significance for this exploratory phase was set at 0.10, a larger p value to prevent accidentally excluding a variable that might be meaningful.

Once the relevant covariates were identified, the data were analyzed further through general linear modeling using regression through univariate analysis of variance in SPSS in a similar manner to the hierarchical regression technique. The latter is more amenable to quantitative variables while the former accommodates categorical variables without the necessity of dummy coding. The relevant covariates were entered first into the model followed by the SM scores. The final model indicated whether SM significantly influenced functional ablement. Level of significance was set at $p < .05$.

The third research question was, “Does perceived self-management support significantly influence functional ablement in chronic low back pain patients after

controlling for relevant covariates including mental health state?” Potential demographical covariates were age, sex, ethnicity, race, level of educational attainment, income, duration of chronic low back pain, overall health, social support, and number of chronic medical conditions. This question was answered similar to the second research question. Utilizing general linear modeling with regression analysis, the relevant covariates were identified and controlled. The relevant covariates were entered first into the model followed by perceived SMS scores. The final model indicated whether SMS significantly influenced functional ablement. Level of significance was set at $p < .05$.

The fourth research question was, “Does self-management mediate perceived self-management support and functional ablement in patients with chronic low back pain?” Mediation analysis recommended by Baron and Kenny (1986) was used to answer this research question through the following: (a) regressing functional ablement on perceived SMS, (b) regressing SM on perceived SMS, and (c) regressing functional ablement on both SM and perceived SMS. Regressing functional ablement on SM was answered by the second research question. Findings from the third research question answered the first regression problem. Similar to the second and third research questions, the second regression problem was evaluated through general linear modeling to identify and control for relevant covariates. Relevant covariates influencing SM were entered first into the model, followed by perceived SMS scores. The final model indicated whether SMS significantly influenced SM. Level of significance was set at $p < .05$. Multicollinearity is expected in mediation analysis because the independent variable (SMS) is assumed to cause the mediator (SM), so these two variables should be correlated (Baron & Kenny).

All regression analyses results should be significant to identify mediation (Baron & Kenny, 1986). If the influence of perceived SMS on functional ablement is decreased to zero with the addition of SM to the equation, then there is complete mediation. If the perceived SMS/functional ablement relationship remained significant, although decreased, this indicates that SM only partially mediates this relationship. Level of significance was set at $p < .05$.

Formal testing of indirect effect is recommended as essential in mediation analyses (Preacher & Hayes, 2004). The Sobel test has been recommended as an appropriate significance test for the indirect effect of the independent variable (SMS) on the outcome (functional ablement) through the mediator (SM) (Baron & Kenny, 1986). Bootstrapping is also considered since this technique does not carry normal distribution assumptions and it is appropriate for small sample sizes.

The fifth research question was, “What do patients describe as: (a) ways they manage their chronic low back pain, (b) ways health care providers give patients support in chronic low back pain management, and (c) patient concerns about functional ablement?” The strategy of choice for data analysis in qualitative description is qualitative content analysis (Sandelowski, 2000). The goal in qualitative content analysis is to summarize the information staying very close to the data gathered and the words used by the participants. There is no attempt at re-presentation of the phenomena and interpretation is low-inference (Sandelowski, 2000).

Data were systematically coded assigning specific names based on information derived from the responses to the open-ended questions. These codes were modified as new data and insights were gathered from the participants’ responses in the open-ended

questions from the surveys during the course of the analysis to allow for best fit. Every effort was conducted to stay close to the essence of the data in identifying the codes. Recurrent patterns and regularities were examined, compared, and combined into themes which are broader categories that represent the topic under study. Once qualitative content analysis was completed, the essence of the qualitative description resulted to the significant themes that emerged.

Methodological rigor in qualitative description is supported through descriptive and interpretive validity (Sandelowski, 2000). Descriptive validity refers to accuracy in describing information that most participants will agree to be true, while interpretive validity refers to the accuracy in describing meanings (although low-inference) that the participants will agree to be true. The researcher continually evaluated for methodological rigor and examined for congruence and confirmability as information was gathered from the participants.

Summary

The study design was non-experimental, cross-sectional, and descriptive, utilizing a mediation approach, with supplemented qualitative data. This design addressed the threefold purpose and the specific research questions. This study was conducted at two pain centers in the state of Nevada after obtaining IRB approval. The inclusion criteria were met and 110 participants gave their informed consents. The demographic surveys and four study measures having acceptable validity and reliability were completed. Data were collected following the specified protocol. Descriptive statistics, general linear modeling using regression technique, and mediation analysis were conducted for data

analysis. Lastly, the supplemental qualitative information was analyzed using qualitative content analysis most appropriate for qualitative description.

CHAPTER IV

RESULTS

The purpose of this study was threefold: (a) to examine whether self-management (SM) and self-management support (SMS) significantly influence functional ablement, after controlling for mental health state and demographic characteristics (age, sex, ethnicity, race, educational attainment, income, duration of chronic low back pain, overall health, social support, and number of medical conditions), (b) to examine whether SM mediates the relationship of SMS and functional ablement in patients with chronic low back pain, and (c) to describe patient perceptions of their SM, SMS, and functional ablement.

This study aimed to address the research purposes through a non-experimental, cross-sectional, descriptive design utilizing the mediation approach to examine SM, SMS, and functional ablement in chronic low back pain patients, and determine whether SM mediates the relationship between SMS and functional ablement. Qualitative data analysis was performed to understand the perceptions of patients on their SM, SMS, and functional ablement. This chapter presents the results of the data analyses.

Participants

Using non-probability convenience sampling, a total of 113 participants gave their informed consent and responded to the survey measures. One participant from Pain Center #1 and another from Pain Center #2 were deleted from the sample because they did not meet the inclusion criteria. One other participant from Pain Center #2 changed her mind and did not complete a majority of the survey packet. This resulted to the final sample of 110 participants which met the targeted enrollment based on the study power

analysis estimate. Fifty eight (58) participants were from Pain Center #1 (53%) and 52 participants were from Pain Center #2 (47%). Approximately, six participants from each location refused to participate. There were no recruitment issues or unexpected adverse events during the research process. The COMIRB-approved protocol was followed without any problems during the data collection period.

Pre-analysis Data Screening

Pre-analysis screening was conducted. Generally, there were less than 3% missing values on all of the variables. Most variables had 0-1% missing data. Missing data occurred randomly without any consistency. Since there was an extraordinarily small number of missing values, data were replaced with either the most common response for categorical variables or the mean for continuous variables (Mertler & Vannatta, 2002).

Only one outlier with an extreme score for age was noted from evaluation of the stem-and-leaf plots and box plots but was retained since the outlier variable was not influential for the measured variables. Histograms and normal probability plots (Q-Q plots) were helpful in evaluating for normal distribution of scores. The variables length of time with chronic low back pain, MHI score, and PAM activation score were not normally distributed (Shapiro-Wilks test $<.05$). However, skewness and kurtosis measurements were not out of range for these variables, hence adjustment by data transformation was not necessary (Mertler & Vannatta, 2002). Assumptions of linearity and homoscedasticity will be discussed under research questions #2 and #3.

Participant Characteristics

The demographic data ($N = 110$) were analyzed using descriptive statistics and frequencies (i.e. percentages for dichotomous variables, and means, standard deviations, variance, and range for continuous data). Table 1 presents the demographic profile data of gender and marital status. The sample was comprised of 41% males and 59% females. Majority of participants were married (44%), with 40% being single/separated/divorced.

Table 1

Demographic Profile: Gender and Marital Status

Demographic variables	Pain center #1		Pain center #2		Total	
	<i>N</i>	%	<i>N</i>	%	<i>N</i>	%
Gender						
Male	21	19.1	24	21.8	45	40.9
Female	37	33.6	28	25.5	65	59.1
Marital status						
Never married	14	12.7	1	0.9	15	13.6
Currently married	17	15.5	31	28.2	48	43.6
Widowed	3	2.7	4	3.6	7	6.4
Living with partner	6	5.5	5	4.5	11	10.0
Separated	6	5.5	5	4.5	11	10.0
Divorced	11	10.0	6	5.5	17	15.5
Other	1	0.9	0	0.0	1	0.9

Table 2 presents the demographic profile data of ethnicity and race. Majority of the participants were non-Hispanics with only 16% having Hispanic, Spanish, or Latin origin, 70% were Caucasians, and 16% were African Americans. All participants could speak and read English.

Table 2

Demographic Profile: Ethnicity and Race

Demographic Variables	Pain center #1		Pain center #2		Total	
	<i>N</i>	%	<i>N</i>	%	<i>N</i>	%
Hispanic, Spanish, Latin origin						
Yes	11	10	7	6.4	18	16.4
No	47	42.7	45	40.9	92	83.6
Race						
White/Caucasian	34	30.9	43	39.1	77	70.0
Black/African American	13	11.8	5	4.5	18	16.4
American Indian/Alaskan Native	1	0.9	0	0.0	1	0.9
Native Hawaiian/Pacific Islander	0	0.0	0	0.0	0	0.0
Asian	0	0.0	1	0.9	1	0.9
Other	10	9.1	3	2.7	13	11.8

Table 3 includes description of educational level, employment status, and household income. The participants were well educated with 58% having attained some college/trade or higher. High school completers comprised 23% of the participants, while 19% completed less than a high school degree. Forty three percent (43%) indicated that

they were disabled and unable to work, 18% worked full time, 5% worked part time, 17% were unemployed, and 12 % were retired. Over one third of the participants (37%) had an annual household income under \$15, 000, while 34% had an income falling within \$15,000 to \$49,999. Other participants (23%) indicated that their income fell in the range of \$50,000 to \$99,999. Only 6% had an income of \$100,000 and above.

Table 3

Demographic Profile: Education, Employment, and Income

Demographic variables	Pain center #1		Pain center #2		Total	
	N	%	N	%	N	%
Highest grade level completed						
Less than high school graduate	17	15.5	4	3.6	21	19.1
High school graduate	14	12.7	11	10.0	25	22.7
Some college or trade school	23	20.9	22	20.0	45	40.9
College graduate or more	4	3.6	12	10.9	16	14.5
Higher than college graduate	0	0.0	3	2.7	3	2.7
Employment status						
Full time	10	9.1	10	9.1	20	18.2
Part time	3	2.7	3	2.7	6	5.5
Unemployed	11	10.0	8	7.3	19	17.3
Retired	3	2.7	10	9.1	13	11.8
Disabled, unable to work	29	26.4	18	16.4	47	42.7
Full time homemaker	2	1.8	2	1.8	4	3.6

Table 3 continued

Student	0	0.0	1	0.9	1	0.9
Annual net household income						
> 15,000	31	28.2	10	9.1	41	37.3
15,000 – 24,999	9	8.2	7	6.4	16	14.5
25,000 – 34,999	6	5.5	7	6.4	13	11.8
35,000 – 49,999	3	2.7	5	4.5	8	7.3
50,000 – 74,999	7	6.4	9	8.2	16	14.5
75,000 – 99,999	1	0.9	8	7.3	9	8.2
100,000 or more	1	0.9	6	5.5	7	6.4

Table 4 presents health insurance information and adequacy of health insurance for the participants. Majority (89%) had healthcare insurance with 15% noting that they do not have much to little health insurance coverage for their chronic low back pain, while 78% responded that they had a good amount to a great deal of coverage.

Description of pain management support from health care providers and from other sources is displayed in Table 5. Fifty eight percent (58%) of the participants indicated that their previous pain management were not much helpful to a little helpful, while 42% responded that their previous pain management helped a good amount to a great deal. For helpfulness of current pain management, 30% noted not much to a little, while 70% indicated that their current pain management helped a good amount to a great deal. In terms of support received from other than healthcare providers for their chronic

low back pain, a total of 61% noted that they did not have much or received a little, while 39% received a good amount to a great deal of support.

Table 4

Demographic Profile: Health Insurance

Demographic variables	Pain center #1		Pain center #2		Total	
	<i>N</i>	%	<i>N</i>	%	<i>N</i>	%
Health care insurance						
Yes	50	45.5	48	43.6	98	89.1
No	8	7.3	4	3.6	12	10.9
Adequate insurance coverage						
Not much at all	3	2.7	3	2.7	6	5.5
A little	8	7.3	2	1.8	10	9.1
Not applicable	5	4.5	3	2.7	8	7.3
A good amount	26	23.6	20	18.2	46	41.8
A great deal	16	14.5	24	21.8	40	36.4

Table 6 shows the overall health of the participants as they perceived and the importance of religion or spirituality to themselves. Seventeen percent (17%) rated their current overall health to be poor, 33% fair, 37% good, 10% very good, and only 3% excellent. Thirty five percent (35%) of the participants responded that religion or spirituality had minimal importance in their lives (15.5% not much at all, 19.1 % a little), 23% felt these to be of good significance, and 43% acknowledged that religion or spirituality had a great deal of importance.

Table 5

Pain Management Support

Demographic variables	Pain center #1		Pain center #2		Total	
	<i>N</i>	%	<i>N</i>	%	<i>N</i>	%
Helpfulness of previous pain management modalities						
Not much at all	15	13.6	14	12.7	29	26.4
A little	17	15.5	18	16.4	35	31.8
A good amount	20	18.2	14	12.7	34	30.9
A great deal	6	5.5	6	5.5	12	10.9
Helpfulness of current pain management modalities						
Not much at all	3	2.7	5	4.5	8	7.3
A little	12	10.9	13	11.8	25	22.7
A good amount	29	26.4	20	18.2	49	44.5
A great deal	14	12.7	14	12.7	28	25.5
Support from other than health care providers						
Not much at all	18	16.4	12	10.9	30	27.3
A little	23	20.9	14	12.7	37	33.6
A good amount	9	8.2	17	15.5	26	23.6
A great deal	8	7.3	9	8.2	17	15.5

Table 6

Overall Health and Importance of Religion or Spirituality

Demographic variables	Pain center #1		Pain center #2		Total	
	<i>N</i>	%	<i>N</i>	%	<i>N</i>	%
Overall health						
Poor	13	11.8	6	5.5	19	17.3
Fair	20	18.2	16	14.5	36	32.7
Good	19	17.3	22	20.0	41	37.3
Very good	4	3.6	7	6.4	11	10.0
Excellent	2	1.8	1	0.9	3	2.7
Religion or spirituality						
Not much at all	9	8.2	8	7.3	17	15.5
A little	12	10.9	9	8.2	21	19.1
A good amount	16	14.5	9	8.2	25	22.7
A great deal	21	19.1	26	23.6	47	42.7

The demographic data for the quantitative demographic variables are displayed in Table 7. Participants ranged in age from 19-85 years with a mean age of 47. Overall, most of the participants (30%) were in the 45-54 age category. The length of time the participants experienced chronic low back pain ranged from three months to 50 years with a mean of 10.8 years. Participants utilized an average of five pain management modalities, the minimum being zero and the most being 15. Mean medical conditions ranged from zero to 17 with a mean of almost four (3.75) other chronic illnesses.

Table 7

Demographic Data for Quantitative Demographic Variables (N = 110)

Variables	Min	Max	Mean	SD
Age	19.00	86	47.12	13.61
Years of chronic low back pain	0.25	50	10.88	10.58
Pain management modalities	0.0	15	5.03	3.33
Medical conditions total	0.0	17	3.75	3.06

Note. Min = minimum. Max = maximum.

To summarize the demographic data, more participants were female (59%), married (44%), and in the age range between 45 to 54 years (30%), with a mean age of 47. Majority were Caucasian (70%) with non-Hispanic origin (84%). Over half of the participants (58%) attended some college/trade or higher, but many were not employed (72%), and over one third (37%) have an annual household income under \$15,000. Despite these, majority (89%) had health insurance that provided adequate coverage to their chronic low back pain management.

A great majority of the participants (70%) felt that their current pain management helped their chronic low back pain compared to only 42% who indicated that their previous pain management helped. Over half of the participants (61%) felt that they did not have much support for their chronic low back pain from their families, friends, or significant others. Participants experienced chronic low back pain with a mean of 10.8 years, utilizing an average of five pain management modalities of which will be further described in the qualitative data results of this study. Fifty percent (50%) felt that their overall health ranged from good to excellent with a mean of four other chronic illnesses.

Lastly, most (65.4%) participants felt that religion or spirituality were important in their lives.

Comparison between the Two Pain Centers

Since participants were recruited from two settings, group statistics were identified for both pain centers for all quantitative data comparing mean scores. T-test was calculated to identify demographic characteristics and survey scores that differed significantly between the two pain centers. Based on the independent samples test for the quantitative variables, only age was statistically different between the two pain centers (see Table 8). Pain Center #1 had a younger population while Pain Center #2 had an older population. This is consistent with the demographic profile for age in the Pain Center #2 setting that caters to more retirees. The MHI score also demonstrated a trend toward achieving significance with Pain Center #2 having a higher MHI score.

Categorical comparisons were also performed between the two locations using Chi-Square statistics to evaluate significant differences among the non-quantitative variables. As shown in Table 9, race, education, income, and marital status differed significantly for the two locations. Caucasians were higher in number in Pain Center #2 (83%) than in Pain Center #1 (59%). More African American participants were noted from Pain Center #1 (22%) than in Pain Center #2 (10%). A considerable amount of participants (71%) attained some college/trade or higher at Pain Center #2 compared to 47% at Pain Center #1. Those with income of \$50,000 or more were also greater in number from Pain Center #2 (44%) than in Pain Center #1 (15%). Lastly, there were more participants who were not married or living with a partner in Pain Center #1 (59%) than in Pain Center #2 (31%).

In summary, only age differed significantly between the two locations for continuous variables, while race, education, income, and marital status differed for the categorical variables. More participants in Pain Center #2 were older, Caucasians, married, with a higher educational level, and income.

Table 8

Comparison of Mean Scores for Pain Center #1 (n = 58) and Pain Center #2 (n = 52)

Variables	Pain Center #1	Pain Center #2	Sig. (2-tailed)
	(n = 58)	(n = 52)	
	M (SD)	M (SD)	
Age	44.43 (13.48)	50.12 (13.25)	.028*
Years of chronic low back pain	9.76 (10.36)	12.13 (10.79)	.242
Pain management modalities	4.57 (3.05)	5.54 (3.57)	.128
Medical conditions total	3.76 (2.90)	3.75 (3.26)	.988
PAM activation score	58.32 (15.19)	62.02 (14.78)	.199
PACIC score	2.69 (0.99)	2.51 (1.00)	.341
MHI score	52.19 (15.54)	57.54 (12.35)	.050
ODI score	46.62 (19.27)	42.09 (15.10)	.176

Note. * = $p < .05$. PAM = Patient Activation Measure. PACIC = Patient Assessment of Chronic Illness Care. MHI = Mental Health Inventory. ODI = Oswestry Disability Index.

Table 8 compared the mean scores for all the quantitative variables in both locations while Table 9 performed the categorical comparisons to identify significant statistical differences.

Table 9

Statistical Summary of Categorical Demographic Variables for both Pain Centers

Variables	X^2	p-value
Gender	1.12	.289
Latin Origin	0.61	.434
Race	11.16	.025*
Education	17.06	.002*
Income	22.00	.001*
Health Insurance	1.07	.300
Adequate coverage	6.43	.169
Employment	8.11	.230
Helpfulness of previous pain management	0.80	.849
Helpfulness of current pain management	1.88	.598
Overall health rating	4.15	.387
Marital Status	20.47	.002*
Support	5.65	.130
Spirituality	2.66	.447

Note. X^2 = Chi-Square. * = $p < .05$.

Findings noted above are consistent with the demographic data in both cities where each pain center is located. In general, despite these differences between the two locations, no differences were seen in the other key variables. The analyses that follow were completed showing both locations as well as separately.

Research Study Questions

Research Question One: Mean SM, SMS, Mental Health State, Functional Ablement, and Pain Intensity Scores

The first research question was, “What are the: (a) level of self-management, (b) amount of perceived self-management support, (c) mental health state, (d) functional ablement score, and (e) mean pain intensity in chronic low back pain patients?” Table 10 documents the combined SM, SMS, mental health state, functional ablement, and pain intensity scores for both pain centers. Table 11 shows the same scores in each pain center.

Table 10

Combined Self-management (SM), Self-management Support (SMS), Mental Health, Functional Ablement (FA), and Pain Intensity Scores (n = 110)

Variables	Mean	SD	95% CI	
			Lower	Upper
PAM activation Score (SM)	60.06	15.04	57.22	62.91
PACIC score (SMS)	2.60	0.99	2.41	2.79
MHI score	54.72	14.31	52.01	57.42
ODI score (FA)	44.48	17.50	41.17	47.78
Pain intensity	2.55	1.15	2.34	2.77
Valid N (listwise)				

Note. CI= Confidence Interval. PAM = Patient Activation Measure. PACIC = Patient Assessment of Chronic Illness Care. MHI = Mental Health Inventory. ODI = Oswestry Disability Index.

Table 11

Self-management (SM), Self-management Support (SMS), Mental Health, Functional Ablement (FA), and Pain Intensity Scores for Pain Center #1 (n = 58) and Pain Center #2 (n = 52)

Variables	Pain Center #1 (n = 58)	Pain Center #2 (n = 52)
	M (SD)	M (SD)
PAM activation Score (SM)	58.32 (15.19)	62.02 (14.78)
PACIC score (SMS)	2.69 (0.99)	2.52 (1.00)
MHI score	52.19 (15.54)	57.54 (12.35)
ODI score (FA)	46.62 (19.28)	42.09 (15.10)
Pain intensity	2.81 (1.18)	2.25 (1.02)

Note. PAM = Patient Activation Measure. PACIC = Patient Assessment of Chronic Illness Care. MHI = Mental Health Inventory. ODI = Oswestry Disability Index.

Level of self-management. The mean SM score for both locations was 60 out of 100; Pain Center #1 had a mean of 58 and Pain Center #2 was 62. According to Hibbard, Mahoney, Stockard, & Tusler's (2005) four activation levels in SM, all of these scores belong to the third level of activation where participants are beginning to take action in self-management.

Amount of perceived self-management support. The mean SMS score for both locations was 2.6 with the highest possible score of five. Participants from Pain Center #1 perceived their SMS to be slightly higher at 2.7 while Pain Center #2 was slightly lower at 2.5. These reflect that participants generally felt that the level of SMS they received was midway between the minimum and maximum score.

Mental health state. The mean mental health state score for both locations was 55 with 100 being the highest possible score. Participants from Pain Center #1 indicated a lower mental health state of 52 while Pain Center #2 was higher at 58. These numbers were less than the established optimal cutpoint of 60 for this study. A score below 60 indicates more psychological distress (Kelly, Dunstan, Lloyd, & Fone, 2008).

Functional ablement score. The mean disablement (disability) score for both locations was 44 out of 100. The mean for Pain Center #1 was 47 while the mean for Pain Center #2 was 42. All of these values fall within the low range of severe disability category for the measure.

Mean pain intensity. The mean pain intensity score for both locations was 2.55 with a highest possible score of five. Participants from Pain Center #1 perceived higher pain intensity at 2.81 while Pain Center #2 indicated lower pain intensity at 2.25.

As noted previously in Table 8, there were no significant differences found in SM, SMS, mental health state, and functional ablement (disablement) between the participants' responses in both locations. There is however a statistical difference ($t = 2.72, p = .008$) in the pain intensity response of participants in both locations. However, it is doubtful that the mean difference of .55 between Pain Center #1 (2.8, SD=1.18) and Pain Center #2 (2.25, SD = 1.02) has any clinical significance or usefulness in the practice setting despite the statistical significance.

Table 12 differentiates the SM activation levels for the combined dataset and the datasets for both locations. The lowest level (Level 1) indicates participants who still do not perceive that SM is important. The second level (Level 2) categorizes those who lack confidence and knowledge to self-manage. The third level (Level 3) are participants who

are beginning to take action towards SM, and the fourth level (Level 4) are those who are exhibiting self-management behaviors but have difficulty maintaining these behaviors consistently (Hibbard, Mahoney, Stockard, & Tusler, 2005).

The frequency of the participants' combined SM activation levels for both locations gradually increased from level one to four with level four being the highest at 33.6%. For Pain Center #1, the frequencies of responses were more evenly spread out among the four levels with level four as the highest (31%). For Pain Center #2, majority of the participants responded that their SM activations levels were in Levels three (32.7%) and four (36.5%).

Table 12

Self-management (SM) Activation Levels

SM Activation Levels	Pain center #1		Pain center #2		Total	
	#	%	#	%	#	%
Level 1: May not yet believe that the patient role is important	12	20.7	9	17.3	21	19.1
Level 2: Lacks confidence and knowledge to take action	15	25.9	7	13.5	22	20.0
Level 3: Beginning to take action	13	22.4	17	32.7	30	27.3
Level 4: Has difficulty maintaining behavior	18	31.0	19	36.5	37	33.6
Total	58	100	52	100	110	100

Note. # = number or frequency.

Table 13 differentiates the ODI levels in the combined dataset and the datasets for both locations. ODI levels are opposite reflections of functional ablement measured by way of disablement or disability from minimal, moderate, severe, crippled, to bedbound (or exaggerated symptoms). In the combined dataset, disability was mostly at the moderate level (39%). For Pain Center #1, participants mostly rated their disability at the severe level (36.2%), while participants at the Pain Center #2 rated their disability to be primarily at the moderate level (48.1%).

Table 13

Disability Levels (Functional Ablement)

Disability Levels	Pain center #1		Pain center #2		Total	
	#	%	#	%	#	%
Minimal disability	5	8.6	3	5.8	8	7.3
Moderate disability	18	31.0	25	48.1	43	39.1
Severe disability	21	36.2	18	34.6	39	35.5
Crippled	13	22.4	6	11.5	19	17.3
Bedbound or exaggerated symptoms	1	1.7	0	0	1	0.9
Total	58	100	52	100	110	100

Note. # = number or frequency.

In summary, due to some statistically significant differences between Pain Centers #1 and #2, “location” was added as a variable in the combined dataset for the analysis of the next research questions to factor out any contribution of variance by location.

Research Question Two: SM Influence on Functional Ablement

The second research question was, “Does self-management significantly influence functional ablement in chronic low back pain patients after controlling for relevant covariates including mental health state?” Potential demographical covariates are age, sex, ethnicity, race, educational attainment, income, duration of chronic low back pain, overall health, social support, and number of medical conditions.

In Table 14, the demographic variables and mental health state were tested against the dependent variable (functional ablement) to find potential covariates that need to be retained in the final model. Based on a $p < .10$, only the variables overall health and gender were retained. A larger p value was determined as appropriate for exploratory analysis as this prevented excluding any variable that may be meaningful.

Evaluation of linearity was not necessary because the covariates were not quantitative variables. There was no violation of homogeneity of variances based on Levene’s test ($F = 1.434, p = .184$). The final model (Table 15) was significant ($F = 7.262, p < .001$) with an effect size approaching moderate (.297). Only the variable *overall health* remained as a significant covariate ($F = 7.281, p < .001$). Gender was not significant in the final model ($F = 3.667, p = .058$). The independent variable, SM, was not significantly predictive of functional ablement ($F = .169, p = .682$). For research question #2, SM did not significantly influence functional ablement in chronic low back pain patients after controlling for overall health. The R^2 for this final model was .297 indicating 30% of explained variance.

Table 14

Demographic Variables and Mental Health State Tested Against Functional Ablement

Variable	df	F	Sig.
Corrected Model	28	2.898	p<.001*
Location	1	.004	.948
Gender	1	3.334	.072*
Hispanic (origin)	1	.640	.426
Race	4	1.374	.250
Education	4	1.309	.274
Income	6	.545	.773
Health (overall)	4	3.752	.008*
Support	3	1.709	.172
Age	1	.561	.456
Low back pain (time)	1	.612	.436
MC total	1	2.648	.108
MHI score	1	2.541	.115

Note. * = $p < .10$. Low back pain (time) = years of chronic low back pain. MC total = number of medical conditions. MHI = Mental Health Inventory. ^aR Squared = .500 (Adjusted R Squared = .328).

Research Question Three: SMS Influence on Functional Ablement

The third research question was, “Does perceived self-management support significantly influence functional ablement in chronic low back pain patients after controlling for relevant covariates including mental health state?” Potential demographical covariates are age, sex, ethnicity, race, educational attainment, income,

duration of chronic low back pain, overall health, social support, and number of chronic medical conditions. As shown in Table 16, demographic and mental health state variables were tested against the dependent variable (functional ablement) to find potential covariates that need to be retained in the final model (Table 16). Based on a $p < .10$, only the variables overall health and gender were retained. A larger p value for exploratory analysis prevented excluding any variable that may be meaningful.

Table 15

Self-management (SM) Influence on Functional Ablement

Variable	df	F	Sig.	Partial Eta Squared
Corrected Model	6	7.262	$p < .001^*$.297
Health (overall)	4	7.281	$p < .001^*$.220
Gender	1	3.667	.058	.034
PAM score	1	0.169	.682	.002

Note. * = $p < .001$. PAM = Patient Activation Measure. ^aR Squared = .297 (Adjusted R Squared = .256).

Evaluation of linearity was not necessary because the covariates were not quantitative variables. There was no violation of homogeneity of variances based on Levene's test ($F = 1.379, p = .207$). The final model (Table 17) was significant ($F = 7.406, p < .001$) with a moderate effect size (.301). Only the variable overall health remained as a significant covariate ($F = 8.262, p < .001$). Gender was not significant in the final model ($F = 3.490, p = .065$). The independent variable, perceived SMS, was not significantly predictive of functional ablement ($F = .776, p = .380$). For research question #3, perceived SMS did not significantly influence functional ablement in

chronic low back pain patients after controlling for overall health. The R^2 for this final model was .301 indicating 30% of explained variance.

Table 16

Demographic Variables and Mental Health State Tested Against Functional Ablement

Variable	<i>df</i>	<i>F</i>	Sig.
Corrected Model	28	2.898	p<.001*
Location	1	.004	.948
Gender	1	3.334	.072*
Hispanic (origin)	1	.640	.426
Race	4	1.374	.250
Education	4	1.309	.274
Income	6	.545	.773
Health (overall)	4	3.752	.008*
Support	3	1.709	.172
Age	1	.561	.456
Low back pain (time)	1	.612	.436
MC total	1	2.648	.108
MHI score	1	2.541	.115

Note. * = $p < .10$. Low back pain (time) = years of chronic low back pain. MC total = number of medical conditions. MHI = Mental Health Inventory. ^aRsquared = .500 (Adjusted R Squared = .328).

Table 17

Self-management Support (SMS) Influence on Functional Ablement

Variable	df	F	Sig.	Partial Eta Squared
Corrected Model	6	7.406	p<.001*	.301
Gender	1	3.490	.065	.033
Health (overall)	4	8.262	p<.001*	.243
PACIC score	1	0.776	.380	.007

Note. * = $p < .001$. PACIC = Patient Assessment of Chronic Illness Care. ^aR Squared = .301 (Adjusted R Squared = .261).

Research Question Four: Mediation Analysis Results

The fourth research question was, “Does self-management mediate perceived self-management support and functional ablement in patients with chronic low back pain?” Mediation analysis requires a few regression steps in order to answer this research question. However, previous analyses showed that regressing functional ablement on SM was statistically nonsignificant. Regressing functional ablement on perceived SMS was also statistically nonsignificant. Since these regression equations were not significant, mediation analysis was not performed because conditions for mediation were not met. Hence, SM did not mediate the SMS-functional ablement relationship.

Regressing SM on perceived SMS was evaluated in the next tables. Relevant covariates were identified and the variables overall health, age, and mental health state were retained based on a $p < .10$ (see Table 18).

Table 18

Demographic Variables and Mental Health State Tested Against Self-management (SM)

Variable	<i>df</i>	<i>F</i>	Sig.
Corrected Model	28	1.715	.032*
location	1	.009	.924
Gender	1	.135	.715
Latin (origin)	1	.018	.893
Race	4	.803	.527
Education	4	1.054	.385
Income	6	.292	.939
Health (overall)	4	2.127	.085*
Support	3	1.618	.192
Age	1	5.712	.019*
Low back pain (time)	1	.429	.515
MC total	1	2.068	.154
MHI score	1	4.532	.036*

Note. * = $p < .10$. Low back pain (time) = years of chronic low back pain. MHI = Mental Health Inventory. MC total = number of medical conditions. ^aR Squared = .372 (Adjusted R Squared = .155).

Linearity assumption was not violated through evaluation of bivariate scatterplots. There was no violation of homogeneity of variances as well based on Levene's test ($F = .958, p = .434$). The final model (Table 19) was significant ($F = 4.437, p < .001$) with a small effect size (.233). No variable remained as a significant covariate: overall health was not significant in the final model ($F = 2.103, p = .086$), age was not significant ($F = 2.893, p = .092$), and mental health state was not significant ($F = 3.796, p = .054$). The

independent variable, perceived SMS as measured by the PACIC, was significantly predictive of SM ($F = 8.265, p = .005$). Perceived SMS significantly influenced SM in chronic low back pain patients after controlling for relevant covariates. The R^2 for this final model was .233 indicating 23% of explained variance.

Table 19

Self-management Support (SMS) Influence on Self-management (SM)

Variable	df	F	Sig.	Partial Eta Squared
Corrected Model	7	4.437	$p < .001^*$.233
Health (overall)	4	2.103	.086	.076
Age	1	2.893	.092	.028
MHI score	1	3.796	.054	.036
PACIC score	1	8.265	.005*	.075

Note. * = $p < .05$. ^aR Squared = .233 (Adjusted R Squared = .181). MHI = Mental Health Inventory. PACIC = Patient Assessment of Chronic Illness Care.

Research Question Five: Qualitative Content Analysis Results

The fifth research question was, “What do patients describe as: (a) ways they manage their chronic low back pain, (b) ways health care providers give patients support in chronic low back pain management, and (c) patient concerns about functional ability?” Qualitative content analysis allowed for coding and evolution of themes based on participant responses. Table 20 displays the major themes derived from participant written comments to open-ended questions.

Table 20

Major Themes Derived from Participant Responses

	Perceptions of SM	Perceptions of SMS	Perceptions of functional ablement
1	Taking medications	Prescribing medications	Anxiety or fear
2	Maintaining physical activity	Providing other treatments (other than medications)	Missing out
3	Making wise decisions and changes in lifestyle	Providing emotional support and encouragement	Hoping for improvement
4	Using heat and cold applications	Giving referrals	Acceptance
5	Rest and relaxation	Offering alternatives	Feeling improved
6	Using other physical and alternative modalities	Providing information	
7		Ensuring follow-up	

Note. SM = self-management; SMS = self-management support

Perceptions of SM. Six themes were identified that described ways participants managed their chronic low back pain. These were arranged from the most prevalent theme to the least prevalent (Sandelowski, 2000). The most prevalent theme was taking medications. This was followed by maintaining physical activity, making wise decisions and changes in lifestyle, heat/cold applications, and rest/relaxation. The least prevalent theme was the use of other physical and alternative modalities.

Participants viewed *taking medications* as the primary way of managing their chronic low back pain. Pain medications included taking opioids (i.e. Lortab, Percocet, Morphine, Fentanyl patches), non-opioids like muscle relaxants (i.e. Flexeril, Soma, Robaxin), non-steroidal anti-inflammatory agents (i.e. Mobic, Ibuprofen, Aleve), adjuvant pain agents (i.e. Neurontin), and numbing agents (i.e. Lidocaine patches). One participant noted, “medications are extremely beneficial to me.” Another wrote, “taking medications regularly and on time.”

The second theme of *maintaining physical activity* included statements of specific kinds of physical activity and exercise to stay active. Specifically noted were exercising in general, walking, stretching, yoga, swimming, and attending physical therapy sessions. Some participants responded that physical activity meant to them the act of “walking 2-6 miles with my dog, “yard work,” or “walking 8 blocks a day.” Despite the pain, they “try to exercise at least 2-3 times a week” or “try to stay as active as possible.”

The next theme of *making wise decisions and lifestyle changes* included taking medications appropriately, following health care provider advice, and lifestyle management considerations. Participants specified a variety of approaches such as taking medications as prescribed, keeping doctor’s appointments and following their advice, eating healthy, taking vitamin supplements, and dieting as needed for weight control. Some participants modified their work and activities by using proper body mechanics and positioning, as well as indicating a greater awareness and attention to their back situation. Referring to body mechanics, they included observations about the importance of “lifting properly,” “not lifting too much,” “not standing too long,” “not walking too far,” and “exercising correctly.” Others practiced biofeedback or cognitive behavioral therapy and

stated they “displaced thoughts in another area or subject,” and tried to “distract myself.” A participant focused on his/her creative abilities when in pain (i.e. engaged in painting); others practiced meditation and minimized their stress levels as possible. Another participant noted, “keeping a positive mood helps with pain, realizing I do have a health problem and work with my lifestyle.”

The fourth theme involved *using heat and cold applications*. Participants identified various means such as ice packs, heating pads, and taking warm showers or hot baths.

The fifth theme comprised of *rest and relaxation* to manage pain. Some participants indicated that they go on bed rest when in pain, stay immobile until the pain subsides, lay down or lay flat on bed, or “not doing anything when in pain.” Other participant responses were, “I baby my back when I overdo walking or standing. Rest is the only thing that helps.” Another noted, “I rest in bed and do absolutely no activity.”

The last theme focused on the use of *other physical and alternative modalities*. These included having procedures and interventional treatments like injections and more invasive remedies like implantation of a spinal stimulator. Many responded that seeing a new doctor by being referred to a pain specialist provided new approaches and treatments that have helped. Others responded that they used alternative modalities including acupuncture, chiropractic, massage, or was seeing a herbologist.

Perceptions of SMS. In response to the open-ended question to participants about ways health care providers give patients support in chronic low back pain management, seven themes were identified in the analyses. These themes are arranged from the most prevalent theme to the least: prescribing medications, providing other

treatments (other than medications), providing emotional support and encouragement, giving referrals, offering alternatives, providing information, and ensuring follow up.

Consistent with patient SM responses, they also felt that *prescribing medications* was the primary way that their health care providers gave them support in managing their low back pain. The next theme is providing treatments other than medications. One participant said that a previous doctor only provided pain medications while current providers now have provided new approaches and therapies that are helping. Few expressed frustration with their insurance coverage because they are unable to get needed treatments other than medications.

The second theme on *other treatments (other than medications)* provided by their health care providers included physical therapy, chiropractic, and injections or interventional procedures. Many have verbalized that their current treatments are working especially after being referred to pain specialists. A participant said, “They made sure we took steps to remedy problems quickly.” Others noted that their current treatments have helped in a greater degree especially for longer-term pain management compared to only taking pain medications from their previous providers.

The third theme on *giving emotional support and encouragement* was valued with specific observations of health care provider behaviors as certain abilities. These behaviors as abilities included their health care providers demonstrating understanding, concern, and compassion by listening, having a caring attitude, taking the time, being in good spirits, keeping participants motivated in making lifestyle changes, or simply asking how the participants are doing and how their back pain is affecting their daily life and work. The participants’ noted, “[Just] believing me when I say I am in pain not judging

me,” and when “they show support that they are very involved.” It was valued when health care providers “help [the] best they can,” and seek to “encourage me to exercise and eat properly.” One participant said, “They do not always tell me what I want to hear but are looking at the best interest of me and [my] treatment.”

The fourth theme referred to *giving referrals* to other health care providers which included pain specialist referral from primary care providers, primary care referral by pain specialists for those who have none, referral to physical therapy, dietician, and other specialists as needed (i.e. neurologist, spine and orthopedic surgeons). Few participants noted referrals to support groups and community resources.

The fifth theme included the health care provider’s demonstration of support by *offering alternatives* or different kinds of options and treatments to assist in the management of their chronic low back pain. Participants indicated that their health care providers assessed the priority issue in the participants’ pain, provided suggestions, and determined the best alternative for the current problem. Some participant responses were, “They try to find treatments that help eliminate or relieve my lower back pain,” “try to put together some things for my pain,” and “Offer different kinds of treatment to better my back pain.”

The sixth theme referred to *providing information*, advice, answering questions, allowing for discussions, and giving explanations about pain and the treatments. Participants perceived that when providers gave them valuable information on what to do to be able to stay motivated and to cope, they felt supported in the management of their chronic low back pain. One participant responded that the health care providers “explain

all treatment.” Another added, “[Health care providers] discuss options that are available to help make my pain more manageable, see what works and what doesn’t.”

The last theme that emerged was on *ensuring follow up*. The providers made certain that there were scheduled appointments. One participant said, “[The provider] checked how much better or worse I was upon follow-up visits.”

Perceptions of functional ablement. Five themes were identified in response to the last open-ended question pertaining to participants’ concerns regarding their functional ablement. These are arranged from the most prevalent theme to the least: anxiety and fear, missing out, hoping for improvement, acceptance, and feeling improved.

The most predominant theme identified is *anxiety or fear*. Participants are not only scared and worried about their current pain and functional level. They are also concerned about their future, wondering about long-term pain, whether it will get worst, and how they will manage or function especially if the pain worsens as they age. They felt concerned about how bad the pain will get, spending the rest of their lives in pain, feeling useless and being unable to work, not having a life, being unable to care for oneself, and also losing one’s family. One participant noted, “That the older I get if my pain persists I will be no good to my kids.” Others posed questions of future fears such as “Will there come a day when I’m completely dependent on others for my personal care?” Another participant responded, “[What if] I lost all my friends because I can’t go and do with them? And I’m afraid my husband will get tired of helping to take care of me and [the] lack of sexual life? And then I will not be able to take care of myself and I’ll be all alone and struggling. This is a very big fear.” Others are worried about future

disability. As a participant noted, “That I will end up in a wheelchair and go nowhere in my life and that pain will always restrict me in daily regular life,” and lastly, “How will I be at age 50 when I’m only 37 now?”

The second theme on participants’ concerns regarding their function ablement is about *missing out*. The participants felt that they are not able to enjoy themselves, let alone perform personal care. They have difficulties with sleeping, sitting, walking, driving, performing household chores, and working. They felt that they are missing out on life situations with their families, their children, their spouse, and their friends. Participants stated the following: “I feel I’m still young and unable to do for myself,” “Can’t enjoy some sport activities with my kids like I used to,” and “be able to get on the floor and play with my kids with no pain.”

Participants also *hoped for improvement* of their chronic low back pain. They yearned to feel better, be functional and more mobile, and have less pain; others longed to be able to take care of themselves without too much assistance, to have a life, and to be happy. They hoped that the treatments will continue to enable them to do needed activities for themselves, their families, and their children. They said, “I just want to be normal again with no pain so whatever I have to do to get there is the plan,” “I would like to improve my mobility; have the pain reduced significantly and participate more in living life,” and “I want to be active and be able to walk, shop, drive, without pain or limits on the amount of housework I can do.”

The fourth theme that evolved is *acceptance*. Participants felt resigned to their present state. They have learned to live with their current functional abilities. Some either minimized their activities, “only lay around,” or sleep it off when they are

experiencing too much pain. Although there is a sense of feeling less capable and having to do less due to the pain, participants also adjusted and adapted to their present state. They said, “Nothing, it is what it is. I have to deal with it,” “I know I will always have pain,” and “I am ok with it you deal with what you have, I put it in Jehovah God’s hand for comfort.”

The last theme that prevailed when participants were asked regarding their functional ablement was that they *felt improved*. They stated that they are better than before with their current health care provider’s help. Some are able to function better with treatments and have no major concerns. One participant summed it all:

It appears that without my injections every 6 month I become more debilitated with my daily functions. Without my pain management teams I would not be able to function as well as I do. This team at Las Vegas Pain Institute has increased my ability to once again have a normal life to the extent that it can be. I am extremely active and want to continue to have that ability and my pain management team along with my own health awareness helps to keep me that way.

Summary of Data Analyses

Using a non-experimental, cross-sectional, descriptive design through general linear modeling using regression analysis, study results showed that SM and SMS did not significantly influence functional ablement after controlling for relevant covariates. Overall health remained to be a significant covariate in the final models. SMS significantly influenced SM, however, the rest of the regression analyses were nonsignificant. In the mediation analysis, Sobel test and bootstrapping technique confirmed the findings; SM did not mediate the SMS-functional ablement relationship.

Utilizing qualitative content analysis, participants’ perceptions of their SM showed that taking medications and maintaining physical activity were dominant themes.

Consistently, participants perceived that their providers gave them support in managing their chronic low back pain primarily through prescribing medications, followed by providing other treatments and emotional support. Lastly, participants' concerns regarding their functional ability centered primarily on anxiety and fear.

CHAPTER V

DISCUSSION

Health care system reform in chronic illness care calls for increased self-management (SM) by patients so affected and the use of self-management support (SMS) strategies by health care providers (Pearson, Mattke, Shaw, Ridgely, & Wiseman, 2007). The expanding chronic care evidence particularly in chronic low back pain includes studies that examine SM and SMS strategies and their effects on outcomes. However, these studies are new and incomplete (Wagner et al., 2001), especially when evaluating the influence of these strategies on functional ablement for chronic low back pain patients. SM and SMS occur in a context of chronic illness complexity.

Chronic low back pain represents a pervasive and challenging condition to self-manage and most often leads to disability (NCHS, 2006). The Chronic Care Model as the overriding theoretical orientation for this study specifies that productive interactions between informed and activated patients in SM and the prepared and proactive healthcare teams engaged in SMS produce improved outcomes (Wagner et al., 2001). The Chronic Care Model (Wagner et al.) was adapted to reflect the disablement process (Verbrugge & Jette, 2004) and with further reflection of a nursing perspective that conceptualizes the person as “being able,” a new term, specifically functional ablement, was coined. Functional ablement denotes that a person having chronic low back pain can maintain the capacity to function. It is necessary to conduct a study that advances our understanding of the role of SM and SMS in influencing functional ablement, and the mechanism by which SMS works through evaluation of the SMS-functional ablement relationship by way of SM.

The purposes of this research study were to: (a) examine whether SM and SMS significantly influenced functional ablement, after controlling for mental health state and relevant demographic characteristics, (b) examine whether SM mediates the relationship of SMS and functional ablement in patients with chronic low back pain after controlling for mental health state and relevant demographic characteristics, and (c) describe patient perceptions of their SM, SMS, and functional ablement. Specifically, the research questions were: (a) What are the level of self-management, amount of perceived self-management support, mental health state, functional ablement score, and mean pain intensity in chronic low back pain patients?, (b) Does self-management significantly influence functional ablement in chronic low back pain patients after controlling for relevant covariates including mental health state?, (c) Does perceived self-management support significantly influence functional ablement in chronic low back pain patients after controlling for relevant covariates including mental health state?, (d) Does self-management mediate perceived self-management support and functional ablement in patients with chronic low back pain?, and (e) What do patients describe as: (a) ways they manage their chronic low back pain, (b) ways health care providers give patients support in chronic low back pain management, and (c) patient concerns about functional ablement?

A non-experimental, cross-sectional, descriptive design utilizing a mediation approach and qualitative content analysis answered the research study purposes. Nonprobability convenience sampling yielded a total N of 110 participants from two pain centers that employed multimodal pain management. After written informed consent, survey tools with scaled items and open-ended questions were completed by participants.

This chapter presents the participant characteristics followed by study findings as organized by the study's purposes and research questions. The chapter next offers a discussion of the findings that draws upon theoretical and empirical literature. As discussion advances, the conclusions and related implications are explicated. Lastly, the salient recommendations are proposed for future research study.

Research Findings

Participant Characteristics

In this study, many of the demographic results were consistent with current national statistics. The NCHS (2006) noted that adults over the age of 45 predominantly complained of longer duration of low back pain. Study results showed that 58% of the participants having low back pain of at least three months were 45 years old and over; 42% of the participants with chronic low back pain were 18 to 44 years old. These age groups are major contributors to the workforce indicating that the predominance of low back pain in the working age group affects not only health care costs but also poses a great human and socio-economic burden. This is highlighted further by the mean duration of chronic low back pain for the participants to be at 10.8 years with majority being disabled and unable to work or unemployed.

Similar to other demographic data for low back pain patients more recently reported by the NCHS (2010), this study also showed that those who reported low back pain were predominantly females, non-Hispanics, and had lower income. Differing from national statistics, the study participants had higher educational attainment, with 58% achieving some college/trade, and majority having healthcare insurance reporting adequate coverage for their low back pain treatments.

When the demographic variables were compared between the two pain centers, age, race, education, income, and marital status differed significantly. In order to address these differences, analyses were completed for both locations combined and separately. The variable “location” was also created in the analyses of the subsequent research questions in order to factor out any variance that may be attributed to a specific pain center. Consequently, location was not a significant covariate that influenced functional ability. Further, none of the participant responses to the study’s key measures was significantly different between the two locations.

Research Question One

Research question one posed in the study was the following: What are the level of self-management, amount of perceived self-management support, mental health state, functional ability score, and mean pain intensity in chronic low back pain patients?

Level of self-management. The mean SM or Patient Activation Measure (PAM) score in this study was 60 out of 100 (60.06, SD = 15.04) with a range from 28-100. This score indicates that participants are beginning to take action towards SM but have not yet consistently demonstrated SM behaviors (Hibbard, Stockard, Mahoney, & Tusler, 2004). The study mean is consistent with the mean score (59.1) for chronic pain patients found during the development and testing of the short form of the PAM used in this study (Hibbard, Mahoney, Stockard, & Tusler, 2005). These scores were also similar to those previously reported in the literature for chronic illnesses (Hibbard et al., 2004; Hibbard et al., 2005; Skolasky, Mackenzie, Riley, & Wegener, 2009; Skolasky, Mackenzie, Wegener, & Riley, 2008). The PAM activation score was not normally distributed

(Shapiro-Wilks test $<.05$), although the skewness and kurtosis measurements were not out of range.

Amount of perceived self-management support. The mean SMS or Patient Assessment of Chronic Illness Care (PACIC) score in this study was average at 2.6 out of 5 being the highest score (2.6, SD = 0.99). The study mean is consistent with the mean overall PACIC score for chronic pain patients (2.64, SD = 1.0) tested during the development and validation of the PACIC, (Glasgow et al., 2005). Patients perceived that their health care providers were supporting them in the management of their chronic low back pain at the average level.

Mental health state. The mean MHI score was 55 out of 100 (55, SD = 14.31). This mean is less than the established optimal cutpoint of 60 for this study to indicate psychological well-being. A score below 60 indicates more psychological distress (Kelly, Dunstan, Lloyd, & Fone, 2008). In comparing the two pain centers, the MHI score also demonstrated a trend toward achieving significance with Pain Center #2 having a higher MHI score. However, when the variable “location” was created in the analyses to factor out any variance that may be attributed to a specific pain center, “location” was not a significant covariate that influenced functional ablement.

Functional ablement. The study participants’ mean disability score was 44 (44.48, SD = 17.5) which belongs to the low range of severe disability category (41-60) based on the Oswestry Disability Index (ODI) (Fairbank & Pynsent, 2000). In a systematic review of previous literature on the use of ODI in spine patients, Fairbank and Pynsent noted that the mean ODI scores for patients with chronic back pain was 43.3 (SD

range = 10-21). The mean disability score in this study is consistent with previous studies.

Pain intensity. The mean pain intensity for the participants in this study was 2.55 with five being the highest pain level. According to Bair et al. (2009), pain and disability are major barriers to SM. Although the mean pain intensity for participants in Pain Center #1 was slightly higher (2.8, SD=1.18) than Pain Center #2 (2.25, SD = 1.02), this difference may not have any clinical significance or usefulness in the practice setting based on the minimal variation.

Research Question Two

Research question two posed in the study was the following: Does self-management significantly influence functional ablement in chronic low back pain patients after controlling for relevant covariates including mental health state? The study findings showed that SM did not influence functional ablement after controlling for relevant covariates. This is an interesting finding that does not support the adapted Chronic Care Model (Pearson et al., 2007). Only overall health was a significant covariate in the final model. A great majority (83%) of the participants responded that their current overall health ranged from fair to excellent which is generally a satisfactory health state. Participants did have an average of 3-4 other chronic illnesses.

SM was measured through the PAM. The PAM was operationalized based on what is an activated patient, which meant a patient who has the knowledge, beliefs, confidence, skills, and behaviors needed to self-manage a chronic illness (Hibbard, Stockard, Mahoney, & Tusler, 2004). Accordingly, patients who are activated are patients who self-manage. They collaborate with their health care providers, maintain

their health and function, know how to minimize decline in their condition, and access health care appropriately (Hibbard, et al.). Hibbard, Collins, Mahoney, and Baker (2010) recently used the PAM in evaluating SM to explore health care providers' beliefs about their patients' SM activities. The PAM has also been evaluated in chronic low back pain patients as a valid and reliable tool (Skolasky, Mackenzie, Riley, & Wegener, 2009; Skolasky, Mackenzie, Wegener, & Riley, 2008).

The ill-defined nature of low back pain is highly related to the complexity of the spine, the multiple structures surrounding the area, and other individual factors that interact with pain and functional ability (AAOS, 2008). A major individual factor is mental health, an important variable that can potentially influence functional ability and pain. The mean mental health state for the participants was 55 out of 100, with 60 being the cutpoint to indicate psychological well-being. Although the PAM was previously validated on many chronic pain patients and the items in the PAM were generally appropriate for chronic low back pain patients, it did not address mental health items that may have affected the sensitivity of the measure specific to patients with chronic low back pain. Patients with poorer mental health state respond less to pain management (van Wijk et al., 2008). Depression and pain-related anxiety affects adequacy of SM (i.e. exercise, pain control) (Huijnen et al., 2010; Vowles, Zvolensky, Gross, & Sperry, 2004). Patients optimally managed emotionally in SM programs demonstrate improved functional ablement and pain intensity levels (Kroenke et al., 2009). In developing a theory of activation, Hibbard and Mahoney (2010) also confirmed that emotional balance is key in SM.

Few previous randomized controlled trials (RCTs) showed no significant changes in disability and physical function after SM strategies (Buszewicz, et al., 2006; Crotty et al., 2009; Lorig et al., 2001). These were SM studies on chronically ill patients that were not geared specifically towards chronic low back pain patients but included patients with arthritis. Haas et al. (2005) used the Chronic Disease Self-Management Program (CDSMP) on a RCT on chronic low back pain patients and did not find improvements in the disability measure during follow up.

It is a question whether the study participants, with the chronicity (mean = 10.8 years) of their chronic low back pain, utilizing a mean of five pain management modalities in the pain centers, and reporting helpfulness of current pain management, already attained well-managed pain and disablement states and learned to adapt to their current pain intensity and disability level resulting to the lack of SM-functional ablement relationship. These patients may have learned to cope and adjust to their disablement state so that SM did not result to a significant variance. In a study looking at the coping perspective in chronic pain, Kranz, Bollinger, and Nilges (2010) found that patients with accommodating and accepting attitudes towards their pain level and functional state had more positive affect and better well-being. However, the study did not look into SM strategies in relation to coping and adaptation. Another possible explanation is that although the mean SM score in this study is consistent with previous studies, perhaps the mean SM score was not high enough in this patient population to create an impact on functional ablement, highlighting the significance of enhanced SM in influencing outcomes. In addition, SM may significantly influence other variables (i.e. coping, mental health) rather than functional ablement.

Research Question Three

Research question three posed in the study was the following: Does perceived self-management support significantly influence functional ablement in chronic low back pain patients after controlling for relevant covariates including mental health state? Perceived SMS did not statistically influence functional ablement in chronic low back pain patients. Only overall health was a significant covariate in the final model.

SMS was measured through the PACIC, a measure developed and tested in chronically ill patients, the majority of which had chronic pain and arthritis (Glasgow et al., 2005). The PACIC is especially geared towards the evaluation of SMS and was operationalized based on the Chronic Care Model (Glasgow et al.). The Chronic Care Model emphasizes that providers of SMS help organize the healthcare system for safe and quality care, assist in delivering effective and efficient care, use evidence-based guidelines in decision-making, organize patient and population data to coordinate care, and mobilize resources in the community to meet patient needs (Glasgow et al.). These elements are essential in sustaining self-management support (Schaefer, Miller, Goldstein, & Simmons, 2009) and are reflected in the PACIC. The PACIC items are applicable to and have utility in chronic low back pain patients.

The findings in this study were found consistent with two research studies. From a previous review of related literature, Crotty et al., (2009) noted no changes in disability and pain levels on osteoarthritis patients after a RCT using a SM-SMS program. Jordan, Holden, Mason, & Foster (2010) conducted a systematic review of 42 trials on patients with spinal pain and osteoarthritis and found inconsistent benefits on adherence, pain, and functional outcomes.

In discussing mediation testing, Krause et al. (2010) explained that a lack of expected relationship between an independent variable and dependent variable may be related to dilution, when the dependent variable is actually distal from the independent variable. In this study, it is likely that the direct effect of SMS on functional ablement is not large enough to be statistically significant because of an unexpected distal relationship. In other words, the SMS-functional ablement relationship is not temporally proximal due to the possibility that additional linkages or variables are present in the proposed mediation model. Another possible explanation is that although the mean SMS score in this study is consistent with previous studies, perhaps the mean SMS score was not high enough in this patient population to create an impact on functional ablement, highlighting the significance of enhanced SMS in influencing outcomes.

In further evaluation of the findings for the second and third research questions, it is also likely that the study participants experienced improved management of their chronic low back pain and in turn responded with pain levels and functional ablement scores that were not high enough for the participants to perceive the impact of SM and SMS. Based on the demographic findings, study participants responded that their previous treatments were helpful only at 42% (less than half the time) while current treatments are helpful at a higher degree (70%). Another possibility is that the disability scores in this study are not high enough to be influenced significantly by SM and SMS. Patients with manageable functional ablement scores may not be ready to change or motivated enough to adopt SM skills, or perceive the important influence of SMS. In relation to overall health being the only significant variable in the final models, this appears consistent with the NCHS (2006) findings that those with low back pain have

worse overall health states based on measurements of their activity limitations, health status, and psychological distress compared to those without low back pain.

Research Question Four

Research question four posed in the study was the following: Does self-management mediate perceived self-management support and functional ablement in patients with chronic low back pain? A necessary step in testing for mediation was to examine whether the independent variable (SMS) significantly contributed to the mediator (SM). As expected, SM and SMS were found to be significantly correlated in this study. This supports the positive relationship of SMS and SM reflected in the Chronic Care Model. Wagner et al. (2001) pointed out the important influence of SMS to SM. Effective SMS interventions enhance patient activation to self-manage. Dixon, Hibbard, and Tusler (2009) also noted that evaluating SM allows for improved SMS through more individualized and tailored interventions, and that SMS is significantly, and positively associated with self-management behaviors and outcomes (Schmittiel et al., 2007).

Due to the lack of significance in the other regression equations that are necessary in supporting mediation, this study found that SM did not have a mediating effect on the SMS-FA relationship. Although there is a significant correlation between SM and SMS, further exploration is needed to determine the influence of SM and SMS on the functional ablement of chronic low back pain patients.

Research Question Five

The fifth research question posed in this study was the following: What do patients describe as: (a) ways they manage their chronic low back pain, (b) ways health

care providers give patients support in chronic low back pain management, and (c) patient concerns about functional ablement? Participant responses to the open-ended questions provided insight into their perceptions and understanding about the ways they engage in self-management, their thoughts about the SMS they receive, and their functional ablement concerns. Many noted a combination of various SM and SMS strategies in their responses.

Perceptions of SM. Participants responded that they managed their chronic low back pain through the following means: taking medications, maintaining physical activity, making wise decisions and changes in lifestyle, using heat/cold applications, rest and relaxation, and use of other physical and alternative modalities. These are consistent with Lorig and Holman's (2003) conceptualization of SM in terms of decision-making and health-directed core skills and tasks (medical management and role management) for improved chronic illness management.

In a qualitative study on chronic low back pain patients evaluating SM and SMS strategies, Crowe, Whitehead, Gagan, Baxter, and Panckhurst (2010) found that the most common strategies used by participants to manage their chronic low back pain were medications, exercise, and heat application. Exercise and activity modification were primary SM strategies noted by Liddle, Baxter, & Gracey (2007) in their qualitative study. Weiner and Nordin (2010) reinforced a chief message based on best evidence on the management of chronic low back pain, that keeping active regardless of the low back pain is actually helpful and healthy with a high potential for improving functional ablement. Cooper, Smith, and Hancock (2009) also found that exercise was a primary

SM strategy but this was not consistently performed which indicated a strongly perceived need for SMS to facilitate SM.

Although SM did not significantly influence functional ablement on chronic low back pain patients in the statistical segment of this research study, it appears that demonstration of SM strategies were evident. In evaluating the experiences of individuals with chronic low back pain, Sokunbi, Cross, Watt, and Moore (2010) found that these experiences were not limited to pain, functional ability, or quality of life, but more importantly reflected increased confidence, development of SM strategies, and ability to take better control over their chronic low back pain.

Perceptions of SMS. Participants perceived that their health care providers gave them support in their SM through the following means: prescribing medications, providing treatments (other than medications), providing emotional support and encouragement, giving referrals, offering alternatives, providing information, and ensuring follow up. These are consistent with the SMS strategies proposed in the Chronic Care Model (Glasgow et al., 2005).

In previous qualitative research studies, general practitioners primarily used pain medications and referrals to specialists for SMS, while physical therapists commonly used exercise as their main supportive management (Crowe, Whitehead, Gagan, Baxter, Panckhurst, 2010). In a systematic review of RCTs evaluating the use of advice interventions on low back pain patients, Liddle, Gracey, & Baxter (2007) found that advice in addition to exercise was very common and effective SMS strategy in decreasing pain and improving back-specific function and disability in chronic low back pain patients. Strong evidence was also noted on the use of advice to promote SM. Liddle,

Baxter, and Gracey (2007) added that treatment effectiveness can be enhanced through supervision, follow-up support, and better understanding of the physical and emotional impact of chronic low back pain by health care providers.

Other SMS strategies noted from previous research studies included engaging multidisciplinary teams in SMS to help improve chronic disease management (Dennis et al., 2008) and emphasizing the importance of explanations, information, providing reassurance, discussing psychosocial issues, and presenting alternatives in SMS (Laerum, Indahl, & Skouen, 2006). Follow up and coordination was found to be the least reported SMS activity (Glasgow, Whitesides, Nelson, & King, 2005). Participant responses were supported by these studies.

In evaluating providers' SMS skills based on patients' perceptions, Lawn et al. (2009) found that providers do not have adequate SMS skills. Recommendations were made for appropriate education and training (Dennis et al., 2008) and enhancement of knowledge and skills on communication, collaboration, and on psychosocial aspects to better understand and manage the impact of chronic illnesses on patients (Lawn et al., 2009). It is likely that there is a need for stronger SMS in order to significantly influence functional ablement in chronic low back pain patients.

Incidentally, 61% of the study participants responded that they received minimal support from other than their health care providers. Low family support is a major barrier to SM in patients with chronic illnesses (Jerant, von Friederichs-Fitzwater, & Moore, 2005), while family and friend support have been found to help improve some SM behaviors (Rosland et al., 2008).

Perceptions of functional ablement. Five themes evolved from the open-ended question asking about participants' concerns regarding their functional ablement: anxiety and fear, missing out, wishing for improvement, acceptance, and feeling better. These perceptions are reflected in Verbrugge and Jette's (1994) Disablement Model. The model emphasized the importance of social, environmental, and personal factors on functional disablement. When impairments and functional limitations are not managed adequately, disability may ensue. Management can come in the form of extra-individual factors (i.e. SMS) and intra-individual factors (i.e. SM) that influence the disablement process to impact functional ablement.

A particular concern is the effect of mental health state on an individual's functional ablement. Mental well-being, anxiety, and depression pose significant roles in the management of patients with chronic low back pain (Last & Hulbert, 2009). Lorig and Holman (2003) noted that another necessary task in SM other than medical and role management is emotional management. This refers to the work required by an individual to deal with feelings like coping with anger or depression (Lorig and Holman). Although the study participants' mental health state did not significantly influence functional ablement statistically, it was evident that anxiety and fear were primary thematic concerns. Further, the participants' mean mental health state was not adequate enough to reach the psychological well-being cutpoint, possibly influencing SM and SMS responses.

In a recent qualitative research study, Crowe et al. (2010) identified four themes from participant semi-structured interviews on the impact of chronic low back pain on patient lives. Through inductive thematic analysis, Crowe et al.'s results included the

following: unpredictability of pain, need for vigilance, externalization/objectification of the body, and alteration to sense of self. These themes are reflected within participant responses in this study. The primary study theme on anxiety or fear is closely related to the unpredictability of pain, leading to increased vigilance and awareness of current pain situations. These in turn results to the participant missing out on life activities, externalization of the body, wishing for improvement, and consequently alteration of oneself. The participants in this study however also felt that despite the negative perceptions, many have learned to accept their current situation. Some have also expressed improvement in their functional ablement indicating no current concerns relating to their chronic low back pain. It is possible that for some participants, this functionally able state has influenced their responses minimizing the influence of SM and SMS on functional ablement.

In integrating the quantitative and qualitative findings in this study, it is important to recognize that the measure of SM (PAM) was not closely reflective of all the themes derived from the participants' responses to the open-ended questions. The PAM contained more general questions about SM rather than specific SM measures shown on the qualitative results. The measures for SMS (PACIC) and functional ablement (ODI) contained more specific items that correlated better with the qualitative findings on SMS and functional ablement.

Implications for Nursing

Although the statistical analyses showed that SM and SMS did not significantly influence functional ablement in chronic low back pain patients in this study, the results did confirm that SM and SMS are very closely associated. SMS strategies are related to

SM behaviors. However, further exploration is needed to evaluate whether SM and SMS lead to improved outcomes in chronic low back pain patients. Regardless, it is important to continue to engage patients and health care providers in SM and SMS. A coordinated approach is needed in order to successfully implement these strategies in the healthcare system to encourage sustenance (Jordan, Briggs, Brand, & Osborne, 2008). Chronic low back pain is a multidisciplinary concern requiring complex collaborative interdisciplinary strategies in facilitating SM and SMS.

For educational implications, the study results on participant perspectives can increase awareness by patients and health care providers regarding SM and SMS preferences, issues, and concerns. Patients make choices about activating their SM (Hibbard, Stockard, Mahoney, and Tusler, 2004). Concurrently, nurses and nurse practitioners encourage patients to engage in SM behaviors. The psychosocial process of promoting SM behavior and offering SMS requires health care providers to be educated, well-prepared, and continually engaged in ongoing SMS training and evaluation to maintain evidence-based practice.

For nursing theory implications, study results supported the relationship of SM and SMS reflected in the Chronic Care Model and from previous studies. The positive influence of SMS in activating SM is a significant finding suggesting a relational statement or a proposition which is an important step in theory building. Further elucidation of the relationships of SM and SMS to chronic low back pain outcomes is indicated. It is also essential to continue to examine the adapted Chronic Care Model especially in other low back pain patient populations. Future derivation of an appropriate

middle-range theory that details SM, SMS, and functional ablement in chronic low back pain patients can benefit patient care and nursing practice.

The term, functional ablement, coined in this study is also an important health care view of patients as being functionally able despite their chronic illness. This poses a challenge to nursing in considering theoretical perspectives away from the deficit model. This positive outlook may influence health care providers in developing SMS strategies that facilitate optimistic results which tends to be restricted when one has a disability viewpoint.

In nursing science and practice, findings have potential significance to building knowledge and improving practice in the clinical area for chronic low back pain patients. Study results are important to the health of individuals, families, and communities affected by the epidemic of chronic low back pain and the disablement that ensues. It is evident that social support is not optimal in this study and that overall health influenced functional ablement. The nurse's role in addressing these variables is key in enhancing SM and strengthening SMS initiatives. Overall findings can be vital to clinical decision-making processes with potential implications to effective and quality patient care. Information can also be critical to future health planning and policy

The study implications to research are multiple, providing groundwork and foundation for future research. There is a strong need to explore the influence of SM and SMS in chronic low back pain patients beyond the demonstration of SM behaviors towards the outcome of functional ablement. Significant findings can also support a step towards conducting an experimental design in the future employing SM and SMS interventions.

Strengths and Limitations of the Study

To the best of this author's knowledge, this is the first study to examine the influence of SM and SMS on the functional ablement of chronic low back pain patients. It is also the first attempt at a mediation analysis considering the variables under study.

In order to narrow the scope of this research, this study was limited to patients in pain centers with chronic low back pain, focusing on the relations of SM and SMS on their functional ablement. The study design is cross-sectional providing information about the participants at only one point in time. Future longitudinal studies are helpful in capturing the dynamic state of chronic low back pain patients.

Convenience sampling was a limitation in terms of generalization. However, participants were recruited from two pain centers in different cities within the state of Nevada to allow for diversity. Quantitative data findings are also not generalizable to those beyond the chronic low back pain population in the pain center settings.

In terms of methodology, no interventions were conducted. Instead, this study was supplemented with significant qualitative descriptive information that provided deeper insights into the perceptions of patients on their SM, SMS, and functional ablement. Qualitative data gathered was limited to responses from the open-ended questions included in the surveys and are not generalizable beyond the study participants. Results did not provide re-presentation of the data. Instead, the evolved themes reflected the participants' straight description of their responses leading to fundamental information relevant to the study

In relation to the measures, few published studies to date utilized the PAM and the PACIC focusing on chronic low back pain patients. However, the development of

these instruments included content items from participants with chronic pain. The questions are applicable to chronic low back pain patients although the use of self-report surveys instead of observable measures may influence objectivity.

Recommendations for Future Research

The demographic results of this study point to the importance of looking at the socioeconomic significance of chronic low back pain as well as potential disparities in care. Since many of the adult workforce experience chronic low back pain resulting to diminished functional ablement, the socio-economic burden is apparent. It was also evident on the demographic results of this research that social support was minimal. Social support can potentially influence SMS in the management of chronic low back pain patients. Further, this study was conducted in two pain centers that employ multimodal therapy, it is essential to conduct a similar study on chronic low back pain patients seen in the primary care area by general practitioners as opposed to pain specialists.

Based on this study results, another research potential is to conduct correlations on SM and SMS for chronic low back pain patients with more limited functional ablement or higher pain intensity scores. It may be likely that the influence of SM and SMS on the functional ablement of these patients will be more apparent compared to chronic low back pain patients in multimodal pain centers who have potentially better-managed pain level and functional abilities. Due to the complex nature of chronic low back pain, it is also important to evaluate other variables that are influential in this patient population (i.e. adaptation, coping, self-efficacy, locus of control, anxiety, and

depression) whether as predictors, moderators, or mediators. Most clinical situations involve multiple mediating factors or variables (Baron & Kenny, 1986).

Another recommendation for research in chronic low back pain patients is to evaluate outcomes other than functional ablement or pain. These outcomes include coping, mental health, adherence to medications, exercise, and treatments, or other chronic low back pain-related outcomes, and more specific SM strategies utilized by this patient population. Longitudinal studies are also beneficial considering the dynamic situations that chronic low back pain patients experience, as well as qualitative studies that delve further into the SM and SMS strategies that are beneficial to their functional ablement. It is clear from the literature review that in-depth qualitative studies are lacking on SM and functional ablement, most particularly on SMS in chronic low back pain patients. Qualitative findings can better inform and allow for evaluation of measures that are more specific and appropriate to chronic low back pain patients. Information gathered will be critical to increasing understanding and improving nursing science and practice for this patient population.

Summary

Pain management is expensive, time-consuming and frustrating for many healthcare providers, patients, and their significant others (NCHS, 2006). A fundamental principle in chronic low back pain is that nonstructural factors are primarily responsible for the prevalence of pain and disability so that structural corrections tend to be highly unlikely to be the most effective intervention (Covington, 2007). This understanding also implies that at some point, endless searching for a peripheral pathology to explain a

patient's status becomes pointless and possibly even harmful (Covington). These facts highlight the importance of the concepts of SM and SMS in chronic low back pain.

The Chronic Care Model which emphasizes SMS was adapted to guide the conduct of this study. The adaptation of the model included SM as activated patients (Lorig & Holman, 2003; Hibbard, Mahoney, Stockard, & Tusler, 2005) with SM being the mediating variable between SMS (Wagner et al., 2001) and functional ablement. The outcome of functional ablement was derived from the Disablement Model (Verbrugge & Jette, 1994). This study examined whether SM and SMS significantly influenced functional ablement in patients with chronic low back pain after controlling for mental health state and demographic characteristics, whether SM mediated the relationship of SMS and functional ablement, and described patient perceptions of their SM, SMS, and functional ablement.

A non-experimental, cross-sectional descriptive design was conducted utilizing the mediation approach and qualitative content analysis to address the research purposes. Data were gathered from 110 participants in two pain centers through convenience sampling. Study findings showed a lack of significant statistical influence of SM and SMS in the functional ablement of chronic low back pain patients. Only the variable overall health was found to be significant in the final models. Using the mediation approach, SM and SMS were found to be strongly correlated, however, the other required regression equations were not significant. In effect, SM did not mediate the SMS-functional ablement relationship in this patient population.

Participant responses to the open-ended questions provided significant themes. Taking medications and maintaining physical activity were dominant SM activities.

Consistently, participants perceived that their providers gave them support in managing their chronic low back pain primarily through prescribing medications, followed by providing other treatments, and emotional support or encouragement. Lastly, participants' concerns regarding their functional ablement centered primarily on anxiety and fear. These perceptions contributed to a deeper understanding of SM, SMS, and functional ablement in chronic low back pain patients.

Despite some nonsignificant findings, the study results assisted in building further knowledge around SM and SMS in chronic low back pain patients although recommendations for future research are emphasized. The adaptation of the Chronic Care Model in this study needs to be evaluated further to enlighten nursing science and the work of nursing with potential significance to clinical practice. Nurses and nurse practitioners, as well as other health care providers figure prominently in the care of chronically ill patients especially in the areas of SM and SMS (Watts et al., 2009).

Conclusion

The influence of SM and SMS on functional ablement for chronic low back pain patients remains to be determined. The main knowledge generated from study findings include the significant correlations between SM and SMS, the influence of overall health on functional ablement, as well as a deeper understanding on the perceptions of the participants on their SM, SMS, and functional ablement. This essential information contributes to nursing knowledge, theory refinement, and evidence-based practice. Findings are preliminary and exploratory, needing further elaboration and evaluation through future research recommendations. Additional investigation and replication are required to elucidate the influence of SM and SMS on chronic low back patients.

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APPENDIX A

Review of Related Literature Matrix

Author/Year	R L	Sample	Purpose/ Interventions	Findings	Others
				Studies on SM (Self-management) and Chronic Illnesses	
Bair et al. (2009)	1	18 patients (pts); Comorbid musculo-skeletal pain and depression	Identification of patient-perceived barriers and facilitators to chronic pain SM	Multiple barriers in SM (i.e. disability, depression, ineffective pain-relief strategies, limited resources, lack of family and friend support, no individualized care, difficult patient-physician interactions); Facilitators to improve SM in pain (i.e. improving depression with treatment, encouragement from nurse care managers, supportive family and friends, having options for SM strategies, being a proactive patient, having a positive attitude)	
Buszewicz et al. (2006)	5	812 patients; OA	SM and an education booklet	Reduced anxiety and improved self-efficacy to manage symptoms compared to control group (education booklet only)	No significant effects noted on pain, physical function, or visits with primary care provider
Ersek et al. (2004)	5	<i>Target: 273 older adults</i>	<i>Chronic Pain SM Program: CPSMP</i>	<i>In comparison to education only control group, physical disability, depression, pain intensity, and pain-related interference with activities will be measured</i>	<i>Study protocol only, no published results</i>

Jovicic et al. (2006)	6	6 RCTs with 857 pts; Heart Failure (HF)	Evaluation of patients taking primary role in their own care	Decreased hospital readmission rates, improved quality of life and mortality numbers, demonstrated health behaviors (i.e. adherence to exercise and salt/fluid restrictions), and positive cost savings	
Lefort et al. (1998)	5	102 pts; Chronic pain	Chronic Pain SM Program (CPSMP)	Significantly improved pain, dependency, vitality, aspects of role functioning, life satisfaction, self-efficacy, and resourcefulness	Long-term impact needs to be evaluated.
Lorig & Holman (1993)	6	12-year review of SM studies	Arthritis SM Program (ASMP)	Improved pain, self-efficacy, and SM behaviors with decreased health care utilization resulting to cost savings	Physical disability increased.
Lorig et al. (2005)	5	355 pts; Arthritis	ASMP compared to Chronic Disease SM Program (CDSMP)	ASMP: Improvements in health distress, activity limitation, disability, fatigue, pain, practice of mental stress management, stretching, strengthening exercise, and self-efficacy. CDSMP: Improvements in health distress, activity limitation, and practice of mental stress management.	ASMP was more advantageous than CDSMP.
Lorig et al. (2001)	3	831 pts; Heart disease, Lung disease, Stroke, Arthritis	CDSMP: 2-year follow-up to RCT	Reduced ER/outpatient visits and health distress, improved self-efficacy	No significant changes in self-rated health, disability, activity limitations, energy or fatigue
Lorig et al.	5	952 pts;	CDSMP	Improvements in weekly minutes of exercise, frequency	No differences

(1999)		Heart disease, Lung disease, Stroke, Arthritis		of cognitive symptom management, communication with physicians, self-reported health, health distress, fatigue, disability, social/role activities limitations, fewer hospitalizations, and less days in the hospital	in pain/physical discomfort, shortness of breath, or psychological well-being
Norris et al. (2001)	6	72 RCTs; Type 2 Diabetes (DM)	Educational information (lifestyle behaviors, mechanical and coping skills)	Demonstrated knowledge, frequency and accuracy of self-monitoring of blood glucose, self-reported dietary habits, and positive glycemic control in the short term; Longer follow-up using regular reinforcement and follow-up were sometimes effective in improving glycemic control; Educational interventions that involved patient collaboration may be more effective than didactic interventions in improving glycemic control, weight, and lipid profiles.	Only short term effects on some variables; Effects on lipids, physical activity, weight, and blood pressure were variable.
Norris et al. (2002)	6	31 RCTs; Type 2 DM	Use of SM education	Decreased glycohemoglobin in the short term; Glycohemoglobin decreased more with additional contact time between participant and educator.	
Warsi et al. (2003)	6	17 studies reviewed; Arthritis	SM education component	Decreased pain and disability but effect sizes were small.	Small reductions noted
Yip et al. (2007)	4	120 pts; OA	ASMP with exercise	Reduced pain and fatigue, and improved range of motion, exercise, and functional status in the intervention group	No changes in muscle strength
				Studies on SM and Chronic Low Back Pain (CLBP)	

Cooper et al. (2009)	1	25 physiotherapy pts; CLBP	Evaluation of CLBP patients' perceptions of SM	Patients perceived that physiotherapy accounted only for a minimal influence on their CLBP management. Performance of SM strategies (i.e. exercise) were not done consistently. Patients expressed a strong need for SMS after completing physiotherapy.	Highlights association of SM and SMS to improve outcomes; Adequate SM education beyond the traditional means needed for behavior change
Coudeyre et al. (2006)	5	142 inpts; subacute and CLBP	Addition of a written standardized information about back pain	Significant impact noted on disability and patients' knowledge.	Nonsignificant effect on fear-avoidance beliefs
Escolar-Reina et al. (2009)	2	184 pts; CLBP and neck	SM information given during physical therapy	Adherence to nonpharmacologic SM strategies were noted	No significance noted on the outcome measure of back/neck care in activities of daily life.
Haas et al. (2005)	5	109 seniors; CLBP	CDSMP	Positive influence on emotional well-being and energy-fatigue; Advantage noted on disability during the intervention but not noted during the follow-up	No differences on self-efficacy, pain days,

					general health, and self-care attitudes
Liddle, Baxter, & Gracey (2007)	1	3 focus groups; CLBP	Identification of patient experiences and opinions	Verbalized multiple failed treatment approaches, acknowledged poor adherence to advice and exercise due to recurrence of symptoms and lack of precise diagnosis affecting long-term SM strategies, and expressed need for individually tailored programs with support as well as understanding of CLBP impact to patients by providers	
May (2010)	1	Review of systematic reviews: CLBP and Osteo-arthritis (OA)	Review of SM programs	SM was defined to include a relationship between patients and healthcare providers with independent health promotion activities. SM programs for CLBP and OA decreased pain and improved function. However, effect sizes are small. Exercise has been shown to help in SM although there is no clarity in terms of what is optimum exercise. Exercise with advice and education are recommended to be chief SM strategies for CLBP and OA.	The episodic and persistent nature of CLBP with its' high costs validate the need for SM in CLBP. However, clinical significance may be small and there were minimal CLBP studies. The importance of SMS is also highlighted.
Schulz et al.	4	35 pts;	Pilot evaluation	Decreased back pain intensity, increased physical activity,	

(2007)		CLBP	of a SM website	reduction in medical consultation and use of pain medications, and increased knowledge	
Sokunbi et al. (2010)	1	9 patients; CLBP	Evaluation of patient experiences after participating in an RCT of spinal stabilization exercises	Participants expressed increased confidence, formulation of self-help strategies, and control over CLBP.	
Townley et al. (2010)	2	90 seniors; CLBP	Feasibility study for SM pain program	Those with higher levels of pain are more willing to participate in the SM program. Participants' perceptions: tailoring the program to meet disabilities, flexibility in class schedules, information about benefits	These data help guide future SM programs.
Zufferey & Schulz (2009)	1	18 pts; CLBP	Patient-centered SM website called "Oneself"	Positive improvements on self-comprehension, argumentative abilities, orientation, self-confidence, and attention	Some negative effects of confusion and discouragement, Important to tailor and support SM programs
				Studies on SMS (Self-management support) and Chronic Illnesses	
Crotty et al. (2009)	5	152 pts; OA	SMS program: 6-week SM course with individualized	Improved health-directed behaviors and SM skills in the experimental group	No changes noted in pain levels, disability, and

			phone support and goal setting		quality of life
Krieger et al. (2009)	5	309 pts; Asthma	SMS interventions: nurse-provided asthma education, community referrals, social support, and environmental assessments	Improvements in patient outcomes (symptom-free days, quality of life, use of health services)	
Matthias et al. (2010)	1	18 pts; chronic pain	Evaluation of patient perceptions of communication from nurse care managers	Patients with chronic musculoskeletal pain reported that the nurse care managers supported, encouraged, and listened to them more than primary care physicians.	Highlights role of nurses
Schillinger et al. (2008)	5	Multi-lingual pts; DM	Weekly telephone SM and SMS with distinct communication methods	Higher engagement, participation, and representativeness from patients	
Schillinger et al. (2009)	5	339 with communication	Multilingual health information and	Improved SM behavior compared to usual care	

		barriers; DM	patient-centered SMS		
Su et al. (2009)	2	30 pts; ESRD	SMS via multidisciplinary team using group discussions and individual health consultations	Improved volume status, quality of life, and patient rehabilitation, without decline in nutritional state; Statistically significant changes noted in patients' SM and self-efficacy levels	Residual renal function decreased
Tang et al. (2010)	4	77 adults; Type 2 DM	SMS program: health education and weekly sessions focusing on experiential learning, coping, problem solving, and goal setting, with major emphasis on empowerment	Improvements in health behaviors (monitoring blood glucose and following a healthy diet), blood pressures, cholesterol levels, body mass indices, and primarily, hemoglobin A1c levels.	
				Studies on SMS and CLBP	
Jordan et al. (2010)	6	42 trials with 8243 pts; Mostly spinal pain, OA	Review of various interventions for improving adherence to exercise and	Interventions using supervised or individualized exercise regimen and SM techniques can enhance adherence to exercise. However, many results in various trials showed inconsistencies.	No consistency in interventions used with contrasting results on outcomes

			physical activity		(adherence, pain, function).
Liddle, Gracey, & Baxter (2007)	6	39 RCTs with 7347 pts; Low back pain	Review of advice interventions (included acute and chronic patients)	Advice as an addition to exercise was the most common and most effective in decreasing pain, and improving back-specific function and disability in CLBP patients; Strong evidence also noted on the use of advice to promote SM	Recommended to evaluate the role of follow-up advice for CLBP patients
				Studies on SM, SMS, and Chronic Illnesses	
Allen (2008)	2	121 pts; Chronic pain, Depression, Impaired mobility	Principles of SM to engage and empower, with health education towards self-efficacy and motivation for SM; Use of internet-based health coaching that included online worksheets and email exchanges by nurses	Increased patients' active participation in their care and improved patient-clinician partnerships towards better disease management	
Crotty et al. (2009)	5	152 pts; OA	SM course with individual phone	Modest improvements on health-directed behaviors and skill and technique acquisition for SM	No significant effect on pain,

			support and goal setting		disability, quality of life, or depression.
Damush et al. (2003)	5	211 acute low back pain pts	SM program: in-person classes, handouts, audiotapes, physician letters of support, telephone follow-ups	SM classes also included goal setting, problem solving, social support, exercise, and back education. Control group received medications, back exercise sheets, and referrals to specialists. Decreased low back pain, less fear of physical activity and movement, improved anxiety and depression, and increased confidence in managing symptoms in the intervention group	Conducted in inner city neighborhood health centers
Faul et al. (2009)	3	Older adults in community	Geriatric assessment services, SM care plan intervention, and a telephone support	First two interventions improved self-efficacy, self-rated health, functional state, physical mobility, mental health, and reduced falls.	Addition of SMS intervention via telephone support did not demonstrate additional improvements.
Harvey et al. (2008)	2	175 pts; DM, CV disease, Arthritis	Variety of SM education and SMS options	Provider and patient self-reports noted increased patient knowledge and ability for SM.	
Ouwens et al. (2005)	1	13 Systematic reviews; CIs	Review of integrated care programs	Common components for successful programs included SM and SMS interventions resulting to improved quality of care.	

				Studies on SM, SMS, and CLBP	
Crowe et al. (2010)	1	62 pts and 22 healthcare providers; CLBP	Study of patient SM strategies and provider SMS roles	Most common patient strategies: medication, exercise, heat application; Main physiotherapist strategy: exercise; Primary general practitioner roles: prescribing pain medications, dispensing sickness certificates, referral to specialists	More research studies needed

Note. RL = Rating Levels: 6 = Systematic review or meta-analysis of randomized controlled trials (RCTs); 5 = RCT; 4 = Controlled trial without randomization; 3 = Quasi-experimental study; 2 = Non-experimental studies (case control, correlational descriptive); 1 = Qualitative studies. Adapted from the Agency for Healthcare Research and Quality, 2002; Melnyk & Fineout-Overholt, 2005. Agency for Healthcare Research and Quality: Systems to rate the strength of scientific evidence, Evidence Report/Technology Assessment No. 47, Rockville, Md, 2002, Agency for Healthcare research and Quality, U.S. Department of Health and Human Services, AHRQ Publication No. 02-E016; Melnyk, B. M. , & Fineout-Overholt, F. (2006). *Evidence-based practice in nursing & healthcare. A guide to best practice*. Philadelphia: Lippincott, Williams & Wilkins.

APPENDIX B

Letters

B1 Letter: Permission Request

December 20, 2010

Godwin Maduka MD
Medical Director
Las Vegas Pain Institute and Medical Center, LLC



Dear Dr. Maduka:

Greetings! I am conducting a study to: (a) examine the influence of self-management and perceived self-management support on the functional ablement in patients with chronic low back pain, (b) examine whether self-management mediates the relationship between self-management support and functional ablement, and (c) describe patient perceptions of their SM, SMS, and functional ablement. In connection to this, I would like to ask your permission to carry out this study in your two pain centers. I will need approximately 110 participants. Patients will be required to complete questionnaires that may take approximately 20 minutes.

There are no known or anticipated risks or discomforts associated with this study other than what is commonly encountered in a clinic visit. Patient participation is voluntary and each will be asked to sign an informed consent form with HIPAA authorization. Patients can change their minds during completion of their surveys and refuse to participate. They will not be charged for their participation. Instead, they will be given a \$10 gift card upon return of competed surveys. The gift card is offered in compensation for their time and effort.

All of the information from the surveys will be kept confidential. Data will be aggregated so that resulting findings cannot be linked to individual patients. All of the surveys will be collected by trained research assistants, turned over to me, and locked in my secured office for privacy and confidentiality. Results of the surveys will be aggregated and summarized for research purposes and potential benefit to practice quality improvement.

With your consent, I will be training a research assistant for each location to ensure that research is conducted according to study procedures and data collection protocol. I will need to post recruitment flyers in the centers and the website at <http://www.lasvegaspaininstitutes.com/>. Copies of the recruitment flyers will also be

provided to patients in order to advertise the study. Please feel free to ask any questions about the study and I anticipate your positive consideration of my proposed study.

Thank you very much.

Sincerely,

Jennifer Kawi BSN, MSN, FNP-BC PhD Candidate
University of Colorado Denver College of Nursing

APPENDIX B2

Letter: Permission Granted

LAS VEGAS PAIN INSTITUTE AND MEDICAL CENTER, LLC

*3835 So Jones Blvd
Las Vegas, NV 89103
[REDACTED]*

*2705 W Horizon Ridge Pkwy
Henderson, NV 89052
[REDACTED]*

December 20, 2010

Colorado Multiple Institutional Review Board
University of Colorado Denver

[REDACTED]
Aurora, CO 80045

COMIRB Study Review Panel:

Greetings! I have reviewed the request for permission from Jennifer Kawi to conduct her research study at the Las Vegas Pain Institute and Medical Center, LLC. I read her study proposal and support the study. I was given an opportunity to discuss any questions. I do not have any concerns. I oversee both pain centers and I have the authority to make a decision regarding this request. I hereby grant permission for this study to be conducted at the two locations of the Las Vegas Pain Institute and Medical Center, LLC in Las Vegas and Henderson, Nevada. Together with the treating pain physician, I will also serve as a consulting provider in case any medical issues during the data collection process occur. I have reviewed the recruitment flyers and I agree to having these posted in the waiting rooms and our website, and distributed to patients to advertise the study.

Jennifer Kawi is a nurse practitioner at the Las Vegas Pain Institute and has been a part of the team since 2004. At present, she is a part time employee. She converted to a part time status in Fall of 2007. She has also primarily assumed an administrative role in our facility with less direct contact with patients. Jennifer Kawi is conducting this study on her personal time as a doctoral student with the University of Colorado Denver College of Nursing, not in the capacity of a nurse practitioner or an administrator. She will also utilize research assistants under her supervision to assist in conducting her study. In effect, I do not foresee any ethical issues or conflict of interest concern. I am confident that she will uphold ethical conduct throughout the study and will protect the rights of our patients. She has my full support towards the successful completion of this study.

Please feel free to contact me with any questions. Thank you very much.

Sincerely,

Godwin Maduka MD
Medical Director
Las Vegas Pain Institute and Medical Center, LLC



APPENDIX C

Consent

Date: 01/07/11**Valid for Use Through:****Study Title:** Self-Management and Self-Management Support on Functional Ablement
in Chronic Low Back Pain**Principal Investigator:** Jennifer Kawi MSN FNP-BC**COMIRB No:** 10-1502**Version Date:** 01/07/11**Version No:** 2

You are being asked to be in a research study. This form provides you with information about the study. The research assistant acting on behalf of the investigator will describe this study to you and answer all of your questions. Please read the information below and ask questions about anything you do not understand before deciding whether or not to take part.

Why is this study being done?

This study plans to learn more about self-management, self-management support, and functional ablement in patients with chronic low back pain. Self-management refers to your knowledge, beliefs, confidence, skills, and behaviors in managing your chronic low back pain. Self-management support refers to how your health care providers prepare and encourage you to manage your chronic low back pain emphasizing your fundamental role in your own care. Functional ablement refers to your capacity to perform an activity and participate in personal, physical, and social life situations despite their chronic low back pain.

Chronic low back pain patients commonly suffer from disability. You are being asked to be in this research study because you suffer from chronic low back pain.

Up to 110 people from the Las Vegas Pain Institute (Las Vegas and Henderson locations) will participate in the study.

What happens if I join this study?

If you join the study, you will be asked to complete a set of surveys. This will take approximately 20 minutes.

What are the possible discomforts or risks?

There are no known or anticipated risks or discomforts associated with this study other than what is commonly encountered in a clinic visit.

If any unforeseen or unanticipated risk does occur (i.e. severe mental distress), you will be provided with initial support in the pain center with notification of the 911 emergency system as needed. Further, you will be referred for appropriate consultation, referral, or treatment.

Although your confidential information will be secured at all times, there is a very minimal risk of disclosure. However, every effort is done in this research so that individual confidential information is kept safe and protected.

What are the possible benefits of the study?

This study is designed for the researcher to learn more about self-management and self-management support in the functional ability (ability) of patients with chronic low back pain. This study is not designed to treat any illness or to improve your health today.

Will I be paid for being in the study? Will I have to pay for anything?

It will not cost you anything to be in the study. You will be given a \$10 gift card upon return of completed surveys. The gift card is offered by the researcher in compensation for your time and effort, and should in no way influence your response to the survey items.

Is my participation voluntary?

Taking part in this study is completely voluntary. You have the right to choose not to take part in this study. If you choose to take part, you have the right to stop at any time. If you refuse or decide to withdraw later, you will not lose any benefits or rights that you would normally get outside of this study. Refusing to participate or withdrawing later will not affect your employment status or your reputation. It will not change your ability to get government assistance. If you leave this study, the only benefits that you will lose are the ones you are getting as part of this study. Your relationship with the Las Vegas Pain Institute will not be affected.

Can I be removed from this study?

Your physician may decide to stop your participation without your permission if he thinks that being in this study may cause your harm, or for any other reason.

Who do I call if I have questions?

The researcher carrying out this study is Jennifer Kawi. You may ask any questions you have now from the person talking to you about this consent form. You will also get a copy of this consent form to keep. If you have questions later, you may call Jennifer Kawi at [REDACTED].

You may have questions about your rights as someone in this study. You can call Jennifer Kawi with questions. You can also call the Colorado Multiple Institutional Review Board (IRB). You can call them at [REDACTED].

Who will see my research information?

The University of Colorado Denver has rules to protect information about you. Federal and state laws including the Health Insurance Portability and Accountability Act (HIPAA) also protect your privacy. This part of the consent form tells you what information about you may be collected in this study and who might see or use it.

The institutions involved in this study include:

- University of Colorado Denver
- Las Vegas Pain Institute, LLC

We cannot do this study without your permission to see, use and give out your information. You do not have to give us this permission. If you do not, then you may not join this study.

The principal investigator will review your medical records to gather information about your medical conditions and the pain treatments you have received or currently receiving.

We will see, use and disclose your information only as described in this form and in our Notice of Privacy Practices; however, people outside the University of Colorado Denver and the Las Vegas Pain Institute may not be covered by this promise.

We will do everything we can to keep your records a secret. It cannot be guaranteed.

The use and disclosure of your information has no time limit. You can cancel your permission to use and disclose your information at any time by writing to the study's Primary Investigator, at the name and address listed below. If you do cancel your permission to use and disclose your information, your part in this study will end and no further information about you will be collected. Your cancellation would not affect information already collected in this study.

Principal Investigator: Jennifer Kawi MSN FNP-BC PhD Candidate
 University of Nevada Las Vegas, School of Nursing

Las Vegas, Nevada 8

Both the research records that identify you and the consent form signed by you may be looked at by others who have a legal right to see that information.

- Federal offices such as the Food and Drug Administration (FDA) that protect research subjects like you.
- People at the Colorado Multiple Institutional Review Board (COMIRB)
- Officials at the Las Vegas Pain Institute, LLC where the research is being conducted, who are in charge of making sure that we follow all of the rules for research
- The researcher

We might talk about this research study at meetings. We might also print the results of this research study in relevant journals. But we will always keep the names of the research subjects, like you, private.

You have the right to request access to your personal health information from the Investigator.

The investigator (or staff acting on behalf of the investigator) will also make some of the following health information about me available to: Insignia Health, LLC, exclusive licensee and copyright holder of the Patient Activation Measure

Information about me that will be seen, collected, used and disclosed in this study:

- Name and Demographic Information (age, sex, ethnicity, phone number, etc.) for data collection in this research; No personally identifiable health information about me will be disclosed to other than the researcher and those who have a legal right to see the data.
- Portions of my previous and current Medical Records that are relevant to this study, including but not limited to Diagnosis(es), History and Physical, Pain management modalities
- Answers and research findings related to the self-management surveys without personally identifiable health information: These findings will be disclosed to Insignia Health, LLC to assist the organization in examining the influence of self-management to supporting health and for further development of their instrument to measure self-management (Patient Activation Measure).

What happens to Data that are collected in this study?

Scientists at the University of Colorado Denver and those involved in this study work to gather information about diseases. The data collected from you during this study are important to this study and to future research. If you join this study:

- The data is given by you to the investigator for this research and so no longer belongs to you.
- Investigator may study your data
- If data are in a form that identifies you, University of Colorado Denver and those involved in this study may use them for future research only with your consent or IRB approval.
- Any product or idea created by the researchers working on this study will not belong to you.
- There is no plan for you to receive any financial benefit from the creation, use or sale of such a product or idea.

Things that must be reported to authorities

The federal government requires us to keep your information private. But If you give us information about someone hurting someone else, or that you might harm yourself, we will have to report that. If a court orders us to hand over your study records, we will have to hand them over to the court.

Agreement to be in this study

I have read this paper about this research study or it was read to me. I understand the possible risks and benefits of this study. I understand and authorize the access, use and disclosure of my information as stated in this form. I know that being in this study is voluntary. I choose to be in this study: I will get a signed and dated copy of this Consent form.

Signature: _____

Date: _____

Print Name: _____

Consent form explained by: _____

Date: _____

Print Name: _____

Investigator: _____

Date: _____

APPENDIX D

Demographic Surveys and Measures

D1 Demographic Survey

Directions: Please answer the following background information about you. These information are helpful in understanding any impact of these characteristics to chronic low back pain. These information will only be used for research purposes and will be held in **confidence**. Please answer all questions and select the response that best describes you. When applicable, please indicate an **X** mark in the box provided that corresponds to your answer. If you do not know the information requested or the question does not apply to you, please mark “unknown” or “not applicable” as appropriate.

1. What is your age? (Please **list your age** at your last birthday.) _____
2. What is your sex?

<input type="checkbox"/> Male	<input type="checkbox"/> Female
-------------------------------	---------------------------------
3. Are you of Hispanic, Spanish, or Latino/a origin?

<input type="checkbox"/> Yes	<input type="checkbox"/> No
------------------------------	-----------------------------
4. What race do you consider yourself to be?

<input type="checkbox"/> White	<input type="checkbox"/> Native Hawaiian/other Pacific Islander
<input type="checkbox"/> Black/African-American	<input type="checkbox"/> Asian
<input type="checkbox"/> American Indian or Alaska Native	<input type="checkbox"/> Other (Please specify) _____
5. What is the highest grade or level of school you **completed**?

<input type="checkbox"/> Less than high school graduate	<input type="checkbox"/> College graduate or more
<input type="checkbox"/> High school graduate	<input type="checkbox"/> Higher than college graduate
<input type="checkbox"/> Some college or trade school	
6. What is your annual **net** household income?

<input type="checkbox"/> Less than \$15,000	<input type="checkbox"/> \$50,000 to \$74,999
<input type="checkbox"/> \$15,000 to \$24,999	<input type="checkbox"/> \$75,000 to \$99,999
<input type="checkbox"/> \$25,000 to \$34,999	<input type="checkbox"/> \$100,000 or more
<input type="checkbox"/> \$35,000 to \$49,999	
7. Do you have health care insurance currently?

<input type="checkbox"/> Yes	<input type="checkbox"/> No
------------------------------	-----------------------------

8. Does your current health care insurance adequately cover your chronic low back pain management expenses?
- | | |
|--|--|
| <input type="checkbox"/> Not much at all | <input type="checkbox"/> A good amount |
| <input type="checkbox"/> A little | <input type="checkbox"/> A great deal |
| <input type="checkbox"/> Not applicable | |
9. What is your current employment status?
- | | |
|---|---|
| <input type="checkbox"/> Full time (at least 35 hours/week) | <input type="checkbox"/> Disabled, unable to work |
| <input type="checkbox"/> Part time (less 35 hours/week) | <input type="checkbox"/> Full time homemaker |
| <input type="checkbox"/> Unemployed | <input type="checkbox"/> Student |
| <input type="checkbox"/> Retired | <input type="checkbox"/> Other (Please specify) _____ |
10. How long have you had chronic low back pain? (Please **list # of months/years.**)
- _____
11. On the average, how helpful were your **previous** pain management treatments?
- | | |
|--|--|
| <input type="checkbox"/> Not much at all | <input type="checkbox"/> A good amount |
| <input type="checkbox"/> A little | <input type="checkbox"/> A great deal |
12. On the average, how helpful are your **current** pain management treatments?
- | | |
|--|--|
| <input type="checkbox"/> Not much at all | <input type="checkbox"/> A good amount |
| <input type="checkbox"/> A little | <input type="checkbox"/> A great deal |
13. In general, how would you rate **your overall health** now?
- | | |
|-------------------------------|------------------------------------|
| <input type="checkbox"/> Poor | <input type="checkbox"/> Very Good |
| <input type="checkbox"/> Fair | <input type="checkbox"/> Excellent |
| <input type="checkbox"/> Good | |
14. Which of the following best describes your current marital status?
- | | |
|--|--|
| <input type="checkbox"/> Never married | <input type="checkbox"/> Separated |
| <input type="checkbox"/> Currently married | <input type="checkbox"/> Divorced |
| <input type="checkbox"/> Widowed | <input type="checkbox"/> Other (Please specify): _____ |
| <input type="checkbox"/> Living with partner/significant other | |
15. How much support do you receive from people other than your health care providers (i.e. family, friends, significant others) for your chronic low back pain?
- | | |
|--|--|
| <input type="checkbox"/> Not much at all | <input type="checkbox"/> A good amount |
| <input type="checkbox"/> A little | <input type="checkbox"/> A great deal |
16. How important is religion or spirituality in your life?
- | | |
|--|--|
| <input type="checkbox"/> Not much at all | <input type="checkbox"/> A good amount |
| <input type="checkbox"/> A little | <input type="checkbox"/> A great deal |

APPENDIX D2

Demographic Form: Medical Records

1. Does the patient have any of the following medical conditions? Check all that applies.

- Anxiety
- Arthritis
- Asthma
- Chronic Bronchitis
- Cancer
- Chronic Pain (other than chronic low back pain)
- COPD
- Depression
- Diabetes
- Emphysema
- Heart Disease
- High Blood Pressure
- High Cholesterol
- Kidney disease
- Liver disease
- Osteoporosis
- Stroke
- Ulcers
- Others: _____

2. Which of the following pain management modalities have the patient received or is/are currently receiving? Check all that applies.

- Ablation (i.e. chemical denervation, cryotherapy, radiofrequency, thermal) _____
- Acupuncture
- Back School (formal educational program)
- Biofeedback
- Chiropractic
- Cognitive Therapy
- Exercise
- Ice/Heat Packs
- Injections (i.e. Steroids) _____
- Lumbar Support
- Massage
- Opioids
- Pain Medications (other than opioids) _____
- Physical Therapy
- Surgery (other than injections, i.e. fusion) _____
- Traction
- Transcutaneous Electrical Nerve Stimulation (TENS)
- Ultrasound
- Yoga
- Others: _____

APPENDIX D3

Patient Activation Measure (PAM), 13-Item*

Below are some statements that people sometimes make when they talk about their health. Please indicate how much you agree or disagree with each statement as it applies to you personally by circling your answer. *Your answers should be what is true for you and not just what you think the doctor wants you to say.*

If the statement does not apply to you, circle N/A.

1. When all is said and done, I am the person who is responsible for taking care of my health	Disagree Strongly	Disagree	Agree	Agree Strongly	N/A
2. Taking an active role in my own health care is the most important thing that affects my health	Disagree Strongly	Disagree	Agree	Agree Strongly	N/A
3. I am confident I can help prevent or reduce problems associated with my health	Disagree Strongly	Disagree	Agree	Agree Strongly	N/A
4. I know what each of my prescribed medications do	Disagree Strongly	Disagree	Agree	Agree Strongly	N/A
5. I am confident that I can tell whether I need to go to the doctor or whether I can take care of a health problem myself.	Disagree Strongly	Disagree	Agree	Agree Strongly	N/A
6. I am confident that I can tell a doctor concerns I have even when he or she does not ask.	Disagree Strongly	Disagree	Agree	Agree Strongly	N/A
7. I am confident that I can follow through on medical treatments I may need to do at home	Disagree Strongly	Disagree	Agree	Agree Strongly	N/A
8. I understand my health problems and what causes them.	Disagree Strongly	Disagree	Agree	Agree Strongly	N/A
9. I know what treatments are available for my health problems	Disagree Strongly	Disagree	Agree	Agree Strongly	N/A
10. I have been able to maintain (keep up with) lifestyle changes, like eating right or exercising	Disagree Strongly	Disagree	Agree	Agree Strongly	N/A
11. I know how to prevent problems with my health	Disagree Strongly	Disagree	Agree	Agree Strongly	N/A

12. I am confident I can figure out solutions when new problems arise with my health.	Disagree Strongly	Disagree	Agree	Agree Strongly	N/A
13. I am confident that I can maintain lifestyle changes, like eating right and exercising, even during times of stress.	Disagree Strongly	Disagree	Agree	Agree Strongly	N/A

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Please answer the following question. These information will only be used for research purposes and will be held in **confidence**.

What are ways you manage your chronic low back pain?

APPENDIX D4

Patient Assessment of Chronic Illness Care (PACIC)

Assessment of Care for Chronic Conditions*

Staying healthy can be difficult when you have a chronic low back pain. We would like to learn about the type of help with your low back pain you get from your health care team. This might include your regular doctor, his or her nurse, or physician's assistant who treats your illness. Your individual answers will be kept confidential and will not be shared with your physician or clinic.

Over the past 6 months, when I received care for my chronic low back pain, I was:

	<u>None of the time</u>	<u>A Little of the Time</u>	<u>Some of the Time</u>	<u>Most of the Time</u>	<u>Always</u>
B1. Asked for my ideas when we made a treatment plan.	<input type="checkbox"/> ₁	<input type="checkbox"/> ₂	<input type="checkbox"/> ₃	<input type="checkbox"/> ₄	<input type="checkbox"/> ₅
B2. Given choices about treatment to think about.	<input type="checkbox"/> ₁	<input type="checkbox"/> ₂	<input type="checkbox"/> ₃	<input type="checkbox"/> ₄	<input type="checkbox"/> ₅
B3. Asked to talk about any problems with my medicines or their effects.	<input type="checkbox"/> ₁	<input type="checkbox"/> ₂	<input type="checkbox"/> ₃	<input type="checkbox"/> ₄	<input type="checkbox"/> ₅
<hr/>					
B4. Given a written list of things I should do to improve my chronic low back pain.	<input type="checkbox"/> ₁	<input type="checkbox"/> ₂	<input type="checkbox"/> ₃	<input type="checkbox"/> ₄	<input type="checkbox"/> ₅
B5. Satisfied that my care was well organized.	<input type="checkbox"/> ₁	<input type="checkbox"/> ₂	<input type="checkbox"/> ₃	<input type="checkbox"/> ₄	<input type="checkbox"/> ₅
B6. Shown how what I did to take care of myself influenced my chronic low back pain.	<input type="checkbox"/> ₁	<input type="checkbox"/> ₂	<input type="checkbox"/> ₃	<input type="checkbox"/> ₄	<input type="checkbox"/> ₅
<hr/>					
B7. Asked to talk about my goals in caring for my chronic low back pain.	<input type="checkbox"/> ₁	<input type="checkbox"/> ₂	<input type="checkbox"/> ₃	<input type="checkbox"/> ₄	<input type="checkbox"/> ₅

- B8. Helped to set specific goals to improve my eating or exercise. ₁ ₂ ₃ ₄ ₅
- B9. Given a copy of my treatment plan. ₁ ₂ ₃ ₄ ₅
- B10. Encouraged to go to a specific group or class to help me cope with my chronic low back pain. ₁ ₂ ₃ ₄ ₅
- B11. Asked questions, either directly or on a survey, about my health habits. ₁ ₂ ₃ ₄ ₅
-
- B12. Sure that my doctor or nurse thought about my values, beliefs, and traditions when they recommended treatments to me. ₁ ₂ ₃ ₄ ₅
- B13. Helped to make a treatment plan that I could carry out in my daily life. ₁ ₂ ₃ ₄ ₅
- B14. Helped to plan ahead so I could take care of my chronic low back pain even in hard times. ₁ ₂ ₃ ₄ ₅
- B15. Asked how my chronic low back pain affects my life. ₁ ₂ ₃ ₄ ₅
-
- B16. Contacted after a visit to see how things were going. ₁ ₂ ₃ ₄ ₅
- B17. Encouraged to attend programs in the community that could help me. ₁ ₂ ₃ ₄ ₅
- B18. Referred to a dietitian, health educator, or counselor. ₁ ₂ ₃ ₄ ₅

- B19. Told how my visits with other types of doctors, like an eye doctor or other specialist, helped my treatment. ₁ ₂ ₃ ₄ ₅
- B20. Asked how my visits with other doctors were going. ₁ ₂ ₃ ₄ ₅

Group Health Version 8/13/03

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Please answer the following question. This information will only be used for research purposes and will be held in **confidence**.

What are ways your health care providers give you support in your management of your chronic low back pain?

APPENDIX D5

Oswestry Disability Index (ODI) Version 2.1a*

ODI version 2.1a

This questionnaire is designed to give us information as to how your back trouble affects your ability to manage in everyday life.

Please answer every section. Mark one box only in each section that most closely describes you today.

Section 1 - Pain intensity

- I have no pain at the moment.
- The pain is very mild at the moment.
- The pain is moderate at the moment.
- The pain is fairly severe at the moment.
- The pain is very severe at the moment.
- The pain is the worst imaginable at the moment.

Section 2 - Personal care (washing, dressing, etc.)

- I can look after myself normally without causing extra pain.
- I can look after myself normally but it is very painful.
- It is painful to look after myself and I am slow and careful.
- I need some help but manage most of my personal care.
- I need help every day in most aspects of self care.
- I do not get dressed, wash with difficulty and stay in bed.

Section 3 - Lifting

- I can lift heavy weights without extra pain.
- I can lift heavy weights but it gives extra pain.
- Pain prevents me from lifting heavy weights off the floor but I can manage if they are conveniently positioned, e.g. on a table.
- Pain prevents me from lifting heavy weights but I can manage light to medium weights if they are conveniently positioned.
- I can lift only very light weights.
- I cannot lift or carry anything at all.

Section 4 - Walking

- Pain does not prevent me walking any distance.
- Pain prevents me walking more than one mile.
- Pain prevents me walking more than a quarter of a mile.
- Pain prevents me walking more than 100 yards.
- I can only walk using a stick or crutches.
- I am in bed most of the time and have to crawl to the toilet.

Section 5 – Sitting

- I can sit in any chair as long as I like.
- I can sit in my favourite chair as long as I like.
- Pain prevents me from sitting for more than 1 hour.
- Pain prevents me from sitting for more than half an hour.
- Pain prevents me from sitting for more than 10 minutes.
- Pain prevents me from sitting at all.

Section 6 - Standing

- I can stand as long as I want without extra pain.
- I can stand as long as I want but it gives me extra pain.
- Pain prevents me from standing for more than 1 hour.
- Pain prevents me from standing for more than half an hour.
- Pain prevents me from standing for more than 10 minutes.
- Pain prevents me from standing at all.

Section 7 - Sleeping

- My sleep is never disturbed by pain.
- My sleep is occasionally disturbed by pain.
- Because of pain I have less than 6 hours sleep.
- Because of pain I have less than 4 hours sleep.
- Because of pain I have less than 2 hours sleep.
- Pain prevents me from sleeping at all.

Section 8 - Sex life (if applicable)

- My sex life is normal and causes no extra pain.
- My sex life is normal but causes some extra pain.
- My sex life is nearly normal but is very painful.
- My sex life is severely restricted by pain.
- My sex life is nearly absent because of pain.
- Pain prevents any sex life at all.

Section 9 - Social life

- My social life is normal and causes me no extra pain.
- My social life is normal but increases the degree of pain.
- Pain has no significant effect on my social life apart from limiting my more energetic interests, e.g. sport, etc.
- Pain has restricted my social life and I do not go out as often.
- Pain has restricted social life to my home.
- I have no social life because of pain.

Section 10 – Travelling

- I can travel anywhere without pain.
- I can travel anywhere but it gives extra pain.
- Pain is bad but I manage journeys over two hours.
- Pain restricts me to journeys of less than one hour.
- Pain restricts me to short necessary journeys under 30 minutes.
- Pain prevents me from travelling except to receive treatment

Result

Your ODI = %

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Please answer the following question. These information will only be used for research purposes and will be held in **confidence**.

What are your concerns about your functional ability?

APPENDIX D6

Mental Health Inventory (MHI-5)*

Directions: These questions are about how you feel and how things have been with you during the **past month**. For each question, please circle a number for the **one** answer that comes closest to the way you have been feeling.

	All of the time	Most of the time	A good bit of the time	Some of the time	A Little of the time	None of the time
Have you been a very nervous person?	1	2	3	4	5	6
Have you felt so down in the dumps that nothing could cheer you up?	1	2	3	4	5	6
Have you felt calm and peaceful?	1	2	3	4	5	6
Have you felt downhearted and blue?	1	2	3	4	5	6
Have you been a happy person?	1	2	3	4	5	6

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APPENDIX E

Data Collection

E1 Data Collection Protocol

1. A research assistant for each pain center was trained by the researcher according to the research procedures and data collection processes involved in this study including obtaining informed consent and ensuring privacy and confidentiality. Timing for conducting research was considered to prevent disrupting the clinic flow in the pain centers. All survey packets were numbered individually from one and above, and identified as Pain Center 1 or 2.
2. Before the start of the clinic day, the researcher reviewed the list of patients with the medical records to identify who meets the inclusion criteria (18 years old and above, patient in the Las Vegas Pain Institute, with doctor-diagnosed non-malignant low back pain for at least 3 months, and able to read, write, and understand English). Patients with acute pain for other conditions were excluded. The treating physician was consulted to evaluate if the identified patients can participate in the study. This list of eligible patients was given to the research assistant at the arrival to the pain center.
3. When the identified patient came for his/her visit, the research assistant advised the patient of the study and secured informed consent in a private room. Any questions or concerns were addressed. The research assistant and the center staff were instructed to call the researcher anytime as needed for questions or concerns.
4. Patients were advised that they are given time to consider whether they want to participate in the study. If the patient gave permission to participate, a Consent Form with the authorization to use and release health information was given to the participant to sign. A copy of this signed form was given to the participant. The survey packet containing all survey forms were then provided to the participant for completion. All completed forms were locked and secured in a file cabinet at the researcher's office.
5. Participants were advised to answer the questions based on their chronic low back pain. Directions in answering the surveys were reinforced. After the participant completed the surveys, the research assistant verified to ensure that everything is completed. Then, the participant was given a \$10 gift card and thanked for his/her participation. Participants had a choice between a \$10.00 Walmart gift card or \$10.00 Starbucks gift card. The Data Collection form was completed by the research assistant for record keeping. If the survey packet was not finished, this was returned to the participant for completion. If the participant became unavailable, the research assistant subsequently contacted the participant by phone once in order to complete missing information.

6. The researcher then accessed the patient's medical records to validate and document the list of medical conditions and pain treatment modalities that the patient has received or is currently receiving.

7. All of the steps in the data collection protocol were consistently followed. If a step was not followed, this would have been indicated in the Data Collection form and the researcher would be notified. Forms with largely missing information can affect data analysis and subsequent findings.

8. The researcher followed-up with the research assistants on a daily basis, or sooner if needed. This was accomplished either by phone, email, or site visit. Once at the pain centers, the researcher answered any questions, assisted with any concerns, and followed-up on the data collection processes to ensure that the protocol was being consistently followed. Then, all completed survey packets were gathered, secured, and locked in a file cabinet at the researcher's personal work office until data analysis. The contact information of the researcher was readily available at the site.

9. Steps 2 through 8 were repeated until at least 110 participants were recruited and all required data were collected.

APPENDIX E3

Recruitment Flyer

Self-Management and Self-Management Support on Functional Ablement (Ability) in Chronic Low Back Pain

Be part of an important chronic low back pain management research study:

- *Are you at least 18 years old and a patient of the Las Vegas Pain Institute?*
- *Have you had low back pain for at least 3 months, diagnosed by your doctor, with the low back pain not due to cancer?*

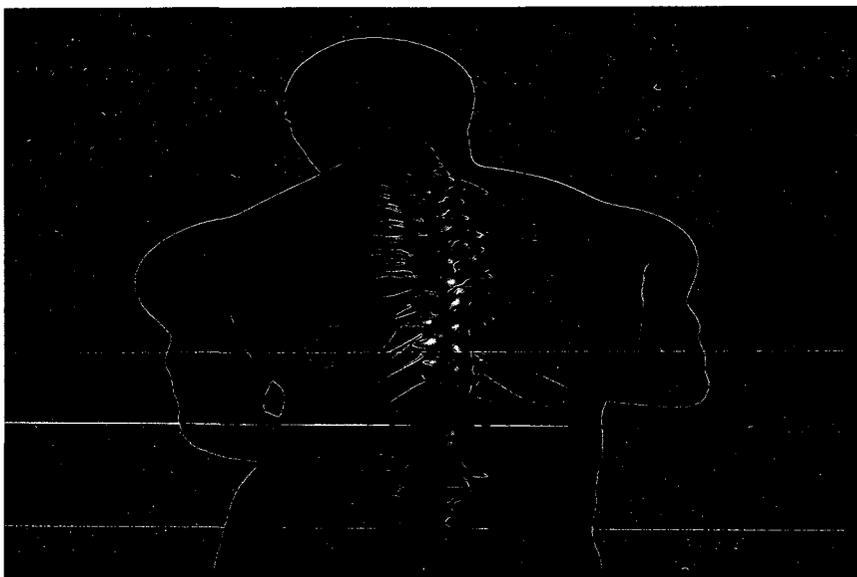
If you answered **YES** to these questions, you may be eligible to participate in this research study.

The **purpose** of this research is to examine self-management, self-management support, and functional ablement (ability) in patients with chronic low back pain. You may be able to receive affirmation for your self-management practices and learn about self-management support from the surveys. You will also receive a gift card in compensation for your time and effort. This process will entail about 20 minutes of your time to complete the surveys.

This research study is being conducted at the **2 locations of the Las Vegas Pain Institute** at (██████████). You can only participate in one of the 2 locations:

- ██████████, *Las Vegas, NV, 89103*
- ██████████, *Henderson, NV, 89052*

This research is under the direction of Jennifer Kawi, MSN FNP-BC, doctoral candidate with University of Colorado Denver. Please call Jennifer Kawi at ██████████ or request to speak with a trained research assistant at any of the Las Vegas Pain Institute locations for more information.



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APPENDIX E4

Recruitment Flyer with Tear-off Phone Numbers

Self-Management and Self-Management Support on Functional Ablement (Ability) in Chronic Low Back Pain

**Be part of an important chronic low back pain management
research study:**

- *Are you at least 18 years old and a patient of the Las Vegas Pain Institute?*
- *Have you had low back pain for at least 3 months, diagnosed by your doctor, with the low back pain not due to cancer?*

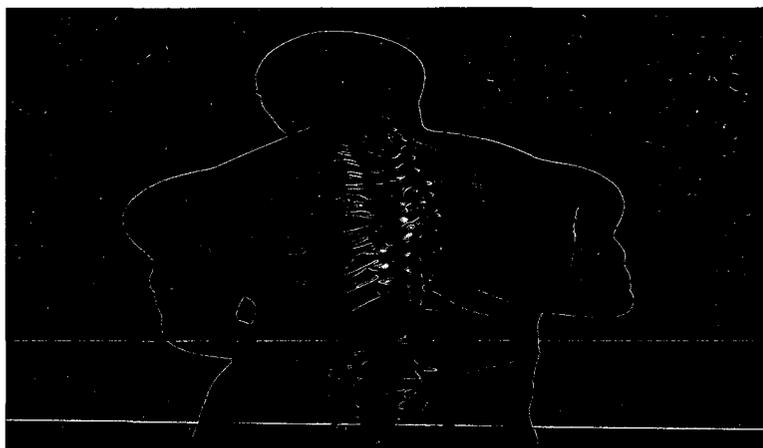
If you answered **YES** to these questions, you may be eligible to participate in this research study.

The **purpose** of this research is to examine self-management, self-management support, and functional ablement (ability) in patients with chronic low back pain. You may be able to receive affirmation for your self-management practices and learn about self-management support from the surveys. You will also receive a gift card in compensation for your time and effort. This process will entail about 20 minutes of your time to complete the surveys.

This research study is being conducted at the **2 locations of the Las Vegas Pain Institute** at [REDACTED]. You can only participate in one of the 2 locations:

- [REDACTED] *Las Vegas, NV, 89103*
- [REDACTED] *Henderson, NV, 89052*

This research is under the direction of Jennifer Kawi, MSN FNP-BC, doctoral candidate with University of Colorado Denver. Please call Jennifer Kawi at [REDACTED] or request to speak with a trained research assistant at any of the Las Vegas Pain Institute locations for more information.



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