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Work-Related Musculoskeletal Disorders: Psychological Factors In Licensed Nurses

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WORK-RELATED MUSCULOSKELETAL DISORDERS: PSYCHOLOGICAL FACTORS IN LICENSED NURSES

A DISSERTATION

SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS

FOR THE DEGREE OF DOCTOR OF PHILOSOPHY IN NURSING

THE UNIVERSITY OF TEXAS HEALTH SCIENCE CENTER AT HOUSTON

SCHOOL OF NURSING

BY

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To the Dean for the School of Nursing:

I am submitting a dissertation written by Cindy Pipkins entitled, "Work-related Musculoskeletal Disorders: Psycological Factors in Licensed Nurses," I have examined the final copy of this dissertation for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of Doctor of Philosophy in Nursing.

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Work-related Musculoskeletal Disorders: Psychological Factors in Licensed Nurses

Cynthia M. Pipkins, MSN, RN

Abstract

Background: Physical risk factors for work-related musculoskeletal disorders (WMSD) among licensed nurses have been well established. Rehabilitation following WMSD traditionally focuses on physical dimensions, but both physical and psychological factors may be useful during rehabilitation, as suggested by the Fear Avoidance Model of Chronic Pain (FAMCP) and the Pain Experience Psychological View model (PE).

Purpose: The purpose was to describe demographic characteristics of nurses with and without WMSD and relationships among related psychological factors of pain (intensity, severity, and interference), personality traits (extraversion and neuroticism), and coping strategies (catastrophizing, diversion, reinterpreting, cognitive coping, fear avoidance, and depression) as postulated in accordance with the FAMCP and PE models.

Methods: An online survey was posted on the websites of three nursing organizations. Nurses with a WMSD (n=124 of 243 participants) completed demographics, WMSD History, Numeric Pain Rating Scale (NPRS), Coping Strategies Questionnaire- 24 (CSQ-24), Fear Avoidance Belief Questionnaire (FABQ), Eysenck Personality Questionnaire-Brief Version (EPQ-BV), and Centers for Epidemiological Studies Depression Scale (CES-D). Nurses without a WMSD (n=119 of 243 participants) completed three sections, demographics, EPQ-BV, and CES-D.

Results: Overall, nurses (n= 243) were predominately Caucasians (82%), females (94%), and married/partnered (68%). In age, 40% were 50 to 59 years old and 44% were employed as a staff nurse in a hospital. Nurses with WMSD reported higher educational level, with 43% having a MSN degree. The highest level for nurses without WMSD was a BSN degree (44%). Nurses with WMSD also reported higher depressive symptoms in relation to the pain experience. Findings were in accordance with the conceptual model in that the relationships of negative coping strategies directed an avoidance pathway. Castastrophizing showed a positive relationship to all psychological factors except cognitive coping and extraversion. Nurses with WMSD showed strong position correlations between catastrophizing and pain severity, r (124) = 0.622, p = .01, catastrophizing and fear avoidance related to work activity, r (124) = 0.549, p = .01, and catastrophizing and depression, r (124) = 0.502, p = .01. Overall, the strongest correlation was between neuroticism and depression, r (124) = 0.733, p = .01.

Conclusions: Relationships between concepts (catastrophizing, fear avoidance, depression) in the FAMCP and psychological risk factors are supported. Catastrophizing is associated with pain severity, fear avoidance, and depression, and fear avoidance is associated with neuroticism, elevated pain levels, and depression. Extroversion is inversely associated with depression. Further work is needed prior to the development of interventions for rehabilitation of nurses with WMSD.

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Summary

The purpose of this descriptive cross-sectional study was to describe nurses with and without WMSD and the related psychological factors of pain (intensity, severity, and interference), personality traits (extraversion and neuroticism), and coping strategies (catastrophizing, diversion, reinterpreting, cognitive coping, fear avoidance, and depression) according to the FAMCP and Pain Experience Psychological View model. The research study process is described herein.

The specific aims of the study were:

1. To determine the demographic characteristics and psychological factors (extraversion, neuroticism, and depression) between nurses with and without a WMSD.
2. To determine the prevalence and the location of WMSD.
3. To describe the pain experience through the psychological view:
    a. Attention: pain intensity
    b. Interpretation: pain (severity and interference) personality traits (extraversion and neuroticism)
    c. Coping Strategies: depression, fear avoidance, catastrophizing, diversion, reinterpreting, and cognitive coping.
4. To describe relationships among the psychological factors.

Included in this dissertation are the abstract, summary, feasibility study proposal, feasibility appendixes, feasibility study, dissertation proposal, dissertation proposal appendixes, manuscript, and researcher curriculum vitae. The abstract briefly describes

the research study; the summary describes the items contained in the dissertation. In the proposal, the researcher describes the specific formal plan for proceeding with the study, including the revisions after the feasibility study. The feasibility study analyzed the online survey method and the proposed ethical aspects of participant's anonymity and confidentiality through the Survey Monkey and Wufoo data collection and storage process. The results of the feasibility study demonstrated the need for Survey Monkey individual question and questionnaire revisions. With minor adjustments to the questionnaire and protocols based on the findings of the feasibility study, a larger study was completed. The dissertation proposal, appendixes, and manuscript are found next in this document. In the background and significance section of this paper, a review of literature, gaps in previous research, and the conceptual framework for this research study are presented. The design and methods, results, discussion, limitations, and conclusion follow. The researchers curriculum vitae is included to describe the researcher's education, experience, service, and research.

MUSCULOSKELETAL INJURIES: PSYCHOSOCIAL FACTORS IN NURSING PERSONNEL

FEASIBILITY STUDY PROPOSAL

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Musculoskeletal Injuries: Psychosocial Factors in Nursing Personnel

The U. S. Bureau of Labor and Statistics (2011) ranks registered nurses the fifth most hazardous occupation in the United States resulting in loss days of work due to occupational injury and illness. Musculoskeletal injuries (MSIs) are costly to both the individual and industry. The American Nurses Association (ANA, 2013) estimates $7 billion U.S. dollars annually are spent in direct (medical bills) and indirect (worker's compensation and staff replacement) costs. The U.S. Health Resources and Service Administration (HRSA) and Texas Center for Nursing Workforce Studies (TCNWS) estimate a continued deficit (30%) of the nursing workforce per population distribution between 2005 and 2020 supporting the nursing shortage (Texas Department of State Health Services [TDSHS], 2013). Nursing personnel (i.e., advanced practice nurse, registered nurse and licensed vocational nurse; hereafter referred to as nursing personnel) continue to sustain MSIs despite the increase of ergonomic safety protocols, regulations and proper ergonomic equipment. Nurses report psychological fear of disabling MSIs as a hazard of the nursing profession (ANA, 2011).

Nursing personnel engage the body, physically (Mitchell, O'Sullivan, Burnett, Straker, & Rudd, 2009; Mohsemi-Bandpei et al., 2006; Smedley, Egger, Cooper, & Coggon, 1997) and psychologically (Feyer et al., 2000; Violante et al., 2004; Yip, 2004) as an occupational tool to complete work-related tasks (Hanks, 2007; Shakespeare, 2003). Physical risk factors of manually transferring, lifting, and repositioning patients have been well documented (De Castro, 2004; De Castro, Hagan, & Nelson, 2006; Nelson & Baptiste, 2004; Nelson, Lloyd, Menzel, & Gross, 2003). Psychological factors (personality traits and defense coping mechanisms/strategies) viewed in the environments

of work and personal life creates the psychosocial factors (Van Vuuren, Zinzen, Van Heerden, Becker, & Meeusen, 2005). In the nursing personnel population, physical risk factors for MSIs have been well established while psychosocial risk factors contributing to MSIs have not (ANA, 2004, DeCastro et al., 2006; Nelson & Baptiste, 2004; Nelson & Baptiste, 2006). Musculoskeletal injuries must be evaluated holistically by discovering the contributions of physical and psychosocial risk factors for nursing personnel.

Multidimensional processing of MSIs is not just physical, but is guided by psychosocial (Gatchel & Turk, 1996; Turk, 2005; Vlaeyen & Linton, 2000). Dawson et al. (2007) completed a review reporting the lack of strong evidence supporting physically focused workplace interventions (lifting teams, education, and ergonomic equipment) exclusively as a means to decrease musculoskeletal injury. Our long term goal is to create a psychosocial intervention aimed at the current psychosocial profile needs of nursing personnel supporting patient handling safety regulations.

Pain (intensity, severity, and interference) and personality traits (extraversion and neuroticism) direct the multidimensional processing of MSIs determining the coping strategy utilized (Marras, Davis, Heaney, Maronitis, & Allread, 2000; Reneman, Schiphorts-Preuper, Kleen, Geertzen, & Dijkstra, 2007). A coping strategy is developed by learned behaviors of previous pain experiences (Ryckman, 2008). Historical research links the development of negative coping strategies (depression, fear avoidance, catastrophizing, diversion, reinterpreting, and cognitive coping) related to a painful (severity or intensity) experience, such as MSIs (Fordcye, 1976; McNeil & Rainwater, 1998). Fear avoidance and catastrophizing have been linked to chronic pain and disability in musculoskeletal injury patients (Crombez, Vlaeyen, Heuts, & Lysens, 1999; Swinkels-

Meewisse, Swinkels, Verbeek, Vlaeyen, & Oostendorp, 2003; Waddell, Newton, Henderson, Somerville, & Main, 1993; Lethem, Slade, Troup, & Bentley, 1983). Patients with back disorders and chronic pain utilize diversion, reinterpreting attention and cognitive coping statements (Cano, May, & Ventimiglia, 2006; Violante et al., 2004). However, few studies have been completed to determine whether the negative coping strategies (depression, fear avoidance, catastrophizing, diversion, reinterpreting, and cognitive coping) and personality traits (extraversion and neuroticism) are associated with the pain experience of MSIs in the nursing population.

Specific Aims

Over the past ten years the focus of interventions has been toward physical risk factors (mechanical lifting devices, lifting teams, and ergonomic education). Few studies have focused on the psychosocial factors of MSIs in this population. The purpose of this analytical cross-sectional study is to determine multiple aspects of a psychosocial profile of nursing personnel with MSIs, pain, coping strategies, and personality traits.

Specific Aims:

1. To examine the prevalence of musculoskeletal injuries (MSIs), pain (intensity and severity), coping strategies (depression, fear avoidance, catastrophizing, diversion, reinterpreting, cognitive coping), and personality traits (extraversion and neuroticism) in nursing personnel.
2. To determine the differences in nursing personnel levels (APN, RN, and LVN) with and without MSIs, pain, personality traits and coping strategies.

Acute/chronic effects of stressful events (MSIs) remains the top nursing personnel concern (ANA, 2011). ANA (2012) is leading a multidisciplinary initiative for National

Safe Patient Handling Standards focused on physical aspects and lacking an educational component for psychosocial health and wellness. The findings of this study will provide important preliminary empirical data to create a psychosocial profile of nursing personnel and support developing psychosocial interventions to decrease MSIs in the nursing personnel population.

Background and Significance

Annually, an estimated 52% of nursing personnel will complain of musculoskeletal pain with 12% of the nurses leaving the profession reporting back injuries (Hunter, Branson, & Davenport, 2010). In response to the rising number of nursing workforce injuries, programs have been developed from organizational recommendations to national regulations (ANA, 2004; Dawson & Harrington, 2012; U. S. Occupational Safety and Health Administration [OSHA], 2009; State of Texas, 2006). Physical factors for MSIs have been well established while psychosocial factors contributing to MSIs have not (ANA, 2004; DeCastro et al., 2004; Nelson & Baptiste, 2004; Nelson & Baptiste, 2006). Nonetheless, nursing personnel continue to sustain MSIs operating under safety protocols, regulations and proper ergonomic equipment.

Limited research supports the psychosocial focus toward outcomes (stress, mood changes, and depression) resulting from a painful stimulus (MSIs) in the nursing personnel population and not the defense mechanism chosen to cope with the stressor (Mitchell et al., 2009; Reneman et al., 2007). A gap in research supports the need to analyze the intricate psychosocial processing factors related to musculoskeletal injury. With a growing focus on a culture of safety, this study will provide the researcher

preliminary data to create a psychosocial profile of nursing personnel (APN, RN, and LVN) with and without musculoskeletal injury in Texas.

Pain demands a response (Eccleston & Crombez, 1999) dictating the attention (pain intensity) given to a musculoskeletal injury. The response is processed not only neurologically and psychologically, but socially as well creating a multidimensional pain experience (Linton & Shaw, 2011). Linton (2005) developed a conceptual model (schematic) depicting the psychological processing of a pain experience. The conceptual model postulates the interpretation (individual perception) of a painful experience will guide the individual to seek out a new coping strategy or rely on one used in past experiences. Pain perception is calculated through an individual's sensory, emotional, and evaluative reactions. Melzack and Casey (1968) describe these components of pain perception as dimensions: "sensory-discriminative (sense of the intensity, location, severity); affective-motivational (urge to escape the unpleasantness through fear avoidance and reinterpreting); and cognitive-evaluative (cognitive coping statements, catastrophizing and distraction)" (p. 432). In order to address MSIs, the multidimensional pain experience (attention, interpretation, coping strategy) must be understood psychosocially.

Literature Review

A literature review to examine the psychosocial concepts proposed in this study was completed.

Musculoskeletal Injury. Musculoskeletal injury is "any trauma to muscles, nerves, tendons, joints, cartilage, and/or spinal discs" (U. S. Bureau of Labor and Statistics [BLS], 2012, p.1). Back injury is the most frequent MSI experienced by nursing

personnel providing bedside care resulting from repeated manual patient handling, such as, lifting, transferring, and repositioning patients (De Castro, 2004; Nelson & Baptiste, 2004; Nelson, Lloyd, Menzel, & Gross, 2003; Retsas & Pinikahana, 2000). ANA (2011) Health and Safety survey reports 8 out of 10 nurses will continue to work while experiencing musculoskeletal pain setting them up for injury or further injury.

Personality Traits: Extraversion and Neuroticism. An individual with extraversion characteristics will be "social, impulsive, outgoing, excitable, and oriented toward external reality"; the individual with introversion characteristics will be "quiet, introspective, well-ordered life, and oriented toward inner reality" (Ryckman, 2008, p. 346). Sato (2005) describes neuroticism individuals as "emotionally unstable" experiencing unreasonable fears and anxiety levels (p. 546). Research supports a direct correlation between personality temperament (affective) traits, stress hormones related to the immune system, and increased spinal loadings (Chapman, Weiss, Barrett, & Duberstein, 2013; Marras et al., 2000; Wistow, Wakefield, Jr., & Goldsmith 1990). Bansevicius, Westgaard, and Jensen (1997) found introverts reported increased levels of low back pain than extroverts (p. 504).

Pain: Intensity and Interference. Pain intensity is a combination of the meaning, attitudes, beliefs, and expected duration of the pain usually expressed by assigning a number "0" no pain to "10" worst pain ever experienced in a question representing the individual's current status (Jones, Vojir, Hutt, & Fink, 2007; Turk & Melzack, 1992). Pain intensity and severity has been positively associated with pain interference (Cano et al., 2006). Pain interference is the "degree to which pain interferes with daily activities" (Ullrich, Jensen, Loeser, & Cardenas, 2008, p. 451). Pain has been

linked to the psychosocial factor of fear (Turk & Melzack, 1992). Pain related fear will cause a person to avoid any activity associated to the initial injury (Reneman et al., 2007). Researchers have begun to focus on the psychosocial component of pain related to fear of injury or re-injury (George, Valencia, & Beneciuk, 2010; Houben et al., 2005).

Depression. Depression is considered a "disturbance in mood" and an outcome of multiple internal interactions (biological, psychological, cognitive, and sociological) secondary to a medical condition (Pasacreta, 2004). The medical condition initiates a response to physiologically and psychologically crisis. When the crisis exceeds the individual's ability to problem-solve effectively, negative coping factors will surface, such as, poor concentration, poor judgment, manifested by depression (Pasacreta, 2004). Bair, Robinson, Katon, and Kroenke (2003) found patients with depression describe increased pain (severity) and disability with decreased functioning and treatment outcomes.

Fear Avoidance. Vlaeyen & Ostelo (2008) states, "patients who catastrophically (mis)interpret their pain are prone to become fearful and consequently engage in protective (e.g. escape/avoidance) behaviors, such as guarding and taking rest" (p. 3). Fear avoidance takes place because of fear of painful movement or fear of re-injury; not because of the original injury (Crombez et al., 1999; Lethem et al., 1983; Reneman et al., 2007). Fear avoidance and catastrophizing are psychosocial factors empirically associated to chronic pain (Boersma & Linton, 2006; Peters, Vlaeyen, & Weber, 2005).

Catastrophizing. Catastrophizing refers to an individual's tendency to focus on and exaggerate the threat value of painful stimuli and to negatively evaluate one's own ability to deal with pain (Utne et al., 2009) and are "more likely to develop a fear of

movement, which in turn will contribute to activity avoidance" (Wideman, Adams, & Sullivan, 2009, p. 45). Research has been completed depicting catastrophizing as an appraisal and/or coping strategy (Haythornthwaite, Menefee, Heinberg, & Clark, 1998; Jensen, Turner, & Romano, 2001; Severeijns, Vlaeyen, , & Van Den Hout, 2004). Sullivan et al. (2001) found catastrophizers will make decisions during actual or expected painful experience under the influence of "an exaggerated negative mental set" (p. 53) contributing to more intense pain experience and increased emotional distress.

Diversion. Tappen (1983) described the process of diversion as "engaging in enjoyable activities to temporarily distract attention from the problem, provide pleasure, and restore energy, sometimes freeing energy for more creative problem solving" (p. 37). Diversion is a defense mechanism used to cope with unpleasant stimuli, such as pain or MSIs, by utilizing distraction techniques, e.g. TV, music, or guided imagery. This study will fill a gap in the literature regarding the concept of diversion utilized by nursing personnel.

Reinterpreting. Reinterpreting an event means to give it a new or different meaning clarifying the experience. Valade et al. (2012) found reinterpreting pain sensations was significantly correlated with pain. Cano, May, and Ventimiglia (2006) found reinterpreting pain sensations was positively associated with psychological disability. Reinterpreting, ethnicity and education level are reported to be significantly linked in a 3-way interaction (Cano et al., 2006). This study will fill a gap in the literature regarding the concept of reinterpreting utilized by nursing personnel.

Cognitive Coping. According to Lazarus and Folkman (1984), coping is a consequence of individuals' appraisals of events (p. 29). Cognitive coping seeks to

change an individual's though process creating a different response. Cano et al. (2006) found coping self statements associated to a decrease in report of physical disability. This study will fill a gap in the literature regarding the concept of cognitive coping utilized by nursing personnel.

This study will determine the prevalence of these psychosocial concepts in Specific Aim #1. Specific Aim #2 will examine relationships among the psychosocial variables and nursing personnel levels through the proposed multidimensional pain experience of MSIs. In the future, the psychosocial profile determined in this study will allow for creating a customized psychosocial educational module for the current safe patient handling programs in Texas.

Conceptual Framework

The Fear Avoidance Model (FAM) of Chronic Pain has been widely tested in a variety of populations, such as adults experiencing acute/chronic musculoskeletal pain, disability, and disfigurement (Asmundson, Norton, & Vlaeyen, 2004; Letham et al., 1983; Newell, 1999; Vlaeyen & Linton, 2000). However, few studies have been completed to determine whether the risk factors are associated with the pain experience in the nursing population. The FAM will serve as the theoretical framework for the current research study. The focused area of this model to be tested is the construct "pain experience" to be defined by the nursing personnel population (See Figure 1). Linton (2005) developed a conceptual model of the psychological process of a pain experience. A conceptual model depicting the construct pain experience psychosocially will guide this study (See Figure 2). The psychosocial pain experience model postulates the attention demanded by a musculoskeletal injury (pain intensity) processed through the

interpretation of the individuals pain severity, interference, and personality traits will determine the coping strategy (ignoring, visualizing, negative self-statements, catastrophizing, fear, avoidance) chosen as a defense mechanism.

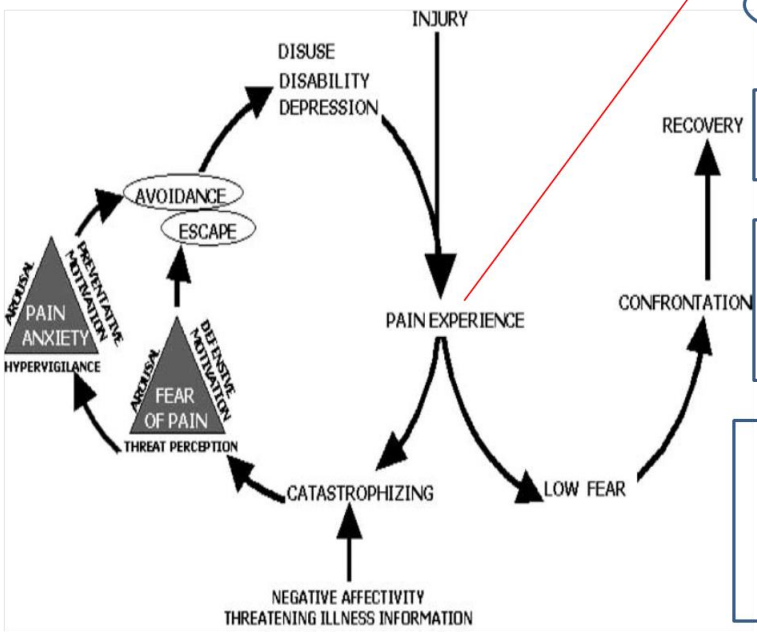

Figure 1. The Fear Avoidance Model of Chronic Pain (FAMCP) based on the Fear Avoidance Model of Vlaeyen and Linton (2000) and the Fear Anxiety Avoidance Model of Asumdson et al. (2004).

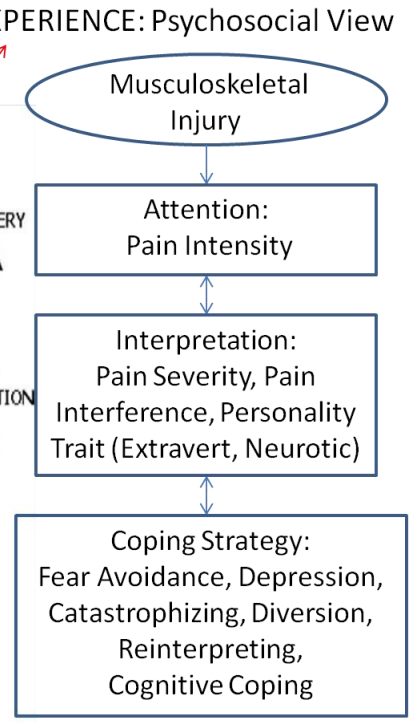

Figure 2. "Pain Experience: Psychosocial View" adapted from "Simplified Schematic Diagram-Pain Perception: Psychological View" (Linton, 2005).

Individual perception (attentive, cognitive, and behavioral) of the pain experience (MSIs) will reveal psychosocial factors utilized to regain homeostasis. Only addressing the physical risk factors leaves the individual psychosocially at risk for fear of painful movement, further injury or re-injury. Nursing personnel should not "fear" a disabling musculoskeletal injury and work despite "feeling" musculoskeletal pain leading to work related musculoskeletal injury (ANA, 2011). Psychosocial factors must be appropriately addressed to further decrease MSIs in nursing personnel.

Innovation

Seeking to validate the conceptual model, a profile of psychosocial risk factors must be collected and evaluated to better understand nursing personnel with or without musculoskeletal injury. Once the individual is injured, the focus should shift to optimal recovery physically and psychosocially. Currently, the focus is primarily on the physical component of musculoskeletal injury. A broader focus should be to rehabilitate the whole person. The primary goal of this study is to collect preliminary data to assist the researcher in creating a multifactor psychosocial profile of nursing personnel regarding MSIs, pain, personality traits, and coping strategies.

Multiple programs are in currently supported addressing the physical components of MSIs, including (1) safe patient handling programs through awareness, education, and training of the direct contact issues between nurse and patient (ANA, 2004), (2) set regulations for safe lifting limits and procedures (OSHA, 2009), (3) Texas SB 1525, Safe Patient and Handling Act, incorporating a program of safety to all healthcare facilities including, use of lifting devices, proper lifting equipment, education of equipment and ergonomics (State of Texas, 2006), and (4) proposed initiative, Safe Patient Handling (SPH) National Standards focusing on evidenced based research supporting the changes to standards, guidelines, and policies, evidenced based outcomes, and dissemination of consistent language, resources, and toolkits (Dawson & Harrington, 2012). A missing link in current programs aimed to decrease MSIs is a psychosocial module educating nursing personnel of risk factors initiated in the pain experience. As a long-term goal, this study seeks to add to a psychosocial module to existing intervention programs for decreasing musculoskeletal injury in nursing personnel.

Design and Methods

This study will utilize an analytical cross-sectional study design for the purpose of finding prevalence of all variables and comparing nursing personnel (groups) differences between those with and without MSIs. The data will be explored for differences of interrelationships among all variables without an intervention employed (Polit & Beck, 2004). Data will be collected at one point in time to determine whether the participant has been exposed to the relevant agent (MSIs) and whether the participant has an outcome of interest (depression, fear avoidance, catastrophizing, diversion, reinterpreting, and/or cognitive coping). Cross-sectional design will allow the researchers to examine timing of exposure relative to outcome.

Analytical cross-sectional study design is supportive when researchers lack information on time of onset in chronic conditions, e.g. musculoskeletal pain/injury, "to identify the association between exposure and disease onset" (Ibrahim, Alexander, Shy, & Farr,1999, p. 3). Cross-sectional design is used to discover prevalence, and infer causation, but does not provided a sequence of events or determine cause and effect (Mann, 2003). Fulfilling a gap in research, this design will allow preliminary data to be collected on a large sample of nursing personnel analyzed quickly and economically with multiple variables studied.

Sample and Setting

Data will be collected in two phases. Phase One will address the feasibility of the online survey process. The aims of the feasibility study are: (1) to analyze the response time, (2) to calculate the return rate of this email survey, (3) to evaluate the completion of

the tools, and (4) evaluate Survey Monkey as a data collection process. Phase Two will be the complete dissertation study presented.

Phase One. Nursing personnel will be identified through the Lamar University email list for the Lamar University Dishman Department of Nursing. This subpopulation of nursing personnel are included in the SK&A Research Center database listing and will meet the inclusion criteria of (1) current email for the advanced practice nurse, registered nurse, or licensed vocational nurse in the state of Texas, and (2) a Texas nursing license. Exclusion criteria will be nursing personnel with injuries other than occupational musculoskeletal injury. An eligible participant list will be compiled.

Phase Two. Nursing personnel will be identified through the SK & A, healthcare marketing company, for a current email database. Inclusion criteria will include (1) current email for the advanced practice nurse, registered nurse, or licensed vocational nurse in the state of Texas, (2) a Texas nursing license, and (3) computer accessibility. Exclusion criteria will be nursing personnel with injuries other than occupational musculoskeletal injury.

An eligible participant list will be compiled according to the licensure level of nursing personnel and county. A computer generated stratified random sample of eligible participants will be selected from each list. A stratified sample can "guarantee the appropriate representation of different segments of the population" (Polit & Beck, 2004, p. 297). Calculated using G*Power V.3.135, the sample size (n= 183) is based on power analysis by testing means (Anderung, 2012). Each nursing personnel level will be equally represented by 61 participants.

Power analysis of the F tests "MANOVA Global Effects: Overall Model Significance" was computed. Statistically calculated, the *a priori* settings were effect size *F*-ratio 0.0625, significance 0.05, and statistical power level 0.80, for minimum sample of 183 participants for a medium effect size (Anderung, 2012). Edwards et al. (2010) a Survey Monkey response rate of 10-15% is a conservative and a safe range for the nursing personnel population. Therefore, a conservative estimation of 1830 participants equally divided among the nursing personnel levels at an emailing response rate of 10% return should yield the desired sample size of 183 participants.

Phase One and Phase Two. Participants will be emailed a letter detailing the study purpose, risks, benefit, and confidentiality. Participants will be informed of internet use and the minimal risk of confidentiality. The Committee for the Protection of Human Subjects (CPHS) suggests a statement of confidentiality be included in the informed consent, such as, "Although every reasonable effort has been taken, confidentiality during actual Internet communication procedures cannot be guaranteed" (Office for Protection of Human Subjects [OPHS], 2012, p.3). The participant may continue by clicking a button, "I agree" or "I do not agree" to participate in the study voluntarily (OPHS, 2012). If the participant "agrees", this will constitute unsigned informed consent. The participant may withdraw at any time. A Survey Monkey web link will be embedded in the cover letter emailed by SK&A. The participant will be directed to click the link to initiate the survey. The University of Texas Institutional Review Board (UT-IRB) and Lamar University Institutional Review Board (LU-IRB) will have to approve the utilization and surveying of the Texas nursing personnel via SK&A and Survey Monkey.

Data Collection

Data will be collected via the web-based survey. Each participant will be provided a URL link to access the computer/internet data collection site (OPHS, 2011).

Phase One. The principle investigator will email a cover letter and informed consent to the selected participants from the Lamar University Dishman Department of Nursing email list. Data will be collected during a two week time period in November 2013. A reminder email will be sent one week from the initial email, e.g. initial email will be sent on November 12, 2013, and a reminder email will be sent November 19, 2013. The participant will read the informed consent email (includes the study, study purpose, confidentiality, risk/benefits, and consent information). If the participant chooses to be in the study, they will click the "Accept Link" (which is the embedded Survey Monkey link). The online survey will include: demographics, Numeric Rating Scale for Pain (NRS), Center for Epidemiological Studies for Depression (CES-D), Fear Avoidance Beliefs Questionnaire (FABQ), Coping Strategies Questionnaire-24 (CSQ24), and Eysenck Personality Questionnaire-Brief Version (EPQ-BV). The data collection process will end two weeks from the initial email date. Based on the Phase One feasibility study results, if changes are indicated the study proposal will be modified and resubmitted for approval from the UT-IRB and LU-IRB.

Phase Two. Dissertation data collection will repeat the data collection procedures documented in the Phase One feasibility study with the exception of the population setting. The setting will advance from the Lamar University Dishman Department of Nursing to the SK&A Research Center database. SK&A Research Center allows for an online setting individualized by each participant according to email and

computer accessibility. Data will be collected over a two week time period in January 2014.

Phase One and Phase Two. Survey Monkey GOLD will provide custom survey controls (random assignment, response settings, and Internet Protocol Address [IP] controls), unlimited questions, unlimited answers, and provide participants the ability to save or re-enter the survey (Waclawski, 2012). No personal direct identifiers will be collected (e.g. name, online name or IP address) maintaining confidentiality and anonymity. Data encryption will protect information transmitted over the internet and the data at rest will reside on a password protected laptop and/or USB flash drive. The principal investigator will be the sole individual with access to stored data.

Variables and Methods of Measurement

The following instruments will be utilized to collect the data needed to statistically analyze the specific aims proposed in this study.

Demographics. Demographics for the participant will be collected to describe the population studied. A checklist of descriptive information will include: age, gender, marital status, ethnicity, education level, employment status, work place, family income, musculoskeletal injury occurrence, and musculoskeletal injury location. It takes less than 5 minutes to complete the checklist.

Numeric Rating Scale. Numeric Rating Scale (NRS) will assess pain intensity, severity and interference. Additionally, a scale-Six Pain Indices will collect: (1) worst pain in past month, (2) severity of pain at present moment, (3) severity of pain in past month, (4) pain interference with social and recreational activities in the past month, (5) pain interference with school or work during past month, and (6) Pain interference with

daily activities during past month (Osman et al., 1997). Each item is rated on an 11 point-Likert scale, "0" being no pain or interference to "10" being the worst pain/most interference. The higher the score the greater the pain intensity, severity, or interference. Ferez et al. (1990) reports test-retest reliability (r = 0.96 and 0.95 respectively) in chronic pain rheumatoid arthritis patients. Construct validity in the same group was validated with a high correlation from 0.86 to 0.95 between the NRS and Visual Analog Scale (Ferez et al., 1990). It takes approximately 3 minutes to complete the scale.

Center for Epidemiological Studies Depression Scale. Center for Epidemiological Studies for Depression Scale (CES-D) will assess the present level of depressive symptoms the participant is experiencing (Smarr & Keefer, 2011). The CES-D is a 20-item self-report questionnaire that developed as a screening tool to measures "perceived mood and level of functioning" occurring in the past week on a four-point Likert scale of "0" rarely or none of the time to "3" most or all of the time. Scoring ranges from 0-60 points with four-items worded in a positive manner to reduce response bias and reverse coded. The cut off points established for depression in populations of spinal cord injury, rheumatoid arthritis, and fibromyalgia is $\geq$ 16, then the higher the score the greater the level of symptoms of depression experienced in the past week. The CES-D has a reported internal consistency of an alpha coefficient α of 0.85 in the general population, test-retest reliability of with expected correlations ranging from 0.45-0.70 with shorter time periods between administrations scoring higher (Smarr & Keefer, 2011). Orme, Reis, and Hertz (1986) reported the criterion validity for the CES-D correlated with depressive measures of self-esteem (0.58), state anxiety (0.44) and trait anxiety (0.71). It takes approximately 5-8 minutes to complete the questionnaire.

Fear Avoidance Beliefs Questionnaire. Fear Avoidance Belief Questionnaire (FABQ) will assess the participant's fear avoidance beliefs regarding the effect of physical and work-related activity on their musculoskeletal pain/injury (Williamson, 2006). The FABQ is a 16-item self-report questionnaire that measures the level of agreement on a 7-point Likert scale of 0 "completely disagree" to 6 "completely agree". The original study factor analysis revealed 2 subscales (physical activity and work); the subscales are summed FABQpa (0-24 points possible) and FABQw (0-42 points possible). There are no cut off points established; only a higher score indicates a stronger belief of fear-avoidance by the participant in the subscale. Waddell, Newton, Henderson, Somerville, and Main (1993) reports internal consistency for the subscale work (α= 0.88) and physical activity (α= 0.77) in chronic low back pain patients. Kovacs et al. (2006) reports a total scale test-retest reliability (ICC=0.97) over 30 minute interval. The FABQ correlates the fear avoidance construct with the Tampa Scale of Kinesiophobia (work 0.53 and physical 0.76 (Crombez et al., 1999; Kovacs et al., 2006). It takes approximately 5-10 minutes to complete the questionnaire requiring both time perspectives of recall and present.

Coping Strategies Questionnaire-24. Coping Strategies Questionnaire-24 (CSQ24) detects cognitive coping strategies to deal with musculoskeletal pain leading to injury. The CSQ24 will measure from the 4-factor subscales: catastrophization, diversion, reinterpreting, and cognitive coping. It is a self report 24-item questionnaire using a 7-point linear scale (0 equals never, 3 equals sometimes, and 6 equals always) to indicate how often they used that coping strategy when they experienced pain. Harland and Georgieff (2003) report internal consistency for catastrophizing (α = 0.85), diversion (α =

0.84), reinterpreting (α = 0.77), and cognitive coping (α = 0.75). Construct validity is demonstrated by highly significant correlations (p<0.001) in all four subscales (Harland & Georgieff, 2003). It takes approximately 5-10 minutes to complete the questionnaire.

Eysenck Personality Questionnaire- Brief Version. Eysenck Personality Questionnaire- Brief Version (EPQ-BV) will measure temperament constructs of an individual's level of extraversion and neuroticism. It is a 24-item self report questionnaire using a Likert scale to report the depth of a personal characteristic ranging from "A" not often at all to "E" extremely. Each item is given a point value (A=1, B=2, C=3, D=4, E=5) except for 2 reversed items 13 and 19 point values assigned (E=1, D=2, C=3, B=4, A=5). The subscale neuroticism is the even number items totaled. The extraversion subscale is the odd numbers totaled. The higher the individual's score the higher the level of extraversion and neuroticism is detected. Sato (2005) reports test-retest reliability identical for both extraversion and neuroticism subscales (r = 0.92 and 0.92 respectively). Concurrent validity was highly correlated (neuroticism 0.88 and extraversion 0.89) with the original EPQR-S (Sato, 2005). It takes approximately 5 minutes to complete (Sato, 2005).

Data Analysis

Upon submission of a completed survey packet, each participant will be assigned a number. The responses to the questions will be entered into a coded (encrypted) data sheet by the researcher on a password protected laptop and stored (encrypted) on a USB flash drive. The statistics will be computed using SPSS 19.0 predictive analytic software for Windows (SPSS, Chicago, IL). According to the level of data, the specific aims will be individually addressed through descriptive statistics and appropriate group (mean)

differences. The data collected will be fall into the categories of nominal, ordinal and interval level data. Table1 shows the construct, concept, variables operationalized, and how the variable will be measured.

Table 1

Construct, Concept, Operationalized and Measured

Construct	Concept	Operationalized	Measured
Injury	MSI	Location	Demographics
Attention	Pain	Intensity	NRS
Interpretation	Pain	Severity	NRS
		Interference	Demographics
	Personality	Extraversion/Introversion	EPQ-BV
		Neurotic/Stability	EPQ-BV
Coping Strategy	Depression	Depressive Symptoms	CES-D
	Fear Avoidance	Physical activities	FABQ
		Work related activities	FABQ
	Catastrophizing	Catastrophizing	CSQ-24
	Diversion	Diversion techniques	CSQ-24
	Reinterpreting	Re-interpretive statements	CSQ-24
	Cognitive Coping	Cognitive suppression	CSQ-24

Note. MSI = Musculoskeletal Injury; DEMO = Demographics, NRS = Numeric Rating Scale, EPQ-BV = Eysenck Personality Questionnaire Brief Version, CES-D = Center or Epidemiological Studies for Depression, FABQ = Fear Avoidance Belief Questionnaire, CSQ 24 = Coping Strategies Questionnaire 24

In the feasibility study, all instruments will be tested for internal consistency of the subscale constructs reporting a Cronbach's alpha (α) coefficient. Cronbach's alphas can be sensitive, with subscales of less than 10 items, projecting a score below the optimal 0.70. Inter-item correlation (0.2 to 0.4) may be more appropriate (Pallant, 2007). Descriptive statistics will explain the demographics of specific aim #1and #2 through the

means, individual and group, frequency (Stem and Leaf Plot), distribution of variables and differences between nursing personnel levels (Box Plot). For specific aim #2, a one-way multivariate analysis of variance (MANOVA) will detect differences in the variables and group differences in our set of variables (MSIs, pain, personality traits, and coping strategies).

Limitations

Analytic cross-sectional studies must be interpreted with "caution regarding potential association of duration of disease with exposure status" resulting in survival bias (Ibrahim et al., 1999, p.3). Also, antecedent-consequent bias can occur "when it cannot be determined if exposure preceded disease" (Ibrahim et al., 1999, p.3). The researcher opted for a conservative medium effect size for the proposed study. The large sample size may pose a limitation on the research due to time constraints. If this occurs, a change in statistical effect size can be utilized. Generalizabiltiy (external validity) will be limited to the multiple aspects of a psychosocial profile of nursing personnel in Texas.

Questionnaire response rate is often low. Non-respondents tend to be less well educated and from lower socioeconomic status groups creating a bias. Respondents may not provide accurate responses. Respondents' tend to not critically think responses merely providing the researcher a "snapshot view" (Patten, 2001, p. 3). Underrepresentation of nurses due to socioeconomic, computer literacy, and computer availability may be a potential problem. The pilot study will provide the researcher insight to these study limitations. If limitations or potential problems surface, a modification plan will be written and submitted to UT-IRB and LU-IRB for approval.

Alternative approach

An alternative approach for this study is to utilize hospital settings, survey nursing personnel in a structured format. The study design will need to remain cross-sectional for the purpose of gathering preliminary data for developing an intervention. Additionally, this approach will require gaining permission to survey hospital nursing personnel through IRB approvals at each facility. An advantage will be face-to-face interaction for proper identification, qualifications, and confidential coding of the participants. Disadvantages will be number of environmental settings, only collecting information on those who are currently employed, socio-culturally bound to geographical area of collection, time and expense of materials.

Timeline

The study timeline will begin with preparation for the IRB submissions for approval and the Survey Monkey preparation of the research components (cover letter, informed consent, and survey questions). Data collection will begin November 5, 2013 – November 19, 2013. Data analysis will be completed for the feasibility study to reveal need for research modifications in proposal. If none required, data collection will proceed January 6, 2014 – February 3, 2014. The remainder of February through April, data analysis will be calculated with written results and discussion in dissertation manuscript format. Finally, the dissertation manuscript submission and defense will be in April 2014 (see Table 2).

Table 2

Timeline for Feasibility Study

	2013				2014					
Activity	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
Preparation (Survey Monkey & SK&A)	X	X								
UT IRB Approval		X	X							
LU IRB Approval		X	X							
Collect Data (Pilot)			X							
Data Analysis (Pilot)			X							
Present Findings (Pilot)				X						
Collect Data (Dissertation)					X	X				
Data Analysis (Dissertation)							X	X		
Results (Dissertation)								X	X	
Discussion (Dissertation)									X	X
Defend (Dissertation)										X

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Appendix A

Feasibility Study

MUSCULOSKELETAL INJURIES: PSYCHOSOCIAL FACTORS IN NURSING PERSONNEL A FEASIBILITY STUDY

FEASIBILITY STUDY

SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR

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Musculoskeletal Injuries: Psychosocial Factors in Nursing Personnel

A Feasibility Study

The U. S. Bureau of Labor and Statistics (2011) ranks registered nurses the fifth most hazardous occupation in the United States resulting in loss days of work due to occupational injury and illness. Musculoskeletal injuries (MSIs) are costly to both the individual and industry. The American Nurses Association (ANA, 2013) estimates $7 billion U.S. dollars annually are spent in direct (medical bills) and indirect (worker's compensation and staff replacement) costs. The U.S. Health Resources and Service Administration (HRSA) and Texas Center for Nursing Workforce Studies (TCNWS) estimate a continued deficit (30%) of the nursing workforce per population distribution between 2005 and 2020 supporting the nursing shortage (Texas Department of State Health Services [TDSHS], 2013). Nursing personnel (i.e., advanced practice nurse, registered nurse and licensed vocational nurse; hereafter referred to as nursing personnel) continue to sustain MSIs despite the increase of ergonomic safety protocols, regulations and proper ergonomic equipment. Nurses report psychological fear of a disabling MSI as a hazard of the nursing profession (ANA, 2011).

Nursing personnel engage the body, physically (Mitchell, O'Sullivan, Burnett, Straker, & Rudd, 2009; Mohsemi-Bandpei et al., 2006; Smedley, Egger, Cooper, & Coggon, 1997) and psychologically (Feyer et al., 2000; Violante et al., 2004; Yip, 2004) as an occupational tool to complete work-related tasks (Hanks, 2007; Shakespeare, 2003). Physical risk factors of manually transferring, lifting, and repositioning patients have been well documented (De Castro, 2004; De Castro, Hagan, & Nelson, 2006; Nelson & Baptiste, 2004; Nelson, Lloyd, Menzel, & Gross, 2003). Psychological factors

(personality traits and defense coping mechanisms/strategies) viewed in the environments of work and personal life creates the psychosocial factors (Van Vuuren, Zinzen, Van Heerden, Becker, & Meeusen, 2005). In the nursing personnel population, physical risk factors for MSI have been well established while psychosocial risk factors contributing to MSIs have not (ANA, 2004; DeCastro et al., 2006; Nelson & Baptiste, 2004; Nelson & Baptiste, 2006). Musculoskeletal injuries must be evaluated holistically by discovering the contributions of physical and psychosocial risk factors for nursing personnel.

Specific Aims

Over the past ten years, the focus of interventions has been directed toward physical risk factors (mechanical lifting devices, lifting teams, and ergonomic education). Few studies have focused on the psychosocial risk factors of MSIs in the nursing personnel population. The proposed study will be completed in two phases: (1) the feasibility of the study and (2) the complete study.

Phase One

The purpose this study is to analyze the feasibility of the online survey method and the proposed ethical aspects of participant's anonymity/confidentiality through the data collection and storage process.

Phase One Specific Aims:

1. To calculate the return rate of the emailed survey.
2. To analyze the response time of the proposed survey.
3. To evaluate the completeness of the survey.
4. To evaluate the data collection and storage process via Survey Monkey and Wufoo.

Phase Two

The purpose of the complete analytical cross-sectional study is to determine multiple aspects of a psychosocial profile of nursing personnel with MSIs, pain, coping strategies, and personality traits.

Phase Two Specific Aims:

1. To examine the prevalence of musculoskeletal injury (MSI), pain (intensity and severity), coping strategies (depression, fear avoidance, catastrophizing, diversion, reinterpreting, cognitive coping), and personality traits (extraversion and neuroticism) in nursing personnel.
2. To determine the differences in nursing personnel levels (APN, RN, and LVN) with and without MSIs, pain, personality traits and coping strategies.

The findings of this feasibility study will provide information to assist in the online survey method of data collection from nursing personnel utilizing Survey Monkey and Wufoo. The complete study will provide important preliminary empirical data to create a psychosocial profile of nursing personnel and support developing psychosocial interventions to rehabilitate nursing personnel who have sustained a musculoskeletal injury. This paper will focus on the feasibility of completing a large scale online survey in the nursing personnel population.

Review of Literature

Email and internet survey methods are constantly evolving. Efficient electronic data collection sources have the potential to eliminate traditional paper mail out costs and reduce survey implementation time from weeks to days (Dillman, 2000). Survey research must utilize concrete data collection methods to gather significant information (Wright &

Schwager, 2008). A literature review was completed to provide rationale for the process, resources, and management of data to be utilized in a proposed online survey study.

According to Thabane et al. (2010), the process analyzes the feasibility of the projected steps of recruitment of participants, amount of time required of the participant to complete the survey, return rates of the participants, and the completeness of the survey attempts by the participants. The challenge for the researcher can be in the development of the survey appeal (Survey Monkey, 2009), depth (Hendrick & Cunningham, 2002) and length (Brennan, Benson, & Kearns, 2005) to draw the attention of the target population to participate. Roster, Rogers, Hozier Jr., Baker, and Albaum, (2007) reports low-response rates and item-omission rates are directly linked with inadequate data collection. Therefore, two keys to the success of this type of study are sufficient return rates (Cobanoglu, Warde, & Moreo, 2001; McConkey, Stevens, & Loudon, 2003; Shaw, Bednall, & Hall, 2002; Wright, Aquilino, & Supple, 1998) and completeness of the survey by the participant (Hanna, Weinberg, Dant, & Berger, 2005; Singer & Frankel, 1982). Sufficient return rates are needed to ensure survey results are representative to the surveyed target population (Survey Monkey, 2009). The completeness of the survey refers to the participant providing a response to each question (Bush & Hair, 1985).

Questions regarding the resources used in survey data collection methods have spurred a debate in research between the traditional mail out method vs. the online method. Results vary from online methods, but they are more efficient in return rates and response time (Cobanoglu et al., 2001; Ilieva, Baron, & Healey, 2002) than mail out methods have higher return rates and less item omission rates/completeness of survey

(Roster, Rogers, & Albaum, 2004; Roster, Rogers, Hozier Jr., Baker, & Albaum, 2007; Roy & Berger, 2005). Neutral studies report no significant difference between the online methods and other forms of survey data collection (Griffis, Goldsby, & Cooper, 2003; McConkey et al., 2003). Wright, Aquilino, and Supple (1998) finds the younger generation provides more personal information and higher levels of trust using online methods.

Survey research methods and data collection will directly impact the results of the study. Therefore, researchers must construct a "deeper understanding of data collection methods and the design factors that impact survey results" (Wright & Schwager, 2008, p.2). In view of escalating technology and that middle adulthood is the prime age for licensed nurses, the advantages gleaned from this literature review for online data collection methods will guide this research study.

Conceptual Framework

Phase One

This feasibility study was conceptually guided using the construct of response quality. In the literature, evaluation of the effectiveness and efficiency of the data collection method chosen was completed through response quality (Bush, 1984; Hanna et al., 2005; Singer, 1978). The components of response quality used to evaluate the data collection and storage method of this research included return rate, response time, and completeness of the survey by individual participants. However, a theoretical framework for the feasibility study was not chosen.

Phase Two

The Fear Avoidance Model of Chronic Pain (FAMCP) has been widely tested in a variety of populations, such as adults experiencing acute/chronic musculoskeletal pain, disability, and disfigurement (Asmundson, Norton, & Vlaeyen, 2004; Letham, Slade, Troup, & Bentley, 1983; Newell, 1999; Vlaeyen & Linton, 2000). However, few studies have been completed in the nursing population to determine whether the risk factors are associated with the pain experience. The FAMCP will serve as the theoretical framework for phase two or the complete research study.

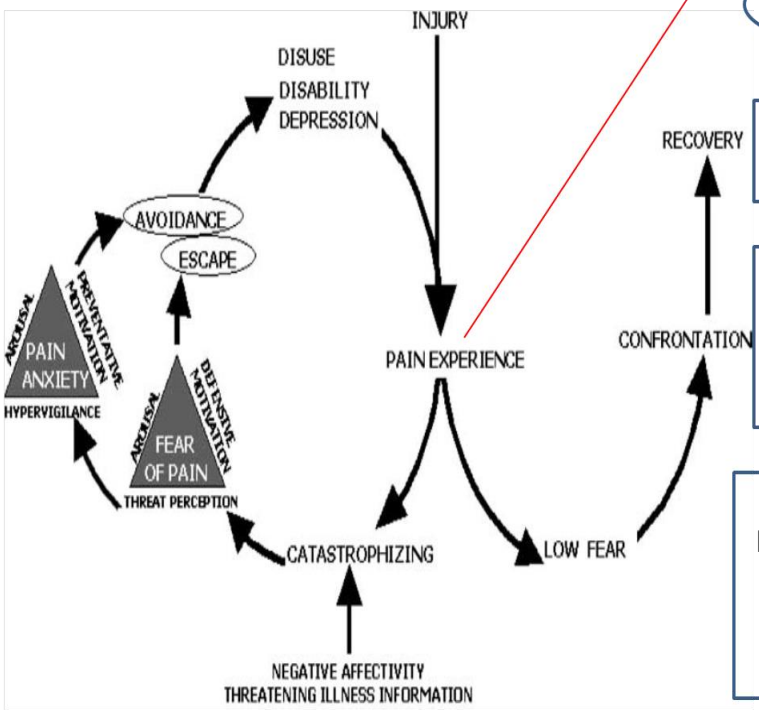

Figure 1. The Fear Avoidance Model of Chronic Pain (FAMCP) based on the Fear Avoidance Model of Vlaeyen and Linton (2000) and the Fear Anxiety Avoidance Model of Asumdson et al. (2004).

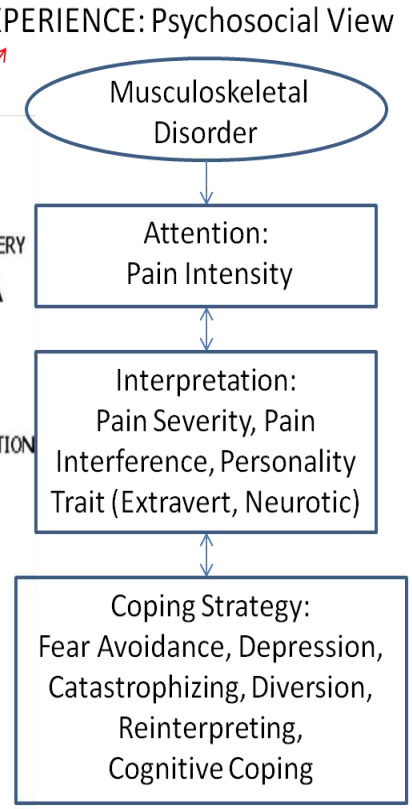

Figure 2. "Pain Experience: Psychosocial View" adapted from "Simplified Schematic Diagram-Pain Perception: Psychological View" (Linton, 2005).

The focused area of the FAMCP to be tested is the construct "pain experience" which will be defined by the nursing personnel population (see Figure 1). Linton (2005)

developed a conceptual model of the psychological process of a pain experience. A conceptual model depicting the construct pain experience psychosocially will guide this study (see Figure 2). The psychosocial pain experience model postulates the attention (pain intensity) demanded by a MSI processed through the interpretation of the individuals pain severity, interference, and personality traits (extraversion and neuroticism) will direct the coping strategy (fear avoidance, depression, diversion, catastrophizing, reinterpreting and cognitive coping) chosen as a defense mechanism.

Methodology

Design

This study utilized a cross-sectional design for the purpose of finding the feasibility of the study process. Data was collected from each participant at one point in time to determine: (1) the response time to complete the survey once initiated by the participant, (2) the return rate of the survey by all participants in the sample, and (3) the completeness of the survey. Cross-sectional design allowed preliminary data to be collected on a sample of nursing personnel. The data was analyzed quickly and economically in order to make suggestions about the study data collection and processing through secondary affiliates of Survey Monkey and Wufoo.

Subjects

Phase Two of this study proposes to utilize participants from a SK&A , a healthcare marketing research center, email database listing of nursing personnel in Texas. Phase One of this study utilized a subpopulation of nursing personnel from the SK&A database identified through the active email list from a nursing department at a university in Southeast Texas. Inclusion criteria for an eligible participant included: (1) a

current email address for the advanced practice nurse, registered nurse, or licensed vocational nurse in the state of Texas, (2) a current Texas nursing license, and (3) computer accessibility.

Sample, Setting and Recruitment

Phase Two will use a stratified random sample of nursing personnel from the SK&A Research Center email database in Texas. Phase One utilized the nursing department directory of a university in Southeast Texas providing a strata (advance practice nurses and registered nurses) sample population of fifty eligible nursing personnel (n=50) included in the SK&A email database in Texas. Twenty-nine participants (n=29) returned the online survey. The internet provided an online environment for the target population. The University of Texas Institutional Review Board (UT-IRB) and Lamar University Institutional Review Board (LU-IRB) approved the utilization and surveying of the nursing personnel at a university in Southeast Texas through email via Survey Monkey and Wufoo.

The principal investigator emailed participants the cover letter detailing the study purpose, risks, benefit, and confidentiality. Participants were informed that internet communication procedures could not be guaranteed and of the minimal risk of breech in confidentiality (Office for Protection of Human Subjects [OPHS], 2012, p.3). The participant was in control of the choice to continue by clicking an embedded Survey Monkey "Accept Link" (web link) to participate in the study voluntarily (Office for Protection of Human Subjects [OPHS], 2011). When the participant clicked the web link to proceed to the survey, this constituted unsigned informed consent. The participant was informed they may withdraw at any time without penalty.

Data Collection

The principle investigator emailed the cover letter and informed consent to the eligible participants (n=50). The survey was launched through Survey Monkey GOLD; the responses were collected from the participant, and coded by Survey Monkey. The participants were not asked to provide any personal direct identifiers (e.g. name or online name) maintaining confidentiality and anonymity. The participant read the cover letter and informed consent which included the study, study purpose, confidentiality, risk/benefits, and consent information. The participants (n=29) who chose to be in the study clicked the embedded Survey Monkey "Accept Link" web link. The online survey included: demographics, Numeric Rating Scale for Pain (NRS), Center for Epidemiological Studies for Depression (CES-D), Fear Avoidance Beliefs Questionnaire (FABQ), Coping Strategies Questionnaire-24 (CSQ24), and Eysenck Personality Questionnaire-Brief Version (EPQ-BV).

Data was collected during a two week period in November 2013. A reminder email was sent one week from the initial email. The last page of the survey in Survey Monkey was an embedded Wufoo web link thanking the participants for their participation, informing them of how to access study results and allowing them to provide feedback on the Survey Monkey process. The purpose of Wufoo was to utilize a separate entity that would not link the participants Survey Monkey data with Wufoo feasibility data (email address) providing confidential and voluntary participation at each site. The data collection process ended two weeks from the initial email date.

Data encryption was provided by Survey Monkey and Wufoo to protect information transmitted over the internet. All data collected was downloaded from

password protected principal investigator Survey Monkey/Wufoo accounts and stored on a password protected laptop and password protected USB flash drive. The laptop, USB flash drive and passwords to accounts are in the principal investigator's locked office and locked storage box.

Variables and Method of Measurement

The feasibility variables constitute the outcomes for the specific aims. The variables are defined and operationalized for the specific aim and purpose of this study.

Return Rate. The percentage of participants that respond to the survey is the return rate (University of Texas-Austin, 2011). Study outcomes are measured through the sufficient return rates to ensure survey results are representative, e.g., low return rates may not contain enough data for sufficient power analysis (Survey Monkey, 2009). This study utilized Kent and Brandal's (2003) computation for online survey return rate, as follows: (completed questionnaires returned via e-mail/total e-mails sent minus e-mail messages returned undeliverable = return rate).

Response Time. Response time is the calculated measure of time it takes for the participant to complete the entire survey (Weible & Wallace, 1998). According to the Oxford University Press (2014), response time is "the length of time taken for a person to react to a given stimulus or event" (p. 1). The question "How much time did it take you to complete the survey?" on the last page of the survey allows the participant to document their individual response time. In this study, response time was the participant's self-report of as one of three choices provided with the previous stated question, "<15 minutes", "15 to 20 minutes", or ">20 minutes".

Completeness. Bush and Hair (1985) define completeness of the survey as "the participant providing an answer to each survey question" (p. 159). A participant's failure or refusal to answer a survey question is considered an "item omission" (Bush & Hair, 1985, p.160). The survey may have item omissions for demographic questions resulting in an answer of "no" musculoskeletal injury history". This study computed the completeness of the survey by the participant providing an answer to each question applicable to them.

Data Collection Instruments

Survey Monkey. Waclawki (2012) describes Survey Monkey as "an internet program and hosting site" (p. 477) that allows the researcher to create a customized survey for online distribution and data collection. Survey Monkey offers different plans and pricing to meet the needs of the research study from "BASIC to PLATINUM" (Waclawski, 2012, p. 477). For this study, the Survey Monkey GOLD plan provided the researcher the ability to create the survey with design features of custom survey controls (e.g. collector restrictions of cutoff date and time, allow only one response per computer, and Internet Protocol Address [IP] controls), unlimited questions, limited answers per question, provided participants the ability to save or re-enter the survey, and provided a completion progress bar. Survey Monkey GOLD data collection features for this study included a custom URL, ability to embed URL in the cover letter emailed to participants, enhanced security (SSL), and SPSS analysis integration. No personal direct identifiers were collected (e.g. name or online name).

Wufoo. Wufoo is a web application that allows the user to build an online form through simple guided steps (Wufoo, 2014). Wufoo utilizes SSL encryption for security

during submission and collected data transcription. Survey Monkey and Wufoo are compatible data collection resources. For this study, the data responses collected for the questions addressing the specific aims of the feasibility study were collected through Wufoo. The last page of the Survey Monkey survey was an embedded Wufoo page that allowed the participant to provide answers to the specific aims of the feasibility study without being linked to their answers in the survey. The last section of the Wufoo page thanked the participant and allowed them to voluntarily leave a current email address for study results dissemination. The data was exported as an Excel document by the researcher.

Data Analysis

Upon submission of a completed survey packet, each participant was assigned a number. Survey Monkey entered the responses to the questions in a coded (encrypted) data sheet. The PI was able to retrieve the coded data through an Excel or SPSS spreadsheet. The data was made available immediately upon the closing of the survey scheduled time and date.

Descriptive statistics will explain the demographics of each specific aim through means, frequency, and distribution of the variables. The data collected was nominal and ordinal level data. The statistics were computed using SPSS 19.0 predictive analytic software for Windows (SPSS, Chicago, IL).

Results

The survey was emailed to 50 nursing personnel with 29 eligible participants returning the survey. There were 28 females (96.5%) and 1 male (3.5%) who returned surveys. The mean of 57.7 years of age was calculated for the nursing personnel. The

median of 60 years of age was higher than the median of 54 years of age for nurse faculty in Texas (TDSHS, 2013). The majority of the participants were married (22, 75.9%) and held a Master's of Science in Nursing (18, 62.1%) or a doctorate degree (11, 37.9%). Of the 29 participants, there were 14 who had sustained MSIs (48.3%) and 4 (28.6%) of those participants reported a work-related musculoskeletal injuries (WMSIs).

The 29 surveys returned were evaluated for completeness in the survey responses. There were 5 incomplete unusable returns with 24 participants providing usable surveys. The return rate was calculated by the 24 usable returns divided by the 50 eligible participants with no surveys returned undeliverable yielding a 48% return rate.

Anonymity and confidentiality limiters embedded in the survey did not provide information needed to allow the researcher to link the Survey Monkey incomplete (unusable) surveys to the responses submitted for the feasibility questions in Wufoo. Therefore, the feasibility questions had a return of 29 surveys. Out of the possible 29 participants submitting information through Wufoo, there were 20 participants who reported the response time for the survey. The participants were asked to report the amount of time it took them to complete the survey by checking the appropriate response box of "<15 minutes", "15-20 minutes", or ">20 minutes" (see Table 1).

Table 1

Participant Reported Response Time (n = 20)

	Response Time		
	< 15 minutes	15-20 minutes	> 20 minutes
Responses	9 (45%)	10 (50%)	1 (5%)

The survey was separated in 8 conceptual sections (demographics, MSI history, pain, coping strategies, fear avoidance, personality, and depression) according to the

questionnaire (instrument) being used. The online survey included the following instruments: demographics, NRS, CSQ24, FABQ, EPQ-BV, CES-D. The last page of the survey contained the Wufoo embedded feasibility questions. The 29 submitted surveys were individually evaluated or completeness of the survey by recording item omissions, section omissions, and invalid responses (see Table 2).

Table 2
Completeness of the Submitted Surveys (n=29)

	Completeness of Survey			
*Code Number	Completed All Sections	Item Omission	Section Omission	Invalid Response
1		X	**X**	X
2	X			
3	X			
4			**X**	
5	X			
6			X	
7		X		
8			**X**	
9			**X**	
10			**X**	
11		X	**X**	
12			**X**	
13	X			
14	X			
15	X			
16			X	
17	X			
18	X			
19	X			
20	X			
21		X		
22	X			
23	X			
24	X			
25		X		
26			X	
27	X			
28	X			
29	X			

Note. (*) Denotes the code Survey Monkey placed on the individual survey returned in numerical order of submission. (**X**) Denotes more than one section omission.

These results provided insight to the usability of the survey response. Out of the 29 survey submissions, there were 5 totally unusable surveys (#1, #4, #8, #9, and #10) yielding 24 usable surveys. There were 3 participants who left an item omission for their birth month and day (#11, #21, and #25). The coded participant #1 entered the survey providing invalid response entries to the questions that allowed personal data input and the remainder of the questions were coded with the first response available. This participant's data was deemed invalid. There were 3 participants who may have decided to quit the survey and exit leaving multiple sections unanswered for an unusable survey status (#4, #8 and #9).

Table 3

Participant Feedback Evaluating the Survey in Survey Monkey

Survey Question	Feedback	Identified Problem	Recommendation
Q9. Have you ever sustained a musculoskeletal injury (MSI)?	Unsure of what questions to answer next if you have never had a MSI	Unclear Instructions	Add "Skip Logic" code to Q9 directing survey "if this answer" it will automatically send participant to next section
Q 12. Did the MSI cause you to take time off work?	Sustained an MSI	No answer option for "0 days off work"	Add an option for "0 days off work"
Q 16-Q21. Deal with Pain Intensity, Severity and Interference	Multiple issues expressed	Confusing terminology interchange of "last" and "past" and instructions of answering questions to MSI pain or chronic pain developments	Clarify instructions, evaluate the presentation of the questions, and use same wording of term "last"

An open-ended response box was made available for the 29 participants to provide feedback regarding the study approach, study content, use of Survey Monkey, and length. There were 7 participants who provided feedback for questionable areas of concern while taking the survey (see Table 3). There were comments not placed in Table 3 due to the type of problem (e.g. arthritic pain not due to MSI, childhood injury and job association at the time of injury, survey is too long, and some questions seem repetitive); therefore, the researcher was not able to formulate a recommendation. The comments of terminology use and clarity of instructions have to be addressed for the clarity of the target audience (high school reading level) and not the perceptions of each individual. The feedback from participants was constructive in creating recommendations for phase two.

Data collection using Survey Monkey and Wufoo was immediate upon the submission of the participant's survey response. The data was able to be viewed in Excel or SPSS by the researcher at any time of the data collection process. This feasibility study found these two entities to be effective and efficient to collect online survey data for the participant and the researcher.

Discussion

The success of online survey methods for research hinges on the data collection process from developing an appropriate and accurate survey (appeal, depth and length) to the effectiveness of the outcomes (return rate and completeness of the survey) received. This study was conducted to analyze the feasibility of the online survey method using Survey Monkey and Wufoo for the data collection and storage process. The online survey

method was evaluated for effectiveness through response quality of the survey by: (1) calculating the return rate, (2) analyzing the response time, and (3) evaluating the completeness of the survey (Bush, 1984).

Survey Construction

The researcher constructed the survey in Survey Monkey. The valid and reliable questionnaires chosen were transcribed using the original survey wording. However, there were a few changes in the participant instructions from "paper" survey to "online" survey terminology. A "test run" was completed by 2 participants who were not eligible to complete the actual study. The "test run" revealed immediate changes needed before the actual survey went out to the target population. The changes made to the survey on the first "test run" were grammatical errors and a question limiter placed on the Coping Strategy Questionnaire-24 (CSQ24). The questionnaires with Likert scale responses used the following limiters: (1) rating scale, (2) 7 ratings, (3) only allow 1 answer per column, (4) rows: questions, (5) columns: numerical representation of the Likert scale, and (6) matrix of choices. The problem surfaced as the participant answered a question in the Likert scale column and needed to answer the same response to another question below, it would clear all existing responses in that column. The questions with Likert scale responses were revised by changing the question limiter from "allow only 1 response per column" to "allow only 1 response per row". The importance of the first test run was to reveal problems that would impede usable data collection. A second test run was completed by the same 2 participants before the survey was sent out to the target population.

Demographics

The nursing personnel demographics of gender, ethnicity and age were compatible with the TDSHS (2013) report of the registered nurse. Of the 25 participants, there were 14 who reported MSIs. The purpose of the phase two complete study is to create a psychological profile of nursing personnel with work-related musculoskeletal injuries (WMSIs). In this study, WMSIs were reported by 4 of the 14 participants or an estimated 3.5 nurses per 100. The ANA (2011) health and safety survey calculated an estimated 5.5 per 100 nurses reported WMSIs. The ANA (2011) calculations support the findings in this study.

Return Rate

A Survey Monkey response rate of 10-15% is a conservative and a safe range (Edwards et al., 2010). There were 24 out of the 50 participants who completed usable surveys yielding a 48% return rate. The high return rate may be attributed to: (1) the researcher being employed at the same facility, (2) the participants having a higher education (MSN or a doctorate degree) with an emphasis on evidence-based research, and/or (3) the participant may have a high sense of obligation to pay back to the profession. The findings of this study produced an inflated return rate. Therefore, the phase two complete study will use the Survey Monkey estimation of 10% return rate to ensure the appropriate sample size needed for statistical analysis.

Response Time

From previous studies, each individual instrument (demographics, NRS, CES-D, FABQ, CSQ24, and EPQ-BV) in the survey was analyzed for estimated completion time. The documented time to complete all instruments ranged from 20 to 42 minutes. Survey

Monkey suggests the study length to be about half that time to engage the participant to initiate and complete the survey (Survey Monkey, 2009). Survey Monkey does provide the individual respondents online response time. A survey limiter was set for the respondent to be allowed to exit and re-enter the survey. The problem with utilizing this particular time to estimate response time is the researcher does not know if the time reported was from one entry or multiple entries. Furthermore, the response time can be skewed if the participant is multitasking while completing the survey, for example, bathroom breaks, dealing with other personal issues, or completing the survey in multiple sessions. From the feasibility question results, we can estimate the participant will need 15 to 20 minutes to complete the survey.

Completeness of Survey

Participants who fear a breach in anonymity and confidentiality even when limiters are established may omit items deemed as personal identifiers (birth month and day) or job security issues (MSIs or pain level). This may explain a participant entering invalid responses throughout the entire survey. In phase two the complete survey, the cover letter should thoroughly explain anonymity and confidentiality afforded the participant. For the complete study, the participant submissions of invalid responses throughout the survey will deem the survey unusable and removed from statistical analysis.

Limiters were placed in the survey to store all data submitted by the participant. If the participant partially completed the survey by completing certain sections, the researcher could feasibly use the completed sections to answer specific research questions. This will allow the researcher to use all completed sections in the survey to

calculate the outcomes of specific aims. If a section needed to test a hypothesis is incomplete, then the survey submission should be removed for the data analysis. If there are only one or two omitted items, then the statistical analysis program used will provide options for missing data (e.g. SPSS uses "Exclude cases pair wise", "Exclude cases list wise", or "Replace with mean"). The researcher will choose the most appropriate option for the particular statistical analysis of the specific aim.

Generalizability

Online survey results can only be generalized to the particular method used. The findings for this feasibility study can only be generalized to researchers using Survey Monkey and Wufoo to collect and store online survey data for a large population. The phase two complete study may be generalized (external validity) to nursing personnel with WMSI and the psychosocial profile reported.

Limitations

Questionnaire response rate is often low. Non-respondents tend to be less well educated and from lower socioeconomic status groups creating a bias. However, low response rate was not a limitation for phase one. There was an inflated response rate creating possible bias. Respondents may not have provided accurate responses. Respondents tend to not critically think through responses; and, merely provide the researcher a "snapshot view" (Patten, 2001, p. 3). Although not a limitation for this study, underrepresentation of nursing personnel due to socioeconomic, computer literacy, and computer availability may be a potential problem for the phase two complete study.

Conclusion

The response rate reported in this study will fill the gap for the lack of information found reporting WMSIs for nursing personnel in Texas. This feasibility study provided pertinent information needed to develop a survey through appropriate design factors that will impact the survey results and data collection. The problematic study issues discovered in the test run allowed for immediate correction. This study will assist the researcher in correcting the problems found in survey limiter settings, question terminology for participant understanding, and instrument instruction clarity for the phase two online survey. This research adds to the online survey methods and data collection process using Survey Monkey and Wufoo. The return rate for online surveys in the nursing personnel population was needed to calculate the appropriate sample size for phase two. Ultimately, the problems discovered through the feasibility study have allowed for recommended changes to be implemented in the phase two study.

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Appendix B

Initial Emailed Study Invitation

Dear Nurse,

You are invited to participate in a research study examining psychosocial factors related to musculoskeletal injuries in nursing personnel. The purpose of this study is to determine the prevalence of psychosocial factors in nursing personnel with or without musculoskeletal injury, such as, pain, coping strategies, and personality traits. This study will further support the development of psychosocial interventions to decrease musculoskeletal injuries in the nursing personnel population.

This study has been approved by the University of Texas Health Science Center, Houston Office of Human Research Protection (Protocol: HSC-SN-13-0765)

Study Title: Musculoskeletal injuries: Psychosocial factors in nursing personnel
Researcher: Cynthia M. Pipkins
Researcher Email Address: cynthia.pipkins@lamar.edu
Researcher Telephone Number: 409-960-9299
Research Supervisor: Nancy Bergstrom
Research Supervisor Email Address: Nancy.Bergstrom@uth.tmc.edu

Cynthia Pipkins is a doctoral nursing student at the University of Texas Health Science Center at Houston and is the primary investigator (PI) of this study. The PI wants to examine the prevalence of multiple psychosocial aspects in nursing personnel with or without musculoskeletal injury, such as, pain, coping strategies, and personality traits.

You are invited to be in the study because you have a current Texas nursing license (advanced practice nurse, registered nurse, or licensed vocational nurse) and a current email address in the state of Texas. This study will involve an online survey that should take about 10-15 minutes to complete. The survey will include demographic information, musculoskeletal injury, pain, coping strategies, and personality traits. The only risk from this study is loss of confidentiality. Your information will be kept securely, but there is a small possibility that responses could be viewed by unauthorized parties (e.g. computer hackers because your responses are being entered and stored on a web server.

Your participation in this study is voluntary. You can decide not to be in the study and you can change your mind about participating in the study at any time. There will be no penalty to you. If you want to remove yourself from the study, you will simply stop answering the questions and do not click the "submit" button. There is no cost or compensation for taking part in this study.

There will be no identifying information collected in this survey. You will not be asked your name or your employer's name for this study. Only the PI will have access to the results of the surveys. The emails of potential participants will only be known to the PI or SK&A research company and will not be disclosed. You will not be identified in any

reports or publications that may result from this study. Once the survey collection is completed, the survey and all data will be removed from the World Wide Web.

If you have any questions or concerns about this study, you may call the PI at 409-960-9299 or email her at cynthia.pipkins@lamar.edu. By clicking the accept link below, you voluntarily agree to be in this study and agree to allow the use and sharing of my study-related records as described above.

ACCEPT LINK:

https://www.surveymonkey.com/s/msipsychosocialfactors

Thank you very much advance for your participation.

Sincerely,

Cynthia Pipkins

IRB NUMBER: HSC-SN-13-0765
IRB APPROVAL DATE: 11/05/2013

Appendix C

Informed Consent

Study Title: Musculoskeletal injuries: Psychosocial factors in nursing personnel
Researcher: Cynthia M. Pipkins
Researcher Email Address: cynthia.pipkins@lamar.edu
Researcher Telephone Number: 409-960-9299
Research Supervisor: Nancy Bergstrom
Research Supervisor Email Address: Nancy.Bergstrom@uth.tmc.edu

You are invited to be part of a research study. Cynthia Pipkins is a doctoral nursing student at the University of Texas Health Science Center at Houston and is the primary investigator (PI) of this study.The PI wants to examine the prevalence of multiple psychosocial aspects in nursing personnel with or without musculoskeletal injury, such as, pain, coping strategies, and personality traits.

You are invited to be in the study because you have a current Texas nursing license (advanced practice nurse, registered nurse, or licensed vocational nurse) and a current email address in the state of Texas. This study will involve an online survey that should take about 10-15 minutes to complete. The survey will include demographic information, musculoskeletal injury, pain, coping strategies, and personality traits. The only risk from this study is loss of confidentiality. Your information will be kept securely, but there is a small possibility that responses could be viewed by unauthorized parties (e.g. computer hackers because your responses are being entered and stored on a web server.

Your participation in this study is voluntary. You can decide not to be in the study and you can change your mind about participating in the study at any time. There will be no penalty to you. If you want to remove yourself from the study, you will simply stop answering the questions and do not click the "submit" button. There is no cost or compensation for taking part in this study.

There will be no identifying information collected in this survey. You will not be asked your name or your employer's name for this study. Only the PI will have access to the results of the surveys. The emails of potential participants will only be known to the PI or SK&A research company and will not be disclosed. You will not be identified in any reports or publications that may result from this study. Once the survey collection is completed, the survey and all data will be removed from the World Wide Web.

If you have any questions or concerns about this study, you may call the PI at 409-960-9299 or email her at cynthia.pipkins@lamar.edu. By clicking the accept link below, you voluntarily agree to be in this study and agree to allow the use and sharing of my study-related records as described above.

ACCEPT LINK: https://www.surveymonkey.com/s/msipsychosocialfactors

Appendix D

Reminder Email

Greetings fellow Nurse Personnel,

Last week you were sent an invitation to participate in my dissertation research study. Thank you to those who have already completed the survey and apologies for any inconvenience that this redundant email brings.

To those who may not have had the opportunity to participate, the study will be closing on Tuesday 11/5/13. I do hope you will consider responding. Your participation would be greatly appreciated:

https://www.surveymonkey.com/s/NursingPersonnel_PhDSurvey

My dissertation research study is entitled, Musculoskeletal injuries: Psychosocial factors in nursing personnel. The purpose of my research is to examine the prevalence of musculoskeletal injuries, pain, coping strategies, and personality traits in nursing personnel.

To be eligible to participate in the research study, you must be a current licensed nurse (APN, RN or LVN) in Texas. The total number of research participants is approximated to be around 1830.

There is a minimal risk in participating in this research study confidentiality via internet use and participation is completely voluntary. Potential benefits of the proposed study include findings to help researchers better understand nursing personnel with/without musculoskeletal injuries and assist in creating interventions to decrease nursing injuries in the future.

If you decide to participate in the research study, you will be asked to complete an electronic questionnaire that will take approximately 15 minutes. If you do not wish to participate in the research study, or decide to withdraw from the study at any time, you will not be adversely affected in any way. Attached to this email is a copy of the full informed consent form. Please read the form and feel free to ask any questions about this study that you may have. All survey responses are anonymous and confidential. You will not be asked to disclose any identifying information, including your name or place of employment. Research analysis results will not be reported individually for any individual participant, but rather as an aggregate. Upon closure of the online survey, online data will be downloaded, deleted from the internet, and records will be kept securely on a password protected encrypted USB in a locked file cabinet in the principal investigators private office.

If you have any questions or concerns about the research study, please do not hesitate to contact me by phone (409) 960-9299, or by email at cynthia.pipkins@lamar.edu. You may also contact my dissertation supervisor, Dr. Nancy Bergstrom at (713) 500-9920.

You may link to my survey by clicking on the following link:

https://www.surveymonkey.com/s/NursingPersonnel_PhDSurvey

I appreciate your consideration of participation.

Sincerely,

Cynthia M. Pipkins

IRB NUMBER: HSC-SN-13-0765
IRB APPROVAL DATE: 11/05/2013

Appendix E

Instruments for Data Collection

Embedded in

Survey Monkey

Musculoskeletal Injuries: Psychosocial Factors in Nursing Personnel

Demographics and Health History

1. What is your gender?

- ◯ Female
- ◯ Male

2. What is your date of birth?

Year

Month

Day

3. What is your ethnicity?

- ☐ Caucasian
- ☐ African American
- ☐ Hispanic
- ☐ Asian
- ☐ American Indian

Other/Biracial (please specify)

4. What is your marital status?

- ◯ Single
- ◯ Married/Partnered
- ◯ Widowed
- ◯ Divorced

Musculoskeletal Injuries: Psychosocial Factors in Nursing Personnel

5. What is the highest level of education you have completed?

- ◯ High School Graduation Equivalent Degree (GED)
- ◯ High School Graduate
- ◯ Licensed Vocational Nurse Certification
- ◯ Diploma Nurse
- ◯ Associate's Degree in Nursing
- ◯ Bachelor's of Science in Nursing
- ◯ Master's of Science in Nursing

Doctorate (please specify field)

6. What is your approximate average household income?

- ◯ $0-$24,999
- ◯ $25,000-$49,999
- ◯ $50,000-$74,999
- ◯ $75,000-$99,999
- ◯ $100,000-$124,999
- ◯ $125,000 and up

7. What is/was your most recent job/title?

8. How long have/did you work(ed) at this job?

9. Have you ever sustained a musculoskeletal injury (MSI)?

- ◯ Yes
- ◯ No

Musculoskeletal Injuries: Psychosocial Factors in Nursing Personnel

Musculoskeletal Injury (MSI) History

If you answered "Yes" to Q9, please answer the following questions. If you answered "No" to Q9, please proceed to the next page.

10. How did the MSI occur?

- ◯ Motor Vehicle Accident
- ◯ Work-related Accident

Other (please specify)

11. Where is the MSI located? (Check all that apply)

- ☐ Neck Region
- ☐ Upper Extremities (Arms)
- ☐ Upper Extremities (Hands)
- ☐ Upper Back
- ☐ Middle Back
- ☐ Lower Back
- ☐ Lower Extremities (Legs)
- ☐ Lower Extremities (Feet)

12. Did the MSI cause you to take time off work?

- ◯ 1 to 3 days off work
- ◯ 4 to 6 days off work
- ◯ 7 to 10 days off work

Greater than 10 days off work (please specify)

13. Before the MSI, what was your employment status?

- ◯ Working Full-time
- ◯ Working Part-time

Other (please specify)

Musculoskeletal Injuries: Psychosocial Factors in Nursing Personnel

14. After the MSI, what was/is your employment status?

- ◯ Working Full-time
- ◯ Working Part-time

Other (please specify)

15. Did your job/title change after the MSI?

- ◯ Yes
- ◯ No

Please specify (if changed)

Musculoskeletal Injuries: Psychosocial Factors in Nursing Personnel

Numeric Pain Rating Scale

The following questions are about your pain experienced.

16. What was your worst pain in the past month?

No Pain (0-3)	
Moderate Pain (4-7)	
Worst Possible Pain (8-10)	

17. What is the severity of your pain at the present moment?

No Pain (0-3)	
Moderate Pain (4-7)	
Worst Possible Pain (8-10)	

18. What was the severity of the pain in the last month?

No Pain (0-3)	
Moderate Pain (4-7)	
Worst Possible Pain (8-10)	

19. Was there pain interference with social and recreational activities in the past month?

No Pain (0-3)	
Moderate Pain (4-7)	
Worst Possible Pain (8-10)	

20. Was there pain interference with school or work in the past month?

No Pain (0-3)	
Moderate Pain (4-7)	
Worst Possible Pain (8-10)	

21. Was there pain interference with daily activities in the past month?

No Pain (0-3)	
Moderate Pain (4-7)	
Worst Possible Pain (8-10)	

Musculoskeletal Injuries: Psychosocial Factors in Nursing Personnel

Coping Strategies

Individuals who experience pain have developed a number of ways to cope or deal with their symptoms. Please check the appropriate number to indicate how often you do the activity. A "0" indicates that you never do that activity when you are experiencing pain symptoms, a "3" indicates you sometimes do it when you are experiencing pain symptoms, and "6" indicates you always do this when experiencing pain symptoms.

22. Coping Strategies

	Never Do "0"	1	2	Sometimes Do "3"	4	5	Always Do "6"
1. I try to feel distant from the pain, almost as is the pain was in somebody else's body.	○	○	○	○	○	○	○
2. I try to think of something pleasant.	○	○	○	○	○	○	○
3. I don't think of it as pain, but rather as a dull or warm feeling.	○	○	○	○	○	○	○
4. It is terrible, and I feel it is never going to get any better.	○	○	○	○	○	○	○
5. It is awful, and I feel that it overwhelms me.	○	○	○	○	○	○	○
6. I feel my life isn't worth living.	○	○	○	○	○	○	○
7. I try not to think of it as my body, but rather as something separate from me.	○	○	○	○	○	○	○
8. I tell myself I can't let the pain stand in the way of what I have to do.	○	○	○	○	○	○	○
9. No matter how bad it gets, I know I can handle it.	○	○	○	○	○	○	○
10. I pretend it is not there.	○	○	○	○	○	○	○
11. I worry all the time about whether it will end.	○	○	○	○	○	○	○
12. I replay in my mind pleasant experiences in the past.	○	○	○	○	○	○	○
13. I think of people I enjoy doing things with.	○	○	○	○	○	○	○
14. I imagine that the pain is outside of my body.	○	○	○	○	○	○	○
15. I just go on as if nothing happened.	○	○	○	○	○	○	○
16. I see it as a challenge, and don't let it bother me.	○	○	○	○	○	○	○
17. Although it hurts, I just	○	○	○	○	○	○	○

Musculoskeletal Injuries: Psychosocial Factors in Nursing Personnel

keep on going.							
18. I feel I can't stand it anymore.	○	○	○	○	○	○	○
19. I feel like I can't go on.	○	○	○	○	○	○	○
20. I think of things I enjoy doing.	○	○	○	○	○	○	○
21. I do anything to get my mind off the pain.	○	○	○	○	○	○	○
22. I do something I enjoy, such as watching TV or listening to music.	○	○	○	○	○	○	○
23. I pretend it is not part of me.	○	○	○	○	○	○	○

23. Based on all the things you do to cope or deal with your pain, over the past week, how much control do you feel you have over it?

No Control			Some Control			Complete Control
○	○	○	○	○	○	○

Musculoskeletal Injuries: Psychosocial Factors in Nursing Personnel

Personality

Please indicate your characteristics by checking the appropriate circle for each question.

24. Personality

	Not at all	Slightly	Moderately	Very much	Extremely
1. Are you a talkative person?	○	○	○	○	○
2. Does your mood often go up and down?	○	○	○	○	○
3. Are you rather lively?	○	○	○	○	○
4. Do you ever feel miserable for no reason?	○	○	○	○	○
5. Do you enjoy meeting new people?	○	○	○	○	○
6. Are you an irritable person?	○	○	○	○	○
7. Can you usually let yourself go and enjoy yourself at a lively party?	○	○	○	○	○
8. Are your feelings easily hurt?	○	○	○	○	○
9. Do you usually take the initiative in making new friends?	○	○	○	○	○
10. Do you often feel "fed-up"?	○	○	○	○	○
11. Can you easily get some life into a rather dull party?	○	○	○	○	○
12. Would you call yourself a nervous person?	○	○	○	○	○
13. Do you tend to keep in the background on social occasions?	○	○	○	○	○
14. Are you a worrier?	○	○	○	○	○
15. Do you like mixing with people?	○	○	○	○	○
16. Would yo call yourself tense or "highly-strung"?	○	○	○	○	○
17. Do you like plenty of action and excitement around you?	○	○	○	○	○
18. Do you worry too long after an embarrassing experience?	○	○	○	○	○

Musculoskeletal Injuries: Psychosocial Factors in Nursing Personnel

19. Are you mostly quiet when you are with other people?	◯	◯	◯	◯	◯
20. Do you suffer from nerves?	◯	◯	◯	◯	◯
21. Do other people think of you as being very lively?	◯	◯	◯	◯	◯
22. Do you often feel lonely?	◯	◯	◯	◯	◯
23. Can you get a party going?	◯	◯	◯	◯	◯
24. Are you often troubled about feelings of guilt?	◯	◯	◯	◯	◯

Musculoskeletal Injuries: Psychosocial Factors in Nursing Personnel

Physical Activity

Here are some of the things which other participants have told us about their pain. For each statement please check any number from "0" to "6" to say how much physcial activities such as bending, lifting, walking or driving affect or would affect your musculoskeletal pain.

25. Physical Activity

	Completely Disagree "0"	1	2	Unsure "3"	4	5	Completely Agree "6"
1. My pain was caused by physical activity.	◯	◯	◯	◯	◯	◯	◯
2. Physical activity makes my pain worse.	◯	◯	◯	◯	◯	◯	◯
3. Physical activity might further harm my MSI.	◯	◯	◯	◯	◯	◯	◯
4. I should not do physical activities which (might) make my pain worse.	◯	◯	◯	◯	◯	◯	◯
5. I cannot do physical activities which (might) make my pain worse.	◯	◯	◯	◯	◯	◯	◯
6. My pain was caused by my work or by an accident at work.	◯	◯	◯	◯	◯	◯	◯
7. My work aggravated my pain.	◯	◯	◯	◯	◯	◯	◯
8. I have a claim for compensation for my pain.	◯	◯	◯	◯	◯	◯	◯
9. My work is too heavy for me.	◯	◯	◯	◯	◯	◯	◯
10. My work makes or would make my pain worse.	◯	◯	◯	◯	◯	◯	◯
11. My work might further harm my MSI.	◯	◯	◯	◯	◯	◯	◯
12. I should not do my normal work with my present pain.	◯	◯	◯	◯	◯	◯	◯
13. I cannot do my normal work with my present pain.	◯	◯	◯	◯	◯	◯	◯
14. I cannot do my normal work till my pain is treated.	◯	◯	◯	◯	◯	◯	◯
15. I do not think that I will be back to my normal work within 3 months.	◯	◯	◯	◯	◯	◯	◯
16. I do not think that I will ever be able to go back to that work.	◯	◯	◯	◯	◯	◯	◯

Musculoskeletal Injuries: Psychosocial Factors in Nursing Personnel

Psychosocial Aspects

Below is a list of the ways you might have felt or behaved. Please tell me how often you have felt this way during the past week.

26. Psychosocial Aspects

	Rarely or none of the time (less than 1 day)	Some or a little of the time (1-2 days)	Occasionally or a moderate amount of time (3-4 days)	Most or all of the time (5-7 days)
1. I was bothered by things that usually don't bother me.	◯	◯	◯	◯
2. I did not feel like eating; my appetite was poor.	◯	◯	◯	◯
3. I felt that I could not shake off the blues even with help from my family or friends.	◯	◯	◯	◯
4. I felt I was just as good as other people.	◯	◯	◯	◯
5. I had trouble keeping my mind on what I was doing.	◯	◯	◯	◯
6. I felt depressed.	◯	◯	◯	◯
7. I felt that everything I did was an effort.	◯	◯	◯	◯
8. I felt hopeful about the future.	◯	◯	◯	◯
9. I thought my life had been a failure.	◯	◯	◯	◯
10. I felt fearful.	◯	◯	◯	◯
11. My sleep was restless.	◯	◯	◯	◯
12. I was happy.	◯	◯	◯	◯
13. I talked less than usual.	◯	◯	◯	◯
14. I felt lonely.	◯	◯	◯	◯
15. People were unfriendly.	◯	◯	◯	◯
16. I enjoyed life.	◯	◯	◯	◯
17. I had crying spells.	◯	◯	◯	◯
18. I felt sad.	◯	◯	◯	◯
19. I felt that people dislike me.	◯	◯	◯	◯
20. I could not get "going".	◯	◯	◯	◯

Musculoskeletal Injuries: Psychosocial Factors in Nursing Personnel

Thank You

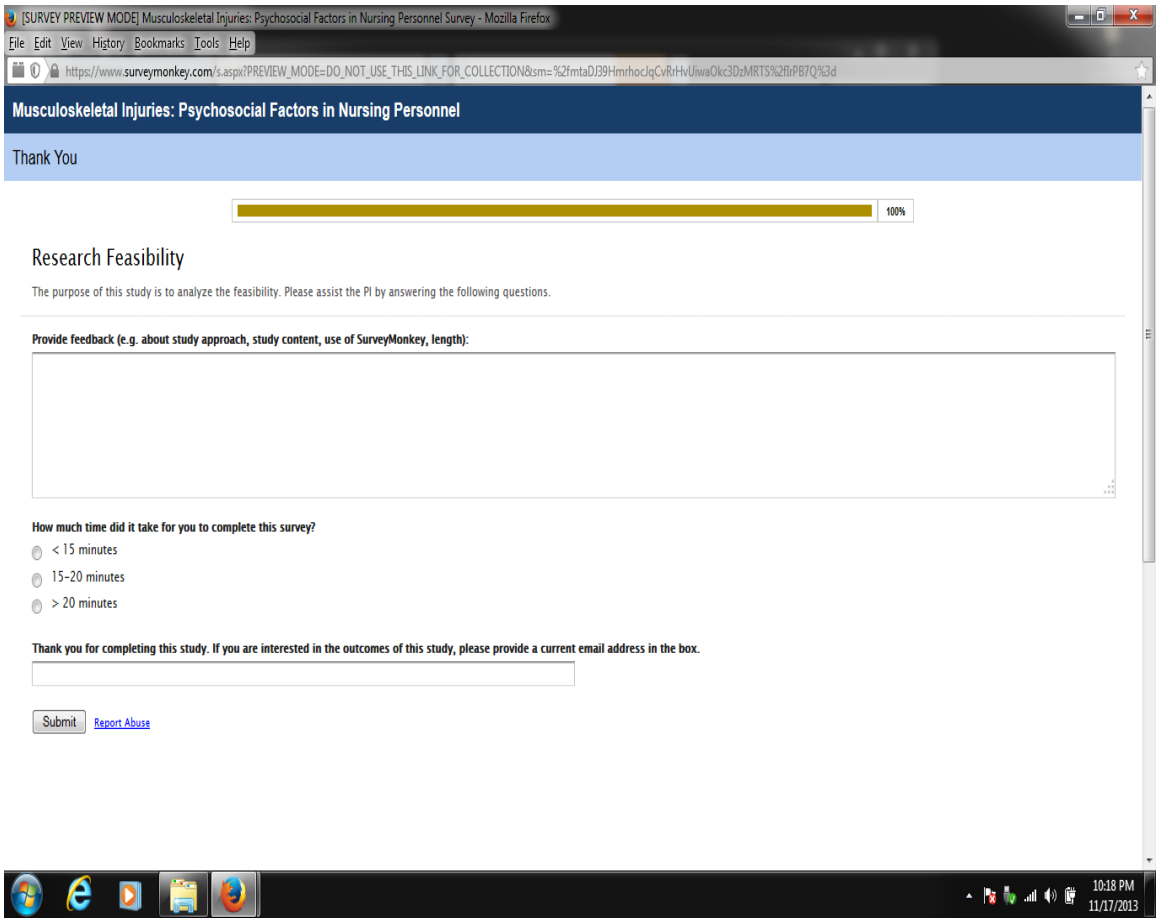
Thank you for completing this survey. If you are interested in the outcome of this study, please click the weblink below.

(A UT weblink will be provided for the participant to leave a current email address. By asking the participant to leave this weblink, confidentiality and anonymity of the information provided in this survey remain secured.)

Appendix D

Wufoo Survey

Screenshot of the Wufoo page embedded into the last page of the Musculoskeletal Injuries: Psychosocial Factors in Nursing Personnel Survey via Survey Monkey.



WORK-RELATED MUSCULOSKELETAL DISORDERS: PSYCHOLOGICAL FACTORS IN LICENSED NURSES

DISSERTATION PROPOSAL

SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR

FOR THE DEGREE OF DOCTOR OF PHILOSOPHY IN NURSING

THE UNIVERSITY OF TEXAS HEALTH SCIENCE CENTER AT HOUSTON

SCHOOL OF NURSING

BY

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AUGUST, 2014

Work-related Musculoskeletal Disorders: Psychological Factors in Licensed Nurses

The Bureau of Labor and Statistics (2011) ranks registered nursing as the fifth most hazardous occupation in the United States, resulting in lost days of work due to occupational injury and illness. Work-related musculoskeletal disorders (WMSD) of licensed nurses (all degree levels of nurses; hereafter referred to as licensed nurses) are costly to both the individual and the industry. American Nurses Association (ANA, 2013) estimates $7 billion U.S. dollars annually are spent in direct (medical bills) and indirect (worker's compensation and staff replacement) costs. The U.S. Health Resources and Service Administration (HRSA) and Texas Center for Nursing Workforce Studies (TCNWS) estimate a continued deficit (30%) of the nursing workforce per population distribution between 2005 and 2020 supporting the nursing shortage (TDSHS, 2013). Work-related musculoskeletal disorders (WMSD) persist despite the increase of ergonomic safety regulations, equipment and education. Nurses continue to report fear of a disabling WMSD as a hazard of the nursing profession (ANA, 2011).

Licensed nurses engage the body, physically (Mitchell, O'Sullivan, Burnett, Straker, & Rudd, 2009; Mohsemi- Bandpei et al., 2006; Smedley, Egger, Cooper, & Coggon, 1997) and psychologically (Feyer et al., 2000; Violante et al., 2004; Yip, 2004) as an occupational tool to complete work-related tasks (Hanks, 2007; Shakespeare, 2003). Physical risk factors of manually transferring, lifting, and repositioning patients have been documented (De Castro, 2004; De Castro, Hagan, & Nelson, 2006; Nelson, Lloyd, Menzel, & Gross, 2003; Nelson & Baptiste, 2004). Psychological factors (personality traits and defense coping mechanisms/strategies) must be viewed in both personal and

work environments (Van Vuuren, Zinzen, Van Heerden, Becker, & Meeusen, 2005). Dawson et al. (2007) completed a review reporting the lack of strong evidence supporting physically focused workplace interventions (lifting teams, education, and ergonomic equipment) exclusively as a means to decrease work-related musculoskeletal disorders. Current research supports multidimensional processing of a WMSD by employing an individual's physical and psychological characteristics (Gatchel & Turk, 1996; Turk, 2005; Vlaeyen & Linton, 2000). Our long term goal is to create an intervention aimed at the current psychological needs of licensed nurses who have sustained a work-related musculoskeletal disorder.

Pain (intensity, severity, and interference) and personality traits (extraversion and neuroticism) direct the multidimensional processing of a WMSD determining the coping strategy utilized (Marras, Davis, Heaney, Maronitis, & Allread, 2000; Reneman, Schiphorts-Preuper, Kleen, Geertzen, & Dijkstra, 2007). A coping strategy is developed by learned behaviors of previous pain experiences (Ryckman, 2008). Historical research links the development of coping strategies (depression, fear avoidance, catastrophizing, diversion, reinterpreting, and cognitive coping) related to a painful (severity or intensity) experience, such as WMSD (Fordcye, 1976; McNeil & Rainwater, 1998). Fear avoidance and catastrophizing have been linked to chronic pain and disability in WMSD patients (Crombez, Vlaeyen, Heuts, & Lysens, 1999; Lethem, Slade, Troup, & Bentley, 1983; Swinkels-Meewisse, Swinkels, Verbeek, Vlaeyen, & Oostendorp, 2003;Waddell, Newton, Henderson, Somerville, & Main, 1993). Patients with back disorders and chronic pain utilize diversion, reinterpreting attention and cognitive coping statements (Cano, May, & Ventimigilia, 2006; Violante et al., 2004). However, few studies have

been completed to determine whether the coping strategies (depression, fear avoidance, catastrophizing, diversion, reinterpreting, and cognitive coping) and personality traits (extraversion and neuroticism) are associated with the pain experience of WMSD in the licensed nurse population.

Specific Aims

Over the past ten years the focus of WMSD interventions has been toward reducing physical risk factors (mechanical lifting devices, lifting teams, and ergonomic education). Few studies have focused on the relationship between WMSD, psychological factors, and personality traits in this population. The purpose of this cross-sectional study is to create a multifactor profile of a licensed nurse with a WMSD and the psychological factors of pain, coping strategies, and personality traits.

Specific Aims:

1. What are the differences in the demographic characteristics between licensed nurses who have sustained a work-related musculoskeletal disorder (WMSD) and those who have not?
2. What is the prevalence and location of WMSD among licensed nurses?
3. What is the pain experience of licensed nurses who have sustained a WMSD and the following psychological factors:
    a. Pain (intensity, severity, and interference)
    b. Personality traits (extraversion and neuroticism)
    c. Coping strategies (depression, fear avoidance, catastrophizing, diversion, reinterpreting, cognitive coping).

4. In the licensed nurse population, is there a relationship between WMSD and the following psychological factors:
    a. Pain (intensity, severity and interference) scores on the Numeric Pain Rating Scale (NPRS) and (1) depression scores on t*he* Center for Epidemiological Studies Depression Scale (CES-D), (2) fear avoidance scores on the Fear Avoidance Beliefs Questionnaire (FABQ), and (3) negative coping score on the Coping Strategies Questionnaire-24 (CSQ24).
    b. Personality traits (neuroticism and extraversion) scores on the Eysenck Personality Questionnaire- Brief Version (EPQ-BV) and (1) depression scores on CES-D, (2) fear avoidance scores on the FABQ, and (3) negative coping score on the CSQ24.

Acute/chronic effects of stressful events (WMSD) remains the top nursing personnel concern (ANA, 2011). The findings of this study will provide important preliminary empirical data to create a psychological profile of licensed nurses with work-related musculoskeletal disorders. In the future, this profile will support the development of psychological health and wellness interventions for rehabilitative purposes in the WMSD licensed nurse population.

Background and Significance

Annually, an estimated 52% of licensed nurses will complain of musculoskeletal pain with 12% of the nurses leaving the profession reporting back injuries (Hunter, Branson, & Davenport, 2010). In response to the rising number of nursing workforce musculoskeletal disorders, programs have been developed from the organizational level to national level regulations (ANA, 2004; Dawson & Harrington, 2012; OSHA, 2009;

State of Texas, 2006). Physical factors for WMSD have been well established while psychological factors contributing to WMSD have not (ANA, 2004; DeCastro et al., 2004; Nelson & Baptiste, 2004; Nelson & Baptiste, 2006). Nonetheless, licensed nurses continue to sustain WMSD operating under safety protocols, regulations and proper ergonomic equipment.

Limited research supports the psychological focus toward outcomes (stress, mood changes, and depression) resulting from a painful stimulus (WMSD) in the licensed nursing population and not the defense mechanism chosen to cope with the stressor (Mitchell, O'Sullivan, Burnett, Straker, & Rudd, 2009; Reneman et al., 2007). A gap in research supports the need to analyze the intricate psychological processing factors associated with work-related musculoskeletal disorders. With a growing focus on a culture of safety, this study will provide preliminary data to create a psychological profile of licensed nurses with WMSD.

Pain demands a response (Eccleston & Crombez, 1999) dictating the attention (pain intensity) given to a work-related musculoskeletal disorder. The response is processed neurologically and psychologically creating a multidimensional pain experience (Linton & Shaw, 2011). Linton (2005) developed a conceptual model (schematic) depicting the psychological processing of a pain experience. The conceptual model postulates the interpretation (individual perception) of a painful experience will guide the individual to seek out a new coping strategy or rely on one used in past experiences. Pain perception is calculated through an individual's sensory, emotional, and evaluative reactions. Melzack and Casey (1968) describe these components of pain perception as dimensions: "sensory-discriminative (sense of the intensity, location,

severity); affective-motivational (urge to escape the unpleasantness through fear avoidance and reinterpreting); and cognitive-evaluative (cognitive coping statements, catastrophizing and distraction)" (p. 432). In order to address WMSD, the multidimensional pain experience (attention, interpretation, coping strategy) must be understood psychologically.

Literature Review

A literature review to examine the psychological concepts proposed in this study was completed.

Work-related Musculoskeletal Disorder. Work-related musculoskeletal disorders (WMSD) are "injury or disorders of the muscles, nerves, tendons, joints, cartilage, and/or spinal discs in which the work environment and performance of work contribute significantly to the condition; and/or the condition is made worse or persists longer due to work conditions" (CDC, 2013, p.6). Back injury is the most frequent MSD experienced by nursing personnel providing bedside care resulting from repeated manual patient handling, such as, lifting, transferring, and repositioning patients (De Castro, 2004; Nelson & Baptiste, 2004; Nelson et al., 2003; Retsas & Pinikahana, 2000). ANA (2011) Health and Safety survey reports 8 out of 10 nurses will continue to work while experiencing musculoskeletal pain setting them up for a musculoskeletal disorder or further a current musculoskeletal injury.

Pain: Intensity, Severity and Interference. Pain intensity is a combination of the meaning, attitudes, beliefs, and expected duration of the pain usually expressed by assigning a number "0" no pain to "10" worst pain ever experienced in a question representing the individual's current status (Jones, Vojir, Hutt, & Fink, 2007; Turk &

Melzack, 1992). Pain intensity and severity has been positively associated with pain interference (Cano et al., 2006). Pain interference is the "degree to which pain interferes with daily activities" (Ullrich, Jensen, Loeser, & Cardenas, 2008, p. 451). Pain has been linked to the psychological factor of fear (Turk & Melzack, 1992). Pain related fear will cause a person to avoid any activity associated to the initial injury (Reneman et al., 2007). Researchers have begun to focus on the psychological component of pain related to fear of injury or re-injury (George, Valencia, & Beneciuk, 2010; Houben et al., 2005).

Depression. Depression is considered a "disturbance in mood" and an outcome of multiple internal interactions (biological, psychological, cognitive, and sociological) secondary to a medical condition (Pasacreta, 2004). The medical condition initiates a response to physiological and psychological crisis. When the crisis exceeds the individual's ability to problem-solve effectively, negative coping factors will surface, such as, poor concentration, poor judgment, manifested by depression (Pasacreta, 2004). Bair, Robinson, Katon, and Kroenke (2003) found patients with depression describe increased pain (severity) and disability with decreased functioning and treatment outcomes.

Fear Avoidance. Vlaeyen & Ostelo (2008) states, "patients who catastrophically (mis)interpret their pain are prone to become fearful and consequently engage in protective (e.g. escape/avoidance) behaviors, such as guarding and taking rest" (p. 3). Fear avoidance takes place because of fear of painful movement or fear of re-injury; not because of the original injury (Crombez et al., 1999, Lethem et al., 1983; Reneman et al., 2007). Fear avoidance and catastrophizing are psychological factors empirically associated to chronic pain (Boersma & Linton, 2006; Peters, Vlaeyen, & Weber, 2005).

Catastrophizing. Catastrophizing refers to an individual's tendency to focus on and exaggerate the threat value of painful stimuli and to negatively evaluate one's own ability to deal with pain (Utne et al., 2009). Catastrophizers are "more likely to develop a fear of movement, which in turn will contribute to activity avoidance" (Wideman, Adams, & Sullivan 2009, p. 45). Research has been completed depicting catastrophizing as an appraisal and/or coping strategy (Haythornthwaite, Menefee, Heinberg, & Clark 1998; Jensen, Smith, Ehde, & Robinson 2001; Severeijns, Vlaeyen, & Van Den Hout, 2004). Sullivan et al. (2001) found catastrophizers will make decisions during an actual or expected painful experience under the influence of "an exaggerated negative mental mindset" (p. 53) contributing to more intense pain experienced and emotional distress increased.

Diversion. Tappen (1983) described the process of diversion as "engaging in enjoyable activities to temporarily distract attention from the problem, provide pleasure, and restore energy, sometimes freeing energy for more creative problem solving" (p. 37). Diversion is a defense mechanism to cope with unpleasant stimuli, such as pain or MSI, by utilizing distraction techniques, e.g. TV, music, or guided imagery. This study will fill a gap in the literature regarding the concept of diversion utilized by licensed nurses.

Reinterpreting. Reinterpreting an event means to give it a new or different meaning clarifying the experience. Valade et al. (2012) found reinterpreting pain sensations was significantly correlated with pain. Cano, May, and Ventimiglia (2006) found reinterpreting pain sensations was positively associated with psychological disability. Reinterpreting, ethnicity and education level are reported to be significantly

linked in a 3-way interaction (Cano, May, & Ventimiglia, 2006). This study will fill a gap in the literature regarding the concept of reinterpreting utilized by licensed nurses.

Cognitive Coping. According to Lazarus and Folkman (1984), coping is a consequence of individuals' appraisals of events (p. 29). Cognitive coping seeks to change an individual's though process creating a different response. Cano et al. (2006) found coping self statements associated to a decrease in report of physical disability. This study will fill a gap in the literature regarding the concept of cognitive coping utilized by licensed nurses.

Personality Traits: Extraversion and Neuroticism. An individual with extraversion characteristics will be "social, impulsive, outgoing, excitable, and oriented toward external reality"; the individual with introversion characteristics will be "quiet, introspective, well-ordered life, and oriented toward inner reality" (Ryckman, 2008, p. 346). Sato (2005) describes neuroticism individuals as "emotionally unstable" experiencing unreasonable fears and anxiety levels (p. 546). Research supports a direct correlation between personality temperament (affective) traits, stress hormones related to the immune system, and increased spinal loadings (Chapman, Weiss, Barrett, & Duberstein, 2013; Marras, Davis, Heaney, Maronitis, & Allread 2000; Wistow, Wakefield, Jr., & Goldsmith, 1990). Bansevicius, Westgaard, and Jensen (1997) found introverts reported increased levels of low back pain than extroverts (p. 504).

In summary, this study aims to determine the prevalence of these psychological concepts in licensed nurses. The different characteristics between the licensed nurses with and without WMSD will contribute to the development a psychological profile of the WMSD licensed nurse. In the future, the psychological profile determined in this study

will be utilized in the development of an educational module for the purpose of rehabilitation of the WMSD licensed nurse.

Conceptual Framework

The Fear Avoidance Model of Chronic Pain (FAMCP) has been widely tested in a variety of populations, such as adults experiencing acute/chronic musculoskeletal pain, disability, and disfigurement (Asmundson, Norton, & Vlaeyen, 2004; Letham et al., 1983; Newell, 1999; Vlaeyen & Linton, 2000). However, few studies have been completed to determine whether the risk factors are associated with the pain experience in the nursing population. The FAM will serve as the theoretical framework for the current research study. The focused area of this model to be tested is the construct "pain experience" to be defined by the licensed nurse population (See Figure 1). Linton (2005) developed a conceptual model of the psychological process of a pain experience. A conceptual model depicting the construct pain experience psychologically will guide this study (See Figure 2). The psychological pain experience model postulates the attention demanded by a musculoskeletal disorder (pain intensity) processed through the interpretation of the individuals pain severity, interference, and personality traits will determine the coping strategy (depression, fear avoidance, catastrophizing, diversion, reinterpreting, and cognitive coping) chosen as a defense mechanism.

Individual perception (attentive, cognitive, and behavioral) of the pain experience (WMSD) will reveal psychological factors utilized to regain homeostasis. Only addressing the physical risk factors leaves the individual psychologically at risk for fear of painful movement, further injury or re-injury. Licensed nurses should not "fear" a disabling musculoskeletal injury and continue working despite "feeling" musculoskeletal

pain leading to a work-related musculoskeletal disorder (ANA, 2011). Psychological factors must be appropriately addressed to support the licensed nurses' ability to rehabilitate from a work-related musculoskeletal disorder/injured status to a recovered return-to-work status.

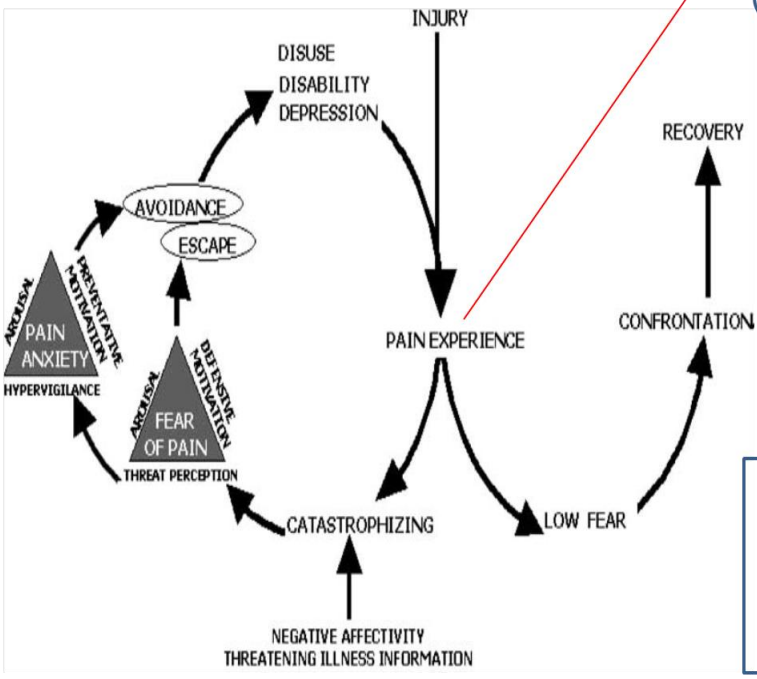

Figure 1. The Fear Avoidance Model of Chronic Pain (FAMCP) based on the Fear Avoidance Model of Vlaeyen and Linton (2000) and the Fear Anxiety Avoidance Model of Asumdson et al. (2004).

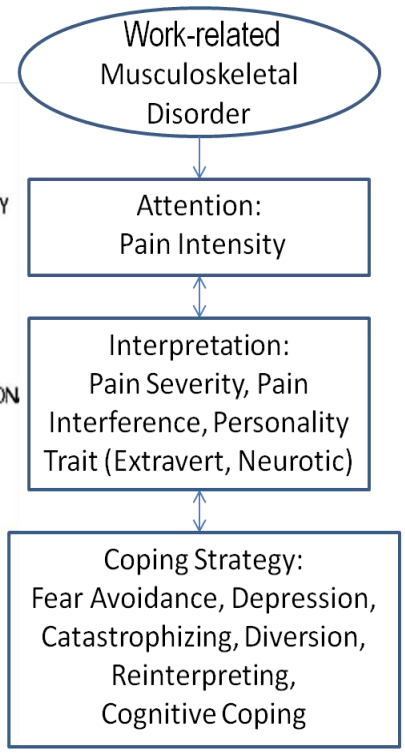

Figure 2. "Pain Experience: Psychological View" adapted from "Simplified Schematic Diagram-Pain Perception: Psychological View" (Linton, 2005).

Innovation

A profile of psychological factors must be evaluated to better understand licensed nurses with a work-related musculoskeletal disorder. Once the individual sustains a WMSD, the focus should shift to optimal recovery (rehabilitation) physically and psychologically. Currently, the focus of rehabilitation is primarily on the physical component of work-related musculoskeletal disorder. A broader focus should be rehabilitation of the whole person. This study contributes data to develop a psychological

profile to be utilized in the development of an educational module for the purpose of rehabilitation.

Multiple programs are currently supported addressing the physical components of WMSD, including (1) safe patient handling programs through awareness, education, and training of the direct contact issues between nurse and patient (ANA, 2004), (2) set regulations for safe lifting limits and procedures (OSHA, 2009), (3) Texas SB 1525, Safe Patient and Handling Act, incorporating a program of safety to all healthcare facilities including, use of lifting devices, proper lifting equipment, education of equipment and ergonomics (State of Texas, 2006), and (4) proposed initiative, Safe Patient Handling (SPH) National Standards focusing on evidenced based research supporting the changes to standards, guidelines, and policies, evidenced based outcomes, and dissemination of consistent language, resources, and toolkits (Dawson & Harrington, 2012). A missing link in current programs aimed to rehabilitate WMSD is a psychological module educating licensed nurses on "how to" properly address risk factors initiated in the pain experience leading to optimal health and recovery.

Design and Methods

Design

This study will utilize a cross-sectional design for the purpose of finding the prevalence of all variables and creating a description of the population at one point in time. The data will be explored for relationships among variables without an intervention employed (Polit & Beck, 2004). Data will be collected at one point in time to determine whether the participant has sustained a WMSD and whether the participant has an outcome of interest (depression, fear avoidance, catastrophizing, diversion, reinterpreting,

and/or cognitive coping). Cross-sectional design will allow the researchers to examine timing of exposure relative to outcome.

A cross-sectional study design is supportive when researchers lack information on time of onset in chronic conditions, e.g. musculoskeletal pain/injury, "to identify the association between exposure and disease onset" (Ibrahim, Alexander, Shy, & Farr 1999, p. 3). The cross-sectional design is used to estimate prevalence, and infer causation, but does not provided a sequence of events or determine cause and effect (Mann, 2003). This design allows preliminary data on a large sample of licensed nurses most quickly and economically providing empirical data on multiple psychological variables.

Feasibility Study

A feasibility study for this dissertation proposal was completed to analyze the process using Survey Monkey and Wufoo for data collection. The survey was emailed to licensed nurses (N=50) with a current Texas registered nurse license and email address from the Dishman Department of Nursing at Lamar University in Beaumont, Texas. There were 29 participants (n=29) who responded to the survey yielding a 58% response rate. The participants were given the opportunity to provide feedback about the process of collecting data using Survey Monkey. The analysis of the amount of time needed to complete the survey was provided by 19 (65.5%) out of 29 participants responding; 18 participants reported $\leq$ 20 minutes with only 1 participant reporting > 20 minutes to complete the survey. There were 8 out of 29 participants who provided feedback toward areas of confusion caused by question structure and/or placement. These issues have been addressed by the principal investigator for this dissertation study proposal.

Setting and Sample

This study will utilize five nursing organization websites to invite licensed nurses to participate: (1). Sigma Theta Tau International (STTI) a global organization that advances world health through nursing research [125,000 active members], (2) American Nurses Association (ANA) an organization that correspond to the safety of registered nurses from the bedside to legislative [3.1 million registered nurses in the US], (3) American Holistic Nurse Association (AHNA) an organization promoting holistic complementary alternative therapies, research, and legal-ethical aspects of integrative healthcare [> 4,500 members], (4) Work Injured Nurse Group-USA (WING-USA) an organization that actively seeks to help the injured nurse through support groups to legislation [unpublished membership numbers], and (5) Injured Nurses Network of America (INNA) a support group for the injured nurse through a social media approach [unpublished enrollment numbers]. A blog or discussion board post will be placed on these websites inviting the licensed nurse member to participate in this study. The eligible participants must meet the following inclusion criteria: (1) a current email address, (2) a current nursing license, and (3) computer accessibility. Utilization of internet discussion boards and/or blogs will allocate for a convenience sample.

Using G*Power 3.1, the projected sample size (n= 106) is based on power analysis by testing correlations for two independent Pearson *r*'s (Anderung, 2012). The sample size is statistically calculated with the *a priori* settings of significance α= 0.05, large effect size *q*=0.5 and power level 0.80, for minimum sample of 106 participants (Anderung, 2012). In order to create a WMSD psychological profile, the sample should

be equally represented by licensed nurses with (n=53) and without (n=53) work-related musculoskeletal disorders.

According to the ANA Health and Safety Survey Report (2011), nurses reported a WMSD at the average rate of 5.5 per 100 nurses. Using ANAs projection, 964 participants will be needed to yield 53 WMSD licensed nurses (e.g. 53 [sample size needed]/5.5 [avg. WMSD licensed nurses per 100] = 9.64 x 100 = 964). A Survey Monkey response rate of 10-15% supports a conservative selection of at least 9640 participants from the nursing organizations eligible participants (Edwards et al., 2010). The number of possible participants from the nurse organizations should support the projected sample size. Post hoc tests will determine if the *a priori* settings of significance α= 0.05, large effect size q=0.5 and power level 0.80 projected is achieved.

The principal investigator (PI) will post the initial invitation to participate in the study through the organizations website discussion board/blog highlighting the study purpose, length, compensation, and IRB study number. A Survey Monkey web link will be embedded in the initial invitation email. The participant may continue by clicking the "Begin Survey" link to participate in the study voluntarily (OPHS, 2012). The first page of the survey is the embedded consent letter to inform the participant in detail of the study purpose, risks, benefit, internet use and the minimal risk of compromised confidentiality. The participant must press the "Accept" link to continue or the "Decline" link to leave the survey. The participant may withdraw at any time. The Committee for the Protection of Human Subjects (CPHS) suggests a statement of confidentiality be included in the informed consent, such as, "Although every reasonable effort has been taken, confidentiality during actual Internet data transmission cannot be guaranteed"

(OPHS, 2012, p.3). The University of Texas Institutional Review Board (UT-IRB) will have to approve the utilization and surveying of the nurse organizations, Survey Monkey, and Wufoo.

Data Collection

Data will be collected via a web-based survey. The nursing organizations (STTI, ANA, ANHA, WING-USA, and INNA) are exclusive to licensed nurses who have membership access to the website meeting the inclusion criteria. The principal investigator (PI) will keep a log to track the websites used in data collection. The PI will post the initial invitation on the website discussion board and/or blog with a Survey Monkey web link to access the computer/internet data collection site (OPHS, 2011). Survey Monkey GOLD will provide custom survey controls (question development, response settings, and Internet Protocol Address [IP] controls), unlimited questions, answer limiters, and provide participants the ability to save or re-enter the survey (Waclawski, 2012). After completing the survey, participants desiring to receive study results may click on a Wufoo web link embedded in the last page of the Survey Monkey survey. The participant will be directed to provide a current email address to receive study results. Survey Monkey and Wufoo are compatible web-based data collection companies but do not link together by IP controls. No personal direct identifiers will be collected (e.g. name, online name or email addresses) by Survey Monkey. Therefore, Survey Monkey submissions cannot be linked to the Wufoo email address submission maintaining confidentiality and anonymity. Data will be collected from September 2014-November 2014.

The participant will read the initial invitation posting. If the participant chooses to be in the study, they will be instructed to click the embedded Survey Monkey web link. The consent letter (including the study title, study purpose, confidentiality, risk/benefits, and consent information) will be the initial page of the Survey Monkey survey requiring the participant to "Accept" or "Decline" study participation. If the participant "Accepts", the online survey will continue and include: demographics, Numeric Rating Scale for Pain (NRS), Center for Epidemiological Studies for Depression (CES-D), Fear Avoidance Beliefs Questionnaire (FABQ), Coping Strategies Questionnaire-24 (CSQ24), and Eysenck Personality Questionnaire-Brief Version (EPQ-BV). The last page of the survey will contain an embedded Wufoo web link providing voluntary participation in providing an email address to receive study results and/or the participant incentive gift e-card. The first 50 participants who have sustained a WMSD and the first 50 participants who have not sustained a WMSD completing the survey and providing a current email address through Wufoo will be sent a $10 Starbucks gift e-card. The data collection process will end November 30, 2014 or when the study has reached the desired sample size requirements.

The Starbuck's e-cards will be provided to the PI as e-codes traceable in an Excel spreadsheet. The PI will create a separate Excel spreadsheet of the email addresses of the participants completing the survey through participant submission of email address through Wufoo. The first 50 participant's with and the first 50 participant's without a WMSD to complete the survey and provide an email address will be sent an e-card code. The PI will track which code is given to a particular participant email. To verify the participant received the e-card, the PI will send the email with a read receipt tracking

option. The Starbuck's e-card codes will be stored on a password protected laptop and/or USB flash drive.

Survey data will be collected, processed, and stored by Survey Monkey and Wufoo via computer/internet password protected accounts. The principal investigator will be the sole individual with access to the data. Data encryption will protect information transmitted over the internet and the data will be stored on a password protected laptop and/or USB flash drive. The USB will be stored in a locked cabinet in the PI's locked office. The PI will be the only person with access to the keys and passwords.

Variables and Methods of Measurement

The following instruments will be utilized to collect the data needed to statistically analyze the specific aims proposed in this study. Estimated time to complete each instrument is documented according to literature findings. However, the feasibility study completed for this dissertation supports an estimated 15-20 minutes to complete all components of the survey packet.

Demographics. Demographics for the participant will be collected to describe the population studied. A checklist of descriptive information will include: gender, age, ethnicity/race, marital status, education level, annual household income, employment status, work-related musculoskeletal disorder, and work-related musculoskeletal disorder location. It takes less than 5 minutes to complete the checklist.

Numeric Rating Scale. Numeric Rating Scale (NRS) will assess pain intensity, severity and interference. Additionally, a NPRS will collect: (1) worst pain in last month, (2) severity of pain at present moment, (3) severity of pain in last month, (4) pain interference with social, recreational activities, school, work, or daily activities during

last month (Osman et al., 1997). Each item is rated on an 11 point-Likert scale, "0" being no pain or interference to "10" being the worst pain/most interference. The higher the score the greater the pain intensity, severity, or interference. Ferez et al. (1990) reports test-retest reliability (r = 0.96 and 0.95 respectively) in chronic pain rheumatoid arthritis patients. Construct validity in the same group was validated with a high correlation from 0.86 to 0.95 between the NRS and Visual Analog Scale (Ferez et al., 1990). It takes approximately 3 minutes to complete the scale.

Center for Epidemiological Studies Depression Scale. Center for Epidemiological Studies Depression Scale (CES-D) will assess the present level of depressive symptoms the participant is experiencing (Smarr & Keefer, 2011). The CES-D is a 20-item self-report questionnaire that developed as a screening tool to measures "perceived mood and level of functioning" occurring in the past week on a four-point Likert scale of "0" rarely or none of the time to "3" most or all of the time. Scoring ranges from 0-60 points with four-items worded in a positive manner to reduce response bias and reverse coded. The cut off points established for depression in populations of spinal cord injury, rheumatoid arthritis, and fibromyalgia is $\geq$ 16, then the higher the score the greater the level of symptoms of depression experienced in the past week. The CES-D has a reported internal consistency of an alpha coefficient α of 0.85 in the general population, test-retest reliability of with expected correlations ranging from 0.45-0.70 with shorter time periods between administrations scoring higher (Smarr & Keefer, 2011). Orme et al. (1986) reported the criterion validity for the CES-D correlated with depressive measures of self-esteem (0.58), state anxiety (0.44) and trait anxiety (0.71). It takes approximately 5-8 minutes to complete the questionnaire.

Fear Avoidance Beliefs Questionnaire. Fear Avoidance Beliefs Questionnaire (FABQ) will assess the participant's fear avoidance beliefs regarding the effect of physical and work-related activity on their musculoskeletal pain/injury (Williamson, 2006). The FABQ is a 16-item self-report questionnaire that measures the level of agreement on a 7-point Likert scale of 0 "completely disagree" to 6 "completely agree". The original study factor analysis revealed 2 subscales (physical activity and work); the subscales are summed FABQpa (0-24 points possible) and FABQwork (0-42 points possible). There are no cut off points established; only a higher score indicates a stronger belief of fear-avoidance by the participant in the subscale. Waddell, Newton, Henderson, Somerville, and Main (1993) reports internal consistency for the subscale work (α= 0.88) and physical activity (α= 0.77) in chronic low back pain patients. Kovacs et al. (2006) reports a total scale test-retest reliability (ICC=0.97) over 30 minute interval. The FABQ correlates the fear avoidance construct with the Tampa Scale of Kinesiophobia (work 0.53 and physical 0.76 (Crombez et al., 1999; Kovacs et al., 2006). It takes approximately 5-10 minutes to complete the questionnaire requiring the participant to report on both time perspectives of past and present.

Coping Strategies Questionnaire-24. Coping Strategies Questionnaire-24 (CSQ24) detects cognitive coping strategies to deal with musculoskeletal pain leading to injury. The CSQ24 will measure from the 4-factor subscales: catastrophization, diversion, reinterpreting, and cognitive coping. It is a self report 24-item questionnaire using a 7-point linear scale (0 equals never, 3 equals sometimes, and 6 equals always) to indicate how often they used that coping strategy when they experienced pain. Harland and Georgieff (2003) report internal consistency for catastrophizing (α = 0.85), diversion (α =

0.84), reinterpreting (α = 0.77), and cognitive coping (α = 0.75). Construct validity is demonstrated by highly significant correlations (p<0.001) in all four subscales (Harland & Georgieff, 2003). It takes approximately 5-10 minutes to complete the questionnaire.

Eysenck Personality Questionnaire-Brief Version. Eysenck Personality Questionnaire- Brief Version (EPQ-BV) will measure temperament constructs of an individual's level of extraversion and neuroticism. It is a 24-item self report questionnaire using a Likert scale to report the depth of a personal characteristic ranging from "A" not often at all to "E" extremely. Each item is given a point value (A=1, B=2, C=3, D=4, E=5) except for 2 reversed items 13 and 19 point values assigned (E=1, D=2, C=3, B=4, A=5). The subscale neuroticism is the even number items totaled. The extraversion subscale is the odd numbers totaled. The higher the individual's score the higher the level of extraversion and neuroticism is detected. Sato (2005) reports test-retest reliability identical for both extraversion and neuroticism subscales (r = 0.92 and 0.92 respectively). Concurrent validity was highly correlated (neuroticism 0.88 and extraversion 0.89) with the original EPQR-S (Sato, 2005). It takes approximately 5 minutes to complete (Sato, 2005).

Data Analysis

Upon submission of a survey packet, each participant will be assigned a code number through the Survey Monkey and Wufoo databases. The responses to the questions will be entered into an SPSS coded (encrypted) data sheet by Survey Monkey and Wufoo. The data will be released to the researcher through a password protected account. The researcher will keep all data on a password protected laptop and stored (encrypted) on a USB flash drive.

Table 1 shows the constructs and concepts of the FAMCP, how the variable is operationalized, and the data collection instrument used to measure the variable. The statistics will be computed using SPSS 19.0 predictive analytic software for Windows (SPSS, Chicago, IL). According to the level of data, the specific aims will be individually addressed through descriptive, appropriate group (mean) differences and/or correlational statistics. The data collected will fall into the categories of nominal and interval level data. Each specific aim will be analyzed through appropriate statistical measures according to the level of data collected (nominal or interval data).

The Specific Aims 1, 2 and 3 (a, b, and c) will be analyzed using descriptive statistics (means, median, and frequency) to: (1) describe differences in the demographic characteristics and prevalence of characteristics between licensed nurses who have sustained a WMSD and those who have not, (2) descriptive statistics (means, median, and frequency) will explain the locations and determine the prevalence by the WMSD licensed nurses, and (3) describe the pain experience of respondents who have sustained a WMSD through psychological factors of [a] pain (intensity, severity, and interference), [b] personality traits (extraversion and neuroticism), and [c] coping strategies (depression, fear avoidance, catastrophizing, diversion, reinterpreting, cognitive coping).

Among WMSD licensed nurses, Specific Aim 4 will utilize a Pearson's *r* coefficient to determine if a there is a relationship between: (a) Pain (intensity, severity and interference) scores on the Numeric Pain Rating Scale (NPRS) and [1] depression scores on the Center for Epidemiological Studies Depression Scale (CES-D), [2] fear avoidance scores on the Fear Avoidance Beliefs Questionnaire (FABQ), and [3] negative coping score on the Coping Strategies Questionnaire-24 (CSQ24), and (b) personality

traits (neuroticism and extraversion) scores on the Eysenck Personality Questionnaire-Brief Version (EPQ-BV) and [1] depression scores on CES-D, [2] fear avoidance scores on the FABQ, and [3] negative coping score on the CSQ24.

Table 1

Construct, Concept, Operationalized and Measured

Construct	Concept	Operationalized	Measured
Injury	MSI	Location	Demographics
Attention	Pain	Intensity	NRS
Interpretation	Pain	Severity	NRS
		Interference	Demographics
	Personality	Extraversion/Introversion	EPQ-BV
		Neurotic/Stability	EPQ-BV
Coping Strategy	Depression	Depressive Symptoms	CES-D
	Fear Avoidance	Physical activities	FABQ
		Work related activities	FABQ
	Catastrophizing	Catastrophizing	CSQ-24
	Diversion	Diversion techniques	CSQ-24
	Reinterpreting	Re-interpretive statements	CSQ-24
	Cognitive Coping	Cognitive suppression	CSQ-24

Note. MSI = Musculoskeletal Injury; DEMO = Demographics, NRS = Numeric Rating Scale, EPQ-BV = Eysecnk Personality Questionnaire Brief Version, CES-D = Center for Epidimeological Studies Depression, FABQ = Fear Avoidance Belief Questionnaire, CSQ 24 = Coping Strategies Questionnaire 24

Limitations

Cross-sectional studies must be interpreted with "caution regarding potential association of duration of disease with exposure status" resulting in survival bias (Ibrahim et al., 1999, p.3). Also, antecedent-consequent bias can occur "when it cannot be determined if exposure preceded disease" (Ibrahim et al., 1999, p.3). The researcher

opted for a conservative medium effect size for the proposed study. The large sample size may pose a limitation on the research due to time constraints. If this occurs, a change in statistical effect size can be utilized. Generalizabiltiy (external validity) will be limited to the multiple aspects of a psychological profile of licensed nurses in the United States.

Convenience sampling is "the most commonly used" and "the weakest form of sampling" (Polit & Beck, 2008, p. 341). Subject to bias, convenience sampling allows the participant to "select themselves" (Polit & Beck, 2008, p. 341). Online questionnaire response rate is often low. Non-respondents tend to be less well educated and from lower socioeconomic status groups creating a bias. Respondents may not provide accurate responses. Respondents' tend to not critically think responses merely providing the researcher a "snapshot view" (Patten, 2001, p. 3). Underrepresentation of licensed nurses due to socioeconomic, computer literacy, nursing organization affiliation and computer availability may be a potential problem.

Alternative approach

An alternative approach for this study is to utilize hospital settings, survey licensed nurses in a structured format. The study design will remain cross-sectional for the purpose of gathering preliminary data for developing an intervention. Additionally, this approach will require gaining permission to survey hospital licensed nurses through IRB approvals at each facility. An advantage will be face-to-face interaction for proper identification, qualifications, and confidential coding of the participants. Disadvantages will be number of environmental settings, only collecting information on those who are currently employed, socio-culturally bound to geographical area of collection, time and expense of materials.

Timeline

The study timeline will begin with preparation for the dissertation proposal defense (see Table 2). Upon approval from IRB for the use of Survey Monkey and Wufoo, nursing organization website (discussion board/blog), and the changes to the research components (proposal, cover letter, informed consent, and survey questions), data collection will be conducted September 2014 – November 2014. Data analysis will be completed and calculated with written results and discussion in dissertation manuscript format. Finally, the dissertation manuscript submission and defense will be in April 2015.

Table 2
Timeline for Dissertation

	2014									2015	
Activity	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May
Preparation (Survey Monkey, Wufoo, Incentives & STTI)	X	X									
UT IRB Approval		X	X								
Collect Data (Dissertation)			X	X	X						
Data Analysis (Dissertation)				X	X	X					
Results (Dissertation)				X	X	X	X				
Discussion (Dissertation)						X	X	X			
Defend (Dissertation)									X	X	
Prepare All Dissertation Documents for Graduation										X	X

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Appendix A

Initial Study Invitation

via Discussion Board

Discussion Board
Subject Line for the Email: Ouch…that hurts!

Body of the Email:

Calling ALL Licensed Nurses…

Have you **EVER** sustained a nursing musculoskeletal injury? Or, maybe you have **NEVER** sustained an injury at work? We need your help in this nursing research study!!

Length: 5-10 minutes (online)

Compensation: Starbuck's e-card to the 1st 50 participants with a WMSD and the 1st 50 participants without a WMSD completing the survey

Study Number: HSC-SN-14-0371

Begin Survey
https://www.surveymonkey.com/s/ZFCV8NV
If you have problems with the link directly, please type in the URL address manually.

Thank you for your time and participation,

Cynthia Pipkins, PhD(c), RN
Primary Investigator
cynthia.pipkins@lamar.edu

Appendix B

Informed Consent

Instruments for Data Collection

Embedded in Survey Monkey

Informed Consent

We need nurses who have and have not sustained a WMSD to complete this survey.

You are invited to participate in a research study examining psychological factors associated with work-related musculoskeletal disorders (WMSDs) in licensed nurses (all degree levels of nurses). The purpose of this study is to create a multifactor profile of a licensed nurse with a WMSD and the psychological factors of pain, coping strategies, and personality traits. In the future, this profile will support the development of psychological health and wellness interventions for rehabilitative purposes in the WMSD licensed nurse population.
This study has been approved by the University of Texas Health Science Center, Houston Office of Human Research Protection (Protocol #: HSC-SN-14-0371).

Study Title: Work-related musculoskeletal disorders: Psychological factors in licensed nurses
Researcher: Cynthia M. Pipkins, PhD(c), RN
Researcher Email Address: cynthia.pipkins@lamar.edu
Researcher Telephone Number: 409-960-9299
Research Supervisor: Dr. Nancy Bergstrom
Research Supervisor Email Address: Nancy.Bergstrom@uth.tmc.edu

Cynthia Pipkins is a doctoral nursing student at the University of Texas Health Science Center at Houston and is the primary investigator (PI) of this study. The PI wants to examine the prevalence and relationships of multiple psychological aspects, such as, pain, coping strategies, and personality traits in licensed nurses with a work-related musculoskeletal disorder.

You are invited to be in the study because you have a current nursing license, a current email address, and computer accessibility. This study will involve an online survey that should take about 5-10 minutes to complete. The survey will include demographic information, work-related musculoskeletal disorder, pain, coping strategies, and personality traits. The only risk from this study is loss of confidentiality. Your information will be kept securely, but there is a small possibility that responses could be viewed by unauthorized parties (e.g. computer hackers) because your responses are being entered and stored on a web server.

Your participation in this study is voluntary. You can decide not to be in the study and you can change your mind about participating in the study at any time. There will be no penalty to you. If you want to remove yourself from the study, you will simply stop answering the questions and do not click the "submit" button. There is no cost for taking part in this study. The first 50 participants with a WMSD and the first 50 participants without a WMSD who complete the survey (Survey Monkey) and provide a current email address (Wufoo) will be sent a $10 Starbuck's e-card.

There will be no identifying information collected through Survey Monkey during the survey. You will not be asked your name or your employer's name for this study. Only the PI will have access to the results of the surveys. The emails addresses of potential participants will only be known to the PI and will not be disclosed. You will not be identified in any reports or publications that may result from this study. Once the survey collection is completed, the survey, all data will be removed from the World Wide Web, and the email list destroyed. All participants will have the option to leave a current email address for study dissemination through Wufoo, a separate entity, maintaining anonymity and confidentiality.

If you have any questions or concerns about this study, you may call the PI at 409-960-9299 or email her at cynthia.pipkins@lamar.edu. By clicking the accept link below, you voluntarily agree to be in this study and agree to allow the use and sharing of my study-related records as described above.

Sincerely,
Cynthia M. Pipkins, PhD(c), RN

***1. If you would like to participate, click "accept". If you choose not to at this time, click "decline".**

- ◯ Accept
- ◯ Decline

UTHealth The University of Texas Health Science Center at Houston

IRB NUMBER: HSC-SN-14-0371
IRB APPROVAL DATE: 09/05/2014

Demographics and Health History

***1. Gender**

- ◯ Female
- ◯ Male

***2. Age**

- ◯ 29 or younger
- ◯ 30-39
- ◯ 40-49
- ◯ 50-59
- ◯ 60-69
- ◯ 70 or older

3. Ethnicity/Race

- ◯ Caucasian
- ◯ African American
- ◯ Hispanic
- ◯ Asian or Pacific Islander
- ◯ American Indian or Alaskan Native

Other/Biracial (please specify)

4. Marital Status

- ◯ Single
- ◯ Married/Partnered
- ◯ Widowed
- ◯ Divorced

5. Highest Level of Education Completed

- ◯ Licensed Vocational Nurse Certification
- ◯ Diploma Nurse
- ◯ Associate's Degree in Nursing
- ◯ Bachelor's Degree in Nursing
- ◯ Master's in Nursing
- ◯ Doctorate in Nursing
- ◯ Doctorate in Nursing Practice
- ◯ Doctorate in Other Field

6. Average Annual Household Income

- ◯ $0-$24,999
- ◯ $25,000-$49,999
- ◯ $50,000-$74,999
- ◯ $75,000-$99,999
- ◯ $100,000-$124,999
- ◯ $125,000 and up

7. Most recent Position/Title

- ◯ Chief Nursing Officer
- ◯ Clinical Nurse Specialist
- ◯ Consultant
- ◯ Director
- ◯ Educator
- ◯ Health Policy Analyst
- ◯ International Nurse
- ◯ Managed Care/Case Manager
- ◯ Nurse Anesthetist
- ◯ Nurse Manager
- ◯ Nurse Midwife
- ◯ Nurse Practitioner
- ◯ Nursing Student ADN Program
- ◯ Nursing Student BSN Program
- ◯ Nursing Student Master's Program
- ◯ Nursing Student Doctoral Program
- ◯ Quality Assurance/Improvement
- ◯ Researcher
- ◯ Risk Management
- ◯ Staff Nurse
- ◯ Supervisor
- ◯ Other

8. Employment Setting

- ◯ Academia
- ◯ Ambulatory Care/Outpatient Clinic
- ◯ Business/Corporation
- ◯ College Health
- ◯ Health Insurance
- ◯ Free-Standing Surgery Center
- ◯ Government Agency
- ◯ HMO
- ◯ Home Health
- ◯ Hospice
- ◯ Hospital
- ◯ Long-Term Care
- ◯ Managed Care
- ◯ Military
- ◯ Nursing Student
- ◯ Occupational Health
- ◯ Office Nurse
- ◯ Private Practice
- ◯ Public Health
- ◯ Quality/Utilization Review
- ◯ School Health Nurse
- ◯ Other

9. Number of Years at Current Position

- ◯ Less than 1 year
- ◯ 1 to 5 years
- ◯ 6 to 10 years
- ◯ 11 to 15 years
- ◯ 16 to 20 years
- ◯ Greater than 20 years

***10. Have you ever sustained a work-related musculoskeletal disorder (WMSD) while employed as a nurse, such as e.g. any injury or disorders of the muscles, nerves, tendons, joints, cartilage, and/or spinal discs in which the work environment and performance of work contribute significantly to the condition; and/or the condition is made worse or persists longer due to work conditions?**

- ◯ Yes
- ◯ No

Work-related Musculoskeletal Disorder (WMSD) History

1. Where is the original location of the WMSD?

- ◯ Neck Region
- ◯ Upper Extremities
- ◯ Back Region
- ◯ Lower Extremities

2. Does the WMSD affect other body regions? (Check all that apply)

- ☐ Neck Region
- ☐ Upper Extremities
- ☐ Back Region
- ☐ Lower Extremities

3. Did the WMSD cause you to take time off work?

- ◯ No days
- ◯ 1 to 3 days
- ◯ 4 to 6 days
- ◯ 7 to 10 days
- ◯ Greater than 10 days

4. Before the WMSD, what was your employment status?

- ◯ Per Diem
- ◯ Working Full-time
- ◯ Working Part-time
- ◯ Other

5. After the WMSD, what was/is your employment status?

- ◯ Per Diem
- ◯ Working Full-time
- ◯ Working Part-time
- ◯ Other

6. Did your job/title change as a result of the WMSD?

- ◯ Yes
- ◯ No

Numeric Pain Rating Scale (NPRS)

As a result to the WMSD sustained, the following questions are about your pain experienced. The NPRS utilizes the numeric ranking of "0" for no pain at all to "10" the worst pain experienced.

***1. Due to the WMSD sustained, rate the pain you have experienced:**

	0	1	2	3	4	5	6	7	8	9	10
Worst pain in the last month	◯	◯	◯	◯	◯	◯	◯	◯	◯	◯	◯
Severity of pain at present	◯	◯	◯	◯	◯	◯	◯	◯	◯	◯	◯
Severity of pain in the last month	◯	◯	◯	◯	◯	◯	◯	◯	◯	◯	◯

***2. During the last month, did the pain interfere with the following activities:**

	Yes	No	N/A
Social	◯	◯	◯
Recreational	◯	◯	◯
School	◯	◯	◯
Work	◯	◯	◯
Daily	◯	◯	◯

Coping Strategies

Individuals who experience WMSD pain have developed a number of ways to cope or deal with their symptoms. Please check the appropriate number to indicate how often you do the activity. A "0" indicates that you never do that activity when you are experiencing pain symptoms, a "3" indicates you sometimes do it when you are experiencing pain symptoms, and "6" indicates you always do this when experiencing pain symptoms.

***1. Coping Strategies**

	Never Do "0"	1	2	Sometimes Do "3"	4	5	Always Do "6"
1. I try to feel distant from the pain, almost as if the pain was in somebody else's body.	○	○	○	○	○	○	○
2. I try to think of something pleasant.	○	○	○	○	○	○	○
3. I don't think of it as pain, but rather as a dull or warm feeling.	○	○	○	○	○	○	○
4. It is terrible, and I feel it is never going to get any better.	○	○	○	○	○	○	○
5. It is awful, and I feel that it overwhelms me.	○	○	○	○	○	○	○
6. I feel my life isn't worth living.	○	○	○	○	○	○	○
7. I try not to think of it as my body, but rather as something separate from me.	○	○	○	○	○	○	○
8. I tell myself I can't let the pain stand in the way of what I have to do.	○	○	○	○	○	○	○
9. No matter how bad it gets, I know I can handle it.	○	○	○	○	○	○	○
10. I pretend it is not there.	○	○	○	○	○	○	○
11. I worry all the time about whether it will end.	○	○	○	○	○	○	○
12. I replay in my mind pleasant experiences in the past.	○	○	○	○	○	○	○
13. I think of people I enjoy doing things with.	○	○	○	○	○	○	○
14. I imagine that the pain is outside of my body.	○	○	○	○	○	○	○
15. I just go on as if nothing happened.	○	○	○	○	○	○	○
16. I see it as a challenge, and don't let it bother me.	○	○	○	○	○	○	○
17. Although it hurts, I just keep on going.	○	○	○	○	○	○	○
18. I feel I can't stand it anymore.	○	○	○	○	○	○	○

19. I feel like I can't go on.	○	○	○	○	○	○	○
20. I think of things I enjoy doing.	○	○	○	○	○	○	○
21. I do anything to get my mind off the pain.	○	○	○	○	○	○	○
22. I do something I enjoy, such as watching TV or listening to music.	○	○	○	○	○	○	○
23. I pretend it is not part of me.	○	○	○	○	○	○	○

2. Based on all the things you do to cope or deal with your pain, over the past week:

	No Control "0"	1	2	Some Control "3"	4	5	Complete Control "6"
How much control do you feel you have over it?	○	○	○	○	○	○	○

Physical Activity

Here are some of the things which other participants have told us about their WMSD pain. For each statement please check any number from "0" to "6" to say how much physcial activities such as bending, lifting, walking or driving affect or would affect your musculoskeletal pain.

1. Physical Activity

	Completely Disagree "0"	1	2	Unsure "3"	4	5	Completely Agree "6"
1. My pain was caused by physical activity.	○	○	○	○	○	○	○
2. Physical activity makes my pain worse.	○	○	○	○	○	○	○
3. Physical activity might further harm my MSI.	○	○	○	○	○	○	○
4. I should not do physical activities which (might) make my pain worse.	○	○	○	○	○	○	○
5. I cannot do physical activities which (might) make my pain worse.	○	○	○	○	○	○	○
6. My pain was caused by my work or by an accident at work.	○	○	○	○	○	○	○
7. My work aggravated my pain.	○	○	○	○	○	○	○
8. I have a claim for compensation for my pain.	○	○	○	○	○	○	○
9. My work is too heavy for me.	○	○	○	○	○	○	○
10. My work makes or would make my pain worse.	○	○	○	○	○	○	○
11. My work might further harm my MSI.	○	○	○	○	○	○	○
12. I should not do my normal work with my present pain.	○	○	○	○	○	○	○
13. I cannot do my normal work with my present pain.	○	○	○	○	○	○	○
14. I cannot do my normal work till my pain is treated.	○	○	○	○	○	○	○
15. I do not think that I will be back to my normal work within 3 months.	○	○	○	○	○	○	○
16. I do not think that I will ever be able to go back to that work.	○	○	○	○	○	○	○

Personality

Please indicate your characteristics by checking the appropriate circle for each question.

1. Personality

	Not at all	Slightly	Moderately	Very much	Extremely
1. Are you a talkative person?	○	○	○	○	○
2. Does your mood often go up and down?	○	○	○	○	○
3. Are you rather lively?	○	○	○	○	○
4. Do you ever feel miserable for no reason?	○	○	○	○	○
5. Do you enjoy meeting new people?	○	○	○	○	○
6. Are you an irritable person?	○	○	○	○	○
7. Can you usually let yourself go and enjoy yourself at a lively party?	○	○	○	○	○
8. Are your feelings easily hurt?	○	○	○	○	○
9. Do you usually take the initiative in making new friends?	○	○	○	○	○
10. Do you often feel "fed-up"?	○	○	○	○	○
11. Can you easily get some life into a rather dull party?	○	○	○	○	○
12. Would you call yourself a nervous person?	○	○	○	○	○
13. Do you tend to keep in the background on social occasions?	○	○	○	○	○
14. Are you a worrier?	○	○	○	○	○
15. Do you like mixing with people?	○	○	○	○	○
16. Would yo call yourself tense or "highly-strung"?	○	○	○	○	○
17. Do you like plenty of action and excitement around you?	○	○	○	○	○
18. Do you worry too long after an embarrassing experience?	○	○	○	○	○
19. Are you mostly quiet when you are with other people?	○	○	○	○	○
20. Do you suffer from	○	○	○	○	○

nerves?					
21. Do other people think of you as being very lively?					
22. Do you often feel lonely?					
23. Can you get a party going?					
24. Are you often troubled about feelings of guilt?					

Psychological Aspects

Below is a list of the ways you might have felt or behaved. Please tell me how often you have felt this way during the past week.

1. Psychological Aspects

	Rarely or none of the time (less than 1 day)	Some or a little of the time (1-2 days)	Occasionally or a moderate amount of time (3-4 days)	Most or all of the time (5-7 days)
1. I was bothered by things that usually don't bother me.	○	○	○	○
2. I did not feel like eating; my appetite was poor.	○	○	○	○
3. I felt that I could not shake off the blues even with help from my family or friends.	○	○	○	○
4. I felt I was just as good as other people.	○	○	○	○
5. I had trouble keeping my mind on what I was doing.	○	○	○	○
6. I felt depressed.	○	○	○	○
7. I felt that everything I did was an effort.	○	○	○	○
8. I felt hopeful about the future.	○	○	○	○
9. I thought my life had been a failure.	○	○	○	○
10. I felt fearful.	○	○	○	○
11. My sleep was restless.	○	○	○	○
12. I was happy.	○	○	○	○
13. I talked less than usual.	○	○	○	○
14. I felt lonely.	○	○	○	○
15. People were unfriendly.	○	○	○	○
16. I enjoyed life.	○	○	○	○
17. I had crying spells.	○	○	○	○
18. I felt sad.	○	○	○	○
19. I felt that people dislike me.	○	○	○	○
20. I could not get "going".	○	○	○	○

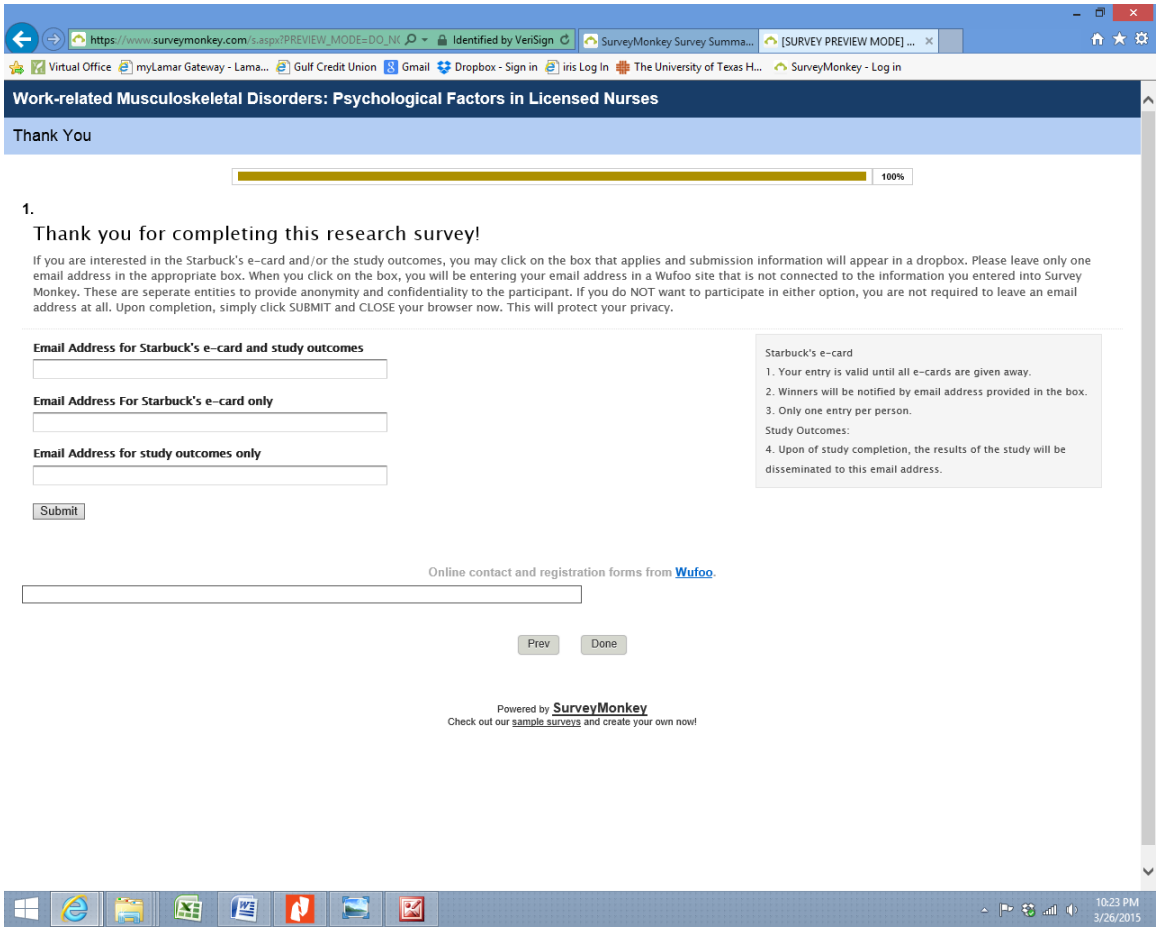
Thank You

1. This is where the Wufoo page is embedded into the survey.

Appendix C

Wufoo Survey

Screenshot of the Wufoo page embedded into the last page of the Work-related Musculoskeletal Disorders: Psychological Factors in Licensed Nurses survey via Survey Monkey.



WORK-RELATED MUSCULOSKELETAL DISORDERS: PSYCHOLOGICAL FACTORS IN LICENSED NURSES

A DISSERTATION

SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS

FOR THE DEGREE OF DOCTOR OF PHILOSOPHY IN NURSING

THE UNIVERSITY OF TEXAS HEALTH SCIENCE CENTER AT HOUSTON

SCHOOL OF NURSING

BY

CYNTHIA PIPKINS, MSN, RN

MAY, 2015

Work-related Musculoskeletal Disorders: Psychological Factors in Licensed Nurses

The U. S. Bureau of Labor and Statistics ranks registered nursing as the fifth most hazardous occupation in the United States, and resulting work-related injuries contribute to lost days of work (U.S. Bureau of Labor and Statistics [BLS], 2014). Annually, an estimated 52% of nurses complain of musculoskeletal pain, and 12% leave the profession due to back injuries (Hunter, Branson, & Davenport, 2010). Work-related musculoskeletal disorders (WMSD) sustained by licensed nurses (licensed vocational nurse and all levels of registered nurses; hereafter referred to as nurses) are costly to both the individual and the industry. The American Nurses Association estimates $7 billion dollars annually are spent in direct (medical bills) and indirect (worker's compensation and staff replacement) costs (American Nurses Association [ANA], 2013). The Texas Center for Nursing Workforce Studies estimates a continued 30% deficit of the nursing workforce between 2005 and 2020 (Texas Department of State Health Services, 2013). Although programs have been developed from the organizational to national level (ANA, 2004; Dawson & Harrington, 2012; Oermann, 2013; State of Texas, 2006; U. S. Occupational Safety and Health Administration, 2009), WMSD persist despite the increase of ergonomic safety regulations, equipment, and education.

Background and Significance

Nurses report a fear of developing WMSD as a potential hazard of the nursing profession (ANA, 2011). The hazard exists because nurses use their bodies (Mitchell, O'Sullivan, Burnett, Straker, & Rudd, 2009; Mohsemi-Bandpei et al., 2006; Smedley, Egger, Cooper, & Coggon, 1997) and intellect (Feyer et al., 2000; Violante et al, 2004; Yip, 2004) to complete work-related tasks (Hanks, 2007; Shakespeare, 2003). In this

context, WMSD are "injuries or disorders in which the work environment and performance of work contribute significantly to the condition" (Centers for Disease Control and Prevention [CDC], 2013, p.6). A Health and Safety survey reports 8 of 10 nurses will continue to work while experiencing musculoskeletal pain, which sets them up for a musculoskeletal disorder (ANA, 2011).

Although physical risk factors related to manually transferring, lifting, and repositioning patients have been documented (De Castro, 2004; De Castro, Hagan, & Nelson, 2006; Nelson & Baptiste, 2004; Nelson, Lloyd, Menzel, & Gross, 2003). psychological factors, such as personality traits and defense coping mechanisms, have been scantly studied in connection with WMSD (Van Vuuren, Zinzen, Van Heerden, Becker, & Meeusen, 2005). Dawson et al. (2007) reported little evidence in support of exclusively physically focused workplace interventions to decrease WMSD.

Current research findings recommend taking both physical and psychological characteristics into account when considering the occurrence of and reaction to WMSD (Gatchel & Turk, 1996; Turk, 2005; Vlaeyen & Linton, 2000). In the Fear Avoidance Model of Chronic Pain (FAMCP), the construct "pain experience" is depicted as an individual's interpretation of pain as threatening or non-threatening (Vlaeyen & Linton, 2000). Pain demands a response (Eccleston & Crombez, 1999) that dictates the amount of attention (pain intensity) an individual gives to WMSD. A response is processed neurologically and psychologically, which creates a multidimensional pain experience (Linton & Shaw, 2011). Linton's conceptual model depicted the psychological processing of a pain experience wherein the interpretation of a painful experience guides the individual to seek out a new coping strategy or rely on one used in past experiences

(Linton, 2005). To address WMSD, the multidimensional pain experience, including attention, interpretation, and coping strategy, must be understood psychologically as well as physically.

Pain (intensity, severity, interference) and an individual's personality traits (extraversion and neuroticism) directly determine the coping strategy utilized (Marras, Davis, Heaney, Maronitis, & Allread, 2000; Reneman, Schiphorts-Preuper, Kleen, Geertzen, & Dijkstra, 2007). According to Lazarus and Folkman (1984), coping is a result of an individual's appraisal of events (p. 29). Learned behaviors of previous pain experiences affect the strategy conceived (Ryckman, 2008). Research historically links the development of coping strategies (depression, fear avoidance, catastrophizing, diversion, reinterpreting, cognitive coping) in response to the severity or intensity of a painful experience (Fordcye, 1976; McNeil & Rainwater, 1998).

Fear avoidance occurs in relation to fear of painful movement or fear of re-injury (Crombez, Vlaeyen, Heuts, & Lysens, 1999; Lethem, Slade, Troup, & Bentley, 1983; Reneman et al., 2007). Catastrophizing (exaggerating the threat) has been depicted as an appraisal or coping strategy (Haythornthwaite, Menefee, Heinberg, & Clark, 1998; Jensen, Turner, & Romano, 2001; Severeijns, Vlaeyen, & Van Den Hout, 2004). Sullivan et al. (2001) found that during an actual or expected painful experience, those who catastrophize make decisions under the influence of "an exaggerated negative mental mindset" (p. 53), which contributes to the experience of more intense pain and emotional distress. Fear avoidance and catastrophizing have been linked to chronic pain and disability in patients with WMSD (Boersma & Linton, 2006; Crombez et al., 1999; Lethem et al., 1983; Peters, Vlaeyen, & Weber, 2005; Swinkels-Meewisse, Swinkels,

Verbeek, Vlaeyen, & Oostendorp, 2003;Waddell, Newton, Henderson, Somerville, & Main, 1993).

Studies of large sample size have found a direct correlation among personality temperament traits, stress hormones, and increased spinal loadings (Chapman, Weiss, Barrett, & Duberstein, 2013; Marras et al., 2000; Wistow, Wakefield, & Goldsmith, 1990). Other studies have found that patients with back disorders and chronic pain utilize strategies such as diversion, reinterpreting attention, and cognitive coping statements (Cano, May, & Ventimigilia, 2006; Violante et al., 2004). Valade et al. (2012) found reinterpretation of pain sensations was significantly correlated with the individual's level of reported pain. Few studies have determined whether coping strategies and personality traits are associated with the pain experience of nurses with WMSD. A gap in nursing research suggests the need to analyze the psychological processing factors associated with work-related musculoskeletal disorders.

Conceptual Framework

As a framework, the FAMCP has been widely tested with a variety of populations, including adults experiencing acute or chronic musculoskeletal pain, disability, and disfigurement (Asmundson, Norton, & Vlaeyen, 2004; Lethem et al., 1983; Newell, 1999; Vlaeyen & Linton, 2000). The main area of the FAMCP focused on for the current research study was the construct of "pain experience" as defined for the nurse population (see Figure 1). Linton's (2005) conceptual model, which depicts the "pain experience" psychologically, was modified to guide this study. According to the model, the psychological pain experience postulates the attention (relative to pain intensity) that a WMSD demands. The demand is processed through the individual's

interpretation of the pain's severity and interference as well as his or her personality traits. This permits determining a coping strategy (depression, fear avoidance, catastrophizing, diversion, reinterpreting, cognitive coping) chosen as a defense mechanism to regain homeostasis.

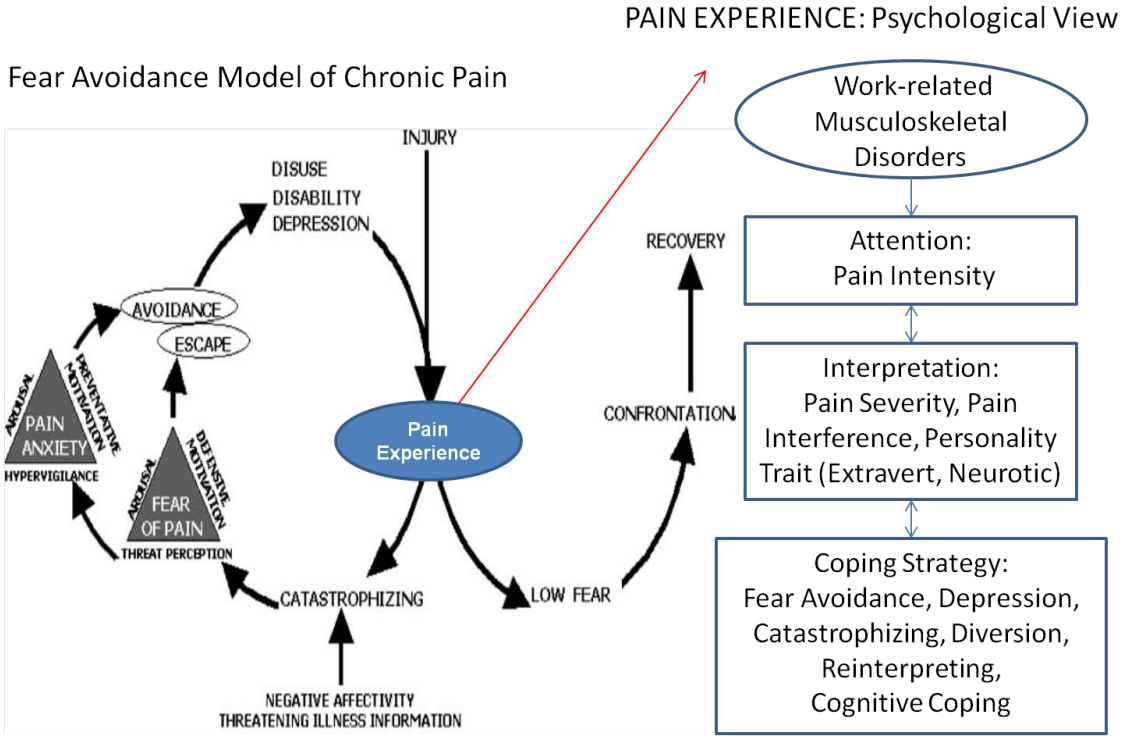


Figure 1. The model to the right is the Fear Avoidance Model of Chronic Pain (FAMCP) based on the Fear Avoidance Model of Vlaeyen and Linton (2000) and the Fear Anxiety Avoidance Model of Asumdson et al. (2004). The model to the left is depicting the "Pain Experience: Psychological View" adapted from "Simplified Schematic Diagram-Pain Perception: Psychological View" (Linton, 2005).

Specific Aims

Over the past 10 years, the focus of interventions has been toward reducing physical risk factors through aspects such as mechanical lifting devices, lifting teams, and ergonomic education. Few studies have focused on the relationship between a WMSD

and psychological risk factors in the nurse population. The purpose of this descriptive cross-sectional study was to describe the characteristics of nurses with WMSD and the nurses' psychological factors of pain (intensity, severity, and interference), personality traits (neuroticism and extraversion), and coping strategies (depression, fear avoidance, catastrophizing, diversion, reinterpreting, and cognitive coping). The specific aims were as follows:

1. To determine demographic characteristics and psychological factors of extraversion, neuroticism, and depression between nurses with and without a WMSD.
2. To determine the prevalence and the location of WMSD.
3. To describe the pain experience through a psychological view in relation to
    d. Attention: pain intensity
    e. Interpretation: pain (severity and interference) and personality traits (extraversion and neuroticism)
    f. Coping Strategies: depression, fear avoidance, catastrophizing, diversion, reinterpreting, and cognitive coping.
4. To describe relationships among the psychological factors.

Acute or chronic effects of stressful events, such as WMSD, are nursing personnel concerns (ANA, 2011). Once a nurse sustains a WMSD, he or she should shift focus to recovery, where rehabilitation is both physical and psychological. Currently, focus is primarily on the physical component of WMSD more so than the psychological and behavioral aspects of WMSD, whereas both are needed to support recovery of the whole person. This study provides preliminary data to describe the psychological factors of nurses with WMSD. In the future, psychological factors can be utilized in the

development of interventions for educating nurses with WMSD on how to process psychological factors in the pain experience that guide to optimal health and rehabilitation outcomes.

Design and Methods

Design

A descriptive, cross-sectional design was used as follows: (1) to collect data at one point in time to estimate prevalence of psychological factors, (2) to describe and to determine differences between nurses with and without WMSD, and (3) to establish relationships among the psychological coping factors of interest (fear avoidance, depression, catastrophizing, diversion, reinterpreting, and cognitive coping) in nurses with WMSD. As a cross-sectional design, the study does not provide evidence of the temporal relationship among the exposure, time of onset, or the time from WMSD to psychological and physical outcomes. The design allowed for the collection of preliminary data on multiple psychological factors as conceptualized in the FAMCP and PE.

Setting and Sample

A convenience sample was obtained through participants on internet discussion boards on the following organization websites: (1) Sigma Theta Tau International (STTI), (2) American Nurses Association (ANA), and (3) Injured Nurses Network of America (INNA). Eligible participants met the following inclusion criteria: possession of a current email address a current nursing license as well as computer accessibility. Recruitment of study participants (n = 278) is shown in Figure 3. Potential participants were first required to read the informed consent and to decline or accept participation in

the study. Of the 275 participants accepting the survey, 35 surveys were unusable due to no or incomplete responses. Of the final study sample (n = 243), the nurse group with a WMSD had 124 participants and the nurse group without a WMSD had 119.

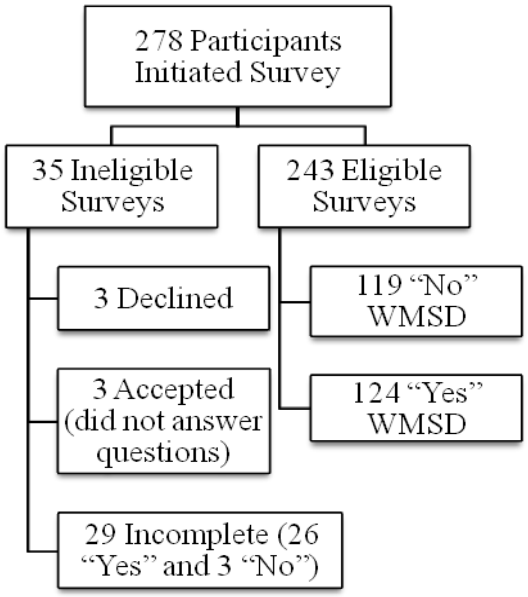


Figure 3. Recruitment of study participants.

Post hoc tests determined the sample size (n = 243) met the *a priori* settings of significance ($\alpha = 0.05$, large effect size $q = 0.5$ and power level 0.80). This was based on power analysis by testing correlations for two independent Pearson *r* analyses (Anderung, 2012). The number of possible participants within the nurse organizations permitted obtaining the estimated sample size required for this study (see Table 1). The return rate for online web discussion posts was 87%, based on Survey Monkey reports of the number of surveys initiated (n=278) versus those completed (n=243). The number of surveys returned in this study from nurses with WMSD (51/100) was higher than the

number in the 2011 ANA Health and Safety Survey Report (5.5/100). The high return rate may be due to the online setting that provided (1) a safe, confidential environment, (2) no fear of job retaliation, or (3) simply, the awareness of a culture of safety at their current job.

Data Collection

The initial invitation to participate in the study was posted three times to each organization's website discussion board. The invitation highlighted the study's purpose, length, and type of compensation. The log used to track the websites is shown in Table 1. Survey Monkey GOLD tools provided custom survey controls used in question development, response settings, and Internet Protocol Address (IP) controls. Participants could save and re-enter or withdraw from the survey at will. The University of Texas Institutional Review Board (UT-IRB) approved the study protocol, including the utilization of nurse organizations, online form builder using Wufoo, and data collection via Survey Monkey. The IRB study number listed on the invitation was valid from September 14, 2014 to November 30, 2014.

A Survey Monkey web link (Begin Survey) was embedded in the initial invitation that invited voluntary study participation. The first page presented a consent letter informing the participant of the study purpose, risks, benefit, length of time of internet use for data collection, and minimal risk of compromised confidentiality. The participant had the option to accept or decline. Upon accepting, the online survey continued, and participants were asked to complete a demographic data form, including a question on whether or not he or she had sustained a WMSD, If the participant had sustained a WMSD, the participant was directed to complete the instruments selected to obtain data

in accordance with the aims of the study. The instruments included the Numeric Pain Rating Scale (NPRS), Coping Strategies Questionnaire-24 (CSQ-24), Fear Avoidance Beliefs Questionnaire (FABQ), Eysenck Personality Questionnaire-Brief Version (EPQ-BV), and Center for Epidemiological Studies for Depression (CES-D) form. If the participant had not sustained a WMSD, the participant was asked to complete the demographic form (health history up to WMSD history), EPQ-BV, and CES-D.

After completing the survey, participants could exit out of the study or click on a Wufoo web link embedded in the last page of the Survey Monkey survey that permitted the participant to voluntarily provide a current email address to receive study results and request the incentive gift e-card. All participants could choose to receive (1) a $10 Starbuck™ gift card and study outcomes, (2) gift card only, or (3) study outcomes only. However, only the first 50 participants who had sustained a WMSD and the first 50 participants who had not sustained a WMSD that completed the survey, requested to receive a gift card, and provided a current email address through Wufoo were sent the gift e-card.

Although Survey Monkey and Wufoo provided for web-based data collection, Survey Monkey did not collect personal direct identifiers (e.g. name, online name, or email addresses). Therefore, Survey Monkey submissions could not be linked to the Wufoo email address submission maintaining confidentiality and anonymity. All survey data were protected by data encryption and a password, and data were stored in a locked cabinet in the principle investigator's office.

Instruments for Data Collection

Participants responded to two or five data collection instruments, depending upon whether or not they had sustained a WMSD. The estimated time to complete all instruments was 10-15 minutes. The study variables and instruments are summarized in Table 2. Reliability for all instruments and subscales ranged from .83 to .92 (see Table 3).

Demographics. Demographics collected to describe the population studied included gender, age, ethnicity/race, marital status, education level, annual household income, and employment status. The participant identified if he or she had sustained a WMSD, which for purpose of the survey was defined as "injury or disorders of the muscles, nerves, tendons, joints, cartilage, and/or spinal discs in which the work environment and performance of work contribute significantly to the condition; and/or the condition is made worse or persists longer due to work conditions" (CDC, 2013, p.6). Participants who had sustained a WMSD were asked to give the WMSD's history.

Numeric Pain Rating Scale. The scale assesses the variables of pain intensity and severity. Pain intensity (how much does it hurt or is an immediate threat) and pain severity (how it feels or is perceived as a threat) are a combination of the meaning, attitudes, beliefs, and expected duration of the pain (Jones, Vojir, Hutt, & Fink, 2007; Turk & Melzack, 1992*).* Participant responses were related to the following: (1) worst pain in last month, (2) severity of pain at present moment, and (3) severity of pain in last month. Each item was rated on an 11 point-Likert scale, with 0 referring to no pain and 10 to the worst pain. In a study of chronic pain rheumatoid arthritis patients, test-retest reliability for the NPRS was reported at r = 0.96 and 0.95 respectively, and construct

validity between the NPRS and Visual Analog Scale was correlated from 0.86 to 0.95 (Ferez et al., 1990).

Fear Avoidance Beliefs Questionnaire. Fear avoidance beliefs are developed when individuals exaggerate or "(mis)interpret" their pain causing them "to engage in protective (e.g. escape/avoidance) behaviors, such as guarding and taking rest" (Ostelo & Vlaeyen, 2008, p. 3). The FABQ assesses the variable of fear avoidance beliefs regarding work-related activity and physical activity in relation to the participant's musculoskeletal pain/injury (Williamson, 2006). The 16-item self-report questionnaire measures the level of agreement on a 7-point Likert scale (0 = completely disagree and 6 = completely agree). For this study, a confirmatory factor analysis (CFA) was completed and in agreement with the 2 subscales of physical activity (FABQpa) and work (FABQw). Waddell et al. (1993) reported internal consistency for the subscale work (α= 0.88) and physical activity (α= 0.77) in a study using patients with chronic low back pain. Kovacs et al (2006) reported a total scale test-retest reliability (ICC=0.97) over a 30 minute interval. The FABQ correlates the fear avoidance construct with the Tampa Scale of Kinesiophobia, with subscale work at 0.53 and physical at 0.76 (Crombez et al., 1999; Kovacs et al., 2006).

Coping Strategies Questionnaire-24. The questionnaire measures the variables of catastrophizing (exaggerated threat), diversion (distraction techniques), reinterpreting (meaning clarification), and cognitive coping (positive coping self-statements), which are designated as coping strategies to deal with musculoskeletal pain after sustaining a WMSD (Cano et al., 2006; Tappen, 1983; Utne et al., 2009; Valade et al., 2012). The self report 24-item questionnaire uses a 7-point linear scale (0 = never, 3 = sometimes, and 6

equals always) to indicate how often the participant used that coping strategy when pain symptoms were experienced. Harland and Georgieff (2003) reported a CFA supported the use of the four CSQ-24 subscales and reported internal consistencies for catastrophizing ($\alpha = 0.85$), diversion ($\alpha = 0.84$), reinterpreting ($\alpha = 0.77$), and cognitive coping ($\alpha = 0.75$). Construct validity was demonstrated by highly significant correlations ($p < 0.001$) in all four subscales.

Eysenck Personality Questionnaire-Brief Version. The questionnaire measures temperament constructs of an individual's level of extraversion and neuroticism. Individuals with extraversion characteristics are "social, impulsive, outgoing, excitable, and oriented toward external reality" (Ryckman, 2008, p. 346). Sato (2005) described neurotic individuals as "emotionally unstable" with unreasonable fears and anxiety levels (p. 546). The 24-item self report questionnaire uses a 5-point Likert scale to report the depth of a personal characteristic, with values ranging from 1 (not at all) to 5 (extremely). For this study, a CFA supported the use of the EPQ-BV items as the subscales of neuroticism and extraversion found in the original principal factor analysis (Sato, 2005). Test-retest reliability was identical for both extraversion and neuroticism subscales ($r = 0.92$), and concurrent validity was highly correlated (neuroticism 0.88 and extraversion 0.89) with the original EPQR-S (Sato, 2005).

Center for Epidemiological Studies Depression Scale. Depression (depressive symptoms) is considered a "disturbance in mood" and an outcome of multiple internal interactions (biological, psychological, cognitive, and sociological) secondary to a medical condition (Pasacreta, 2004, p. 378). The Center for Epidemiological Studies Depression Scale (CES-D) assesses the present level of depressive symptoms

experienced (Smarr & Keefer, 2011). The 20-item self-report questionnaire uses a 4-point Likert scale ranging from 0 (rarely or none of the time) to 3 (most or all of the time). The CES-D has a reported internal consistency alpha coefficient of 0.85 for the general population and .90 for patient populations (Radloff, 1977). For a general population, Smarr and Keefer (2011) reported test-retest reliability with correlations from 0.45 to 0.70, with shorter time periods between administrations resulting in higher scores. In an early study (Orme, Reis, & Hertz, 1986), criterion validity for the CES-D correlated with depressive measures of self-esteem (0.58), state anxiety (0.44) and trait anxiety (0.71).

Data Analysis

Survey Monkey and Wufoo software assigned a code number to each participant upon submission of the survey packet and automatically entered the responses to questions into an SPSS coded (encrypted) data sheet. The principal investigator received the data by means of password protected accounts.

Data were analyzed using SPSS 22.0 predictive analytic software for Windows (SPSS, Chicago, IL). Data for Specific Aim 1 were analyzed using descriptive statistics (frequency and percentage) to describe differences and prevalence in the demographic characteristics between nurses who had and had not sustained a WMSD. Chi Squares were computed to find differences among nurse groups for each demographic variable. An independent sample *t*-test permitted comparison of the personality traits and depression scores for the two nurse groups. Data for Specific Aims 2 and 3 (a, b, and c) were analyzed using descriptive statistics (frequency, percentage, mean, and standard deviation).

Specific Aim 2 descriptive statistics were used to explain the prevalence of the initial body location of the WMSD and the prevalence of other body regions affected. In Specific Aim 3, the "pain experience" referred to in the FAMCP and the Pain Experience Psychological View model was addressed: nurses who had sustained a WMSD responded to the psychological factors of (a) pain (intensity, severity, and interference), (b) personality traits (extraversion and neuroticism), and (c) coping strategies (depression, fear avoidance, catastrophizing, diversion, reinterpreting, and cognitive coping). For Specific Aim 4, Pearson's *r* coefficients were calculated to determine relationships between pain (intensity and severity) scores and (1) depression scores (CES-D), (2) fear avoidance scores (FABQ), and (3) coping scores (CSQ-24). Likewise, Pearson r coefficients were calculated to determine relationships between personality traits (neuroticism and extraversion) scores and depression, fear avoidance, and coping scores.

Results

Demographic characteristics of the participants (n = 243) are presented in Table 4. The majority of the participants were female (94%) and Caucasian (82%). More than half (68%) were married or partnered, and less than half (40%) in the age group of 50-59 years. Whereas 37% had Bachelor's of Science in Nursing (BSN) degrees, 40% had Master's of Science in Nursing (MSN) degrees. The highest employment settings were hospital (44%) and academia (25%). One third of the sample (33%) reported working as staff nurse. Nearly half of the participants reported holding the current job position for 1 to 5 (48.6%) years.

Demographic Profile of Nurses With and Without a WMSD

For the purpose of this study, the sample was separated into two groups of nurses, those with WMSD (n = 124) and without (n = 119). Chi Square computations showed no significant difference in frequencies of categories for each demographic variable for nurses with and without WMSD. Although not significant, differences were found for age and highest level of education, the 50-59 years old group had a greater number of participants with a WMSD (63, 51%) than those without a WMSD (35, 30%). A higher number of nurses with WMSD had a MSN (53, 43%) versus a BSN (38, 31%) degree, whereas the opposite occurred for the group without a WMSD. In the group without a WMSD, a higher number had a BSN (52, 44%) versus a MSN (45, 38%) degree.

Using independent-samples *t*-tests to compare the personality traits and depression scores for the nurses with and without a WMSD, no significant differences were found in neuroticism scores for the no WMSD (M = 13.12, SD = 8.62) and with WMSD (M = 15.06, SD = 10.01; t (241) = -1.62, p = 0.11) groups, as shown in Table 5. Also, no significant differences were found in extraversion scores for the no WMSD (M = 26.76, SD = 8.91) and with WMSD (M = 25.65, SD = 8.89; t (241) = 0.97, p = 0.34) groups. However, there were significant differences in depression scores for the no WMSD (M = 9.15, SD = 9.37) and with WMSD (M = 14.33, SD = 11.00; t (241) = -3.95, p = 0.000) groups. Nurses with WMSD had significantly higher depression scores than nurses with no WMSD.

WMSD Prevalence and Location

Prevalence of the initial body location of WMSD was examined in relation to the (1) neck region (31, 25%), (2) upper extremities (21, 16.9%, (3) back region (53, 42.7%),

and (4) lower extremities (45, 36.3%). The initial site of the WMSD was further explored in terms of its affect on other body regions (see Table 6). The lower extremities group was the only group that did not report affect on another body region.

WMSD Pain Experience

The concept of pain experience was formulated in terms of the FAMCP and Pain Experience Psychological View model. As shown in Table 7, the frequency and percentage of pain interference was assessed in the following five functional areas of the participant's activities of daily living: (1) social, (2) recreational, (3) school, (4) work, and (5) daily. Although "school" was not a valid work experience for 28% of the sample, the greatest interference occurred in relation to recreational activities (72, 58%) and the least, in relation to work (43, 34.7%).

The mean and standard deviations of the psychological factors in nurses with WMSD are shown in Table 8. Data collected for pain intensity and severity ranged from 0 to 10, with 10 representing the worst pain experienced. The mean score of pain intensity (attention) was 4.85 and pain severity (interpretation) was 4.0 over the last month. Personality traits (interpretation) scores for neuroticism ranged from 0 to 41(M = 15.06, SD = 10.01) and extraversion ranged from 3 to 47 (M = 25.65, SD = 8.89).

Because personality traits interact with the perceived interpretation of pain and lead to the coping strategy chosen, catastrophizing, diversion, reinterpreting and cognitive coping (coping strategies) were analyzed using CSQ-24 scores, which ranged from 0-36. The participants reported a low level of catastrophizing (M = 5.42, SD = 6.59) and a higher level of cognitive coping (M = 22.12, SD = 8.88). Fear avoidance scores measured by the FABQ were analyzed as a total score and the subscales of work

(FABQw) and physical activity (FABQpa). The highest level of fear avoidance was detected in the FABQw subscale (M = 20.09, SD = 10.27), where the scores ranged from 0 to 42.

Relationships among Pain, Personality and Psychological Coping Factors

Significant correlations were found among pain, personality traits, and psychological coping factors (see Table 9). Pain intensity significantly correlated to all psychological coping factors, with catastrophizing showing the strongest correlation (r = .515, p = 0.01) and the weakest, FABQpa (r = .241, p = 0.01). Similar results were obtained in relation to pain severity, which also correlated with all psychological coping factors, with catastrophizing showing the strongest correlation (r = .622, p = 0.01) and FABQpa the weakest (r = .193, p = 0.05).

The Pearson product-moment correlation coefficient computed to assess the relationship between the personality trait of neuroticism and the psychological factor of depression resulted in a large, positive correlation between the two variables (r = 0.733, p = 0.01), suggesting a strong relationship between neuroticism and depression. Neuroticism had significant correlations with FABQw (r = 0.317, p = 0.01) and catastrophizing (r = 0.352, p = 0.01). There was a significant negative (inverse) relationship between extraversion and depression (r = -0.257, p = 0.01), suggesting the higher the score of extraversion, the lower the score of depression.

Additionally, a Pearson product-moment correlation coefficient computed to assess the relationship between personality traits (neuroticism and extraversion) and pain (intensity and severity) showed a positive correlation between neuroticism and pain intensity (r = 0.220, p = 0.05) and between neuroticism and pain severity overall (r =

0.266, $p = 0.01$). There were no significant correlations between extraversion and pain intensity or severity.

Further investigation discovered relationships among the psychological coping factors in nurses with WMSD. Pearson product-moment correlations between the psychological factors of depression, fear avoidance beliefs (work and physical activity), and coping strategies (catastrophizing, diversion, reinterpreting, and cognitive coping) are shown in Table 10. Catastrophizing had a moderate positive correlation to depression ($r = .502$, $p = 0.01$), fear avoidance at work ($r = .549$, $p = 0.01$), diversion ($r = .307$, $p = 0.01$), and reinterpreting ($r = .347$, $p = 0.01$). As expected, catastrophizing had no significant correlation with cognitive coping ($r = .068$, $p = 0.45$) although there was a weak correlation with fear avoidance with physical activity ($r = .247$, $p = 0.01$). Fear avoidance at work had a positive correlation to depression ($r =. 339$, $p = 0.01$). Cognitive coping had a moderate positive correlation to diversion ($r =. 461$, $p = 0.01$) and reinterpreting ($r = .425$, $p = 0.01$). However, there were no significant correlations between cognitive coping and the other psychological factors (depression, fear avoidance, and catastrophizing).

Discussion

Overall, participants in this study (n = 243) were demographically similar to participants in a larger workforce study (n = >110,000). In the American Community Survey (U.S. Health Resources and Services Administration [HRSA], 2013), a larger percentage of participants were Caucasian, female, and employed in a hospital setting than portrayed in the current study, and less participants had a higher education level (MSN = 10% HRSA vs. 40% current). This difference in education level may be

accounted for given that the sample for the current study was recruited from nursing organizations that promote higher education. Despite the demographic similarities of nurses between the two studies, findings of the smaller sample size study cannot be generalized to the population at large.

Differences in Demographic Profile of Nurses With and Without a WMSD

Characteristics between nurses with and without a WMSD were essentially similar. In both groups, the nurses were predominately Caucasian, female, married/partnered, and in the age range of 50-59 years. Most were employed in a hospital setting as a staff nurse with 1-5 years in the current position. The factor differing between the groups with and without WMSD related to level of education. In the current study, the group with the greatest number of WMSD had the highest level of education (MSN or greater degree),

Although there were no differences between nurses with and without WMSD and the personality traits of neuroticism and extraversion, nurses with WMSD had higher depression scores. This study finding suggests that nurses with WMSD express more depressive symptoms than do nurses without WMSD.

WMSD Prevalence and Location

In the current study, a majority of the nurses (58%) reported their initial WMSD body location was in the back region. This finding is compatible with the finding of Hunter et al. (2010). In addition, the U.S. Bureau of Labor and Statistics reports the back region as the location of the most commonly reported occupational workforce injury (BLS, 2014). The order of prevalence of an initial WMSD was in the back region, followed WMSD in the lower extremities, neck region, and upper extremities. Evidence

supports that once a WMSD is sustained, the risk of the initial WMSD affecting other body regions is high (Hou & Shiao, 2006; Hunter et al., 2010). This study found the neck region, back region, and upper extremities were affect by the initial WMSD reported.

WMSD Pain Experience

An aim of the study was to describe the WMSD pain experience as conceptualized in the FAMCP and Pain Experience Psychological View model. The pain experience begins with the attention given to the pain intensity. Krebs, Carey, and Weinberger (2007) determined the most commonly accepted degree of pain designation and cut points for clinically screening pain intensity were mild (0-3), moderate (4-6), and severe (7-10). Using these designations, the nurse participants reported a pain intensity level of moderate pain. This suggests that unacceptable levels of pain direct increased attention to pain, which is in turn demands interpretation.

In this study, interpretation of the pain experience is evaluated through the severity of the pain and is related to personality traits, specifically that of neuroticism. Neuroticism has been noted to be a predisposing factor for psychological distress and elevated levels of pain (Ormel & Wohlfarth, 1991). Nurses with WMSD reported moderate levels of pain intensity (how much does it hurt or the immediate threat of) and pain severity (how it feels or is perceived as a threat). This finding that individuals with higher levels of neuroticism report higher pain intensity and severity scores is supported in research (BenDebba, Togerson, & Long, 1997; Hatcher, Whitaker, & Karl, 2009; Koster et al., 2005).

Once the pain experience has been interpreted, individuals rely on available coping strategies to move them toward a pathway of avoidance or confrontation. The

FAMCP proposes the avoidance pathway supports negative coping mechanisms that drive the individual to develop chronic disorders, such as disuse, disability, or depression. Negative coping strategies utilized by the nurses with a WMSD examined were catastrophizing, fear avoidance, and depression (depressive symptoms). Catastrophizing had a positive relationship with all variables in this study except for cognitive coping. Catastrophizers tend to become fearful of re-injury or of painful movements (Ostelo & Vlaeyen, 2008; Sullivan et al., 2001; Wideman, Adams, & Sullivan, 2009;). In the current study, nurses with WMSD reported that work-related fear avoidance correlated with catastrophizing. Also, one-third (38) of the nurses with WMSD reported high depressive symptoms. In keeping with research findings, patients who utilize fear avoidance as a coping mechanism are more likely to have higher depressive symptoms (De Carvalho, Andrade, Tavares, & De Freitas, 1998).

According to the FAMCP, the confrontation pathway utilizes low fear and attempts to drive individuals toward positive coping mechanisms to achieve recovery. This was supported to some degree in this study, which found that nurses with WMSD reporting low levels of pain severity and intensity were likely to use positive cognitive coping strategies. Furthermore, this study supported the expected FAMCP outcome of increased levels of cognitive coping yields decreased levels of depression, fear avoidance, and catastrophizing (negative coping strategies).

Relationships among Pain, Personality and Psychological Coping Factors

Research has begun to focus on the interaction of pain and coping factors as these factors relate to fear of injury or re-injury (George, Valencia, & Beneciuk, 2010; Houben et al., 2005). In the current study, relationships among the psychological factors of pain

(intensity and severity), neuroticism, depression, fear avoidance, catastrophizing, diversion, reinterpreting, and cognitive coping were found for nurses with WMDS. The relationships among psychological factors were examined in regards to the directional FAMCP pathways of avoidance (moderate pain, neuroticism, catastrophizing, fear avoidance, and depression) and confrontation (low pain, extraversion and cognitive coping).

Avoidance Pathway

Neuroticism. Sato (2005) described neuroticism as emotional instability leading to elevated levels of anxiety, mood changes, and irrational fears. This study found neuroticism was significantly associated with pain severity, catastrophizing, fear avoidance, and depression, a finding supported by other researchers (Goubert, Crombez, & Van Damme, 2004; Watson & Pennebaker, 1998). In accordance with the FAMCP conceptual framework, once a WMSD occurs, individuals with higher levels of reported neuroticism guide the pain experience toward catastrophizing and show elevated levels of fear avoidance and depression. In a study using rehabilitative patients, neuroticism was found to be an indicator for depression (DeCarvalho et al., 1998). The strongest positive relationship for this study was between neuroticism and depression.

Catastrophizing. Catastrophizing is viewed as an appraisal that overly focuses and exaggerates the threat of a painful experience (Haythornthwaite et al., 1998; Jensen, Smith, Ehde, & Robinson, 2001; Severeijns et al., 2004; Utne et al., 2009). The exaggerated focus allows the mind to develop fear of movement or re-injury and directs the individual to avoid activities that may contribute to the expected pain experience (Sullivan et al., 2001; Wideman et al., 2009). For nurses with WMSD, the reported level

of catastrophizing was evaluated in preset risk category ranges established by Harland and Ryan (2013), where 6 nurses had scores $\geq$ 20 (High Risk) and 20 nurses had scores between 10 - 19 (Medium Risk). In the current study, catastrophizing was the psychological coping factor with the strongest relationship to pain intensity and severity and fear avoidance related to work activities. This suggests higher levels of reported pain intensity and severity produce higher levels of catastrophizing and higher levels of fear avoidance for work activities. Both catastrophizing and fear avoidance are empirically associated with chronic pain (Boersma & Linton, 2006; Peters et al., 2005). Additionally, catastrophizing is positively related to depression. In keeping with FAMCP conceptualization, these positive relationships suggest once nurses sustain WMSD, the tendency is to (a) catastrophize the injury according to the level of pain intensity (how much does it hurt or the immediate threat) and pain severity (how it feels or perceived as a threat), (b) have a fear of movement or re-injury that guides the individual to avoid the activity that caused the WSMD, and (c) lead to depressive symptoms (Wideman et al., 2009).

Fear Avoidance. Fear of pain has been reported as the driving factor that directs the individual to avoid any type of activity (work or physical) related to the initial WMSD (Reneman et al., 2007). Fritz and George (2002) found the reported level of fear-avoidance beliefs regarding work factors was a strong return-to-work predictor in patients with acute work-related low back pain. In the authors' study, 11 nurses had FABQ work scores greater than 32, which was considered to indicate a high level of fear avoidance. In a study by Crombez et al. (1999) in relation to FABQ physical activity, 42 nurses had scores greater than 15, which also was considered to indicate a high level of fear

avoidance. Consistent with previous research (Fritz & George, 2002; Solidake et al., 2010; Turk & Melzack, 1992), the current study found fear avoidance regarding work and physical activity was positively associated with pain intensity and severity. Fear avoidance related to work activities was associated with the personality trait of neuroticism, but not extraversion.

In another study (De Carvalho et al.,1998), the authors found when fear avoidance coping is utilized, the risk for depressive symptoms are increased. Although fear avoidance regarding work activity and depression were positively associated, this was not true for fear avoidance regarding physical activity and depression. This may be related to the nurses' ability to choose what physical activity they want to engage in without promoting negative associations related to what they cannot complete. The fear avoidance relationships with pain intensity and severity, neuroticism, catastrophizing and depression follow the FAMCP avoidance pathway.

Depression. Bair, Robinson, Katon, and Kroenke (2003) found a relationship between higher levels of depressive symptoms and increased pain severity. Of the 124 nurses with WMSD in the current study, 38 nurses obtained a depression score greater than 16, which suggests high levels of depressive symptoms. Among nurses with WMSD, depression (depressive symptoms) was associated with pain intensity and severity. Depression was positively associated with catastrophizing and fear avoidance beliefs for work. Depression was not linked to fear avoidance of physical activity, diversion, reinterpreting, or cognitive coping.

Confrontation Pathway

Extraversion. Extraversion characteristics describe an individual as one who is usually talkative who likes to be social, is outgoing and not afraid to speak up, and is aware of surroundings (Ryckman, 2008). In the current study of nurses with WMSD, there were no significant relationships between extraversion and pain related factors. Whereas a previous study (BenDebba et al.,1997) found that individuals who score high on extraversion are more likely to complain of pain, this finding was not apparent in the current study, which did not find significant relationships between extraversion and the psychological coping factors. However, an inverse significant relationship was found between extraversion and depression. This finding was expected. An expected non-significant inverse relationship between extraversion and catastrophizing suggests higher levels of extraversion are associated with lower levels of catastrophizing.

Cognitive Coping. Cognitive coping as self-statements guide an individual's thought processes to create a positive response. Utilizing Harland and Ryan's (2013) preset scores, cognitive coping was evaluated as a predictor for "risk of poor outcomes". In the current study, 82 nurses had CSQ-24 scores of less than 21, which identified them at low risk for recovery of a WMSD. The remaining nurses scored either as high risk (n=26) or medium risk (n=16). As expected from these results, there were no significant relationships between cognitive coping and the psychological coping factors of depression, fear avoidance, and catastrophizing. Cognitive coping was found to be positively associated with reported mild (0 to 3) levels of pain intensity and severity. Although non-significant, cognitive coping was negatively associated with neuroticism. For nurses with WMSD, cognitive coping was positively associated with reinterpreting

pain sensations, a finding consistent with other research (Valade et al., 2012). In keeping with findings by Cano, May, and Ventimiglia (2006), cognitive coping also permitted utilization of diversion techniques. These relationships suggest nurses with WMSD utilized positive diversion (distraction techniques) and reinterpreting (clarification or thought processing) to guide pain experiences. Coping positive self-statements have been linked to decreased physical disability (Cano et al., 2006).

Limitations

Because cross-sectional design provides associative or relationship data, causality cannot be inferred. Temporal relationships between pain levels from the time the initial WMSD occurred and the severity of the WMSD at the present are unknown and was not asked for, which could have introduced a bias. The use of convenience sampling allows participants to self-select their responses and introduces the investigator's inability to control sharing the questionnaire outside of the professional blog groups. Also, the participant can duplicate responses if different computer IP addresses are used.

Questionnaire related limitations involved form construction, length of form and time of response, and security controls. Self-administered questionnaires were completed online at the participant's convenience, giving the investigator no control over the test environment. The length of the survey differed, dependent upon whether or not the nurse respondent had a WMSD. Nurses with WMSD completed three additional instruments. The time element possibly introduced a bias because of the participants who did not complete the questionnaire, there were more nurses with than without WMSD. Also, the number of tests to complete plus the personal nature of the questions may have contributed to nurses not completing the survey.

Those completing the questionnaires worked in as safe and confidential environment that could be provided for data collection. Survey Monkey and Wufoo allowed the researcher to set limiters on the tracking of study data, thus increasing a sense of trust and confidentiality for the participant. In addition, the accuracy of the responses was determined by the participants and could not be independently verified. For this study, the demographic characteristics of nurses with WMSD are similar to the demographic characteristics reported in the HRSA 2013 report. However, the generalizability of the results are limited because this is one of the first study to examine the psychological factors of the pain experience of nurses with WMSD in the framework of the FAMCP and Pain Experience Psychological View model. Future research is needed to confirm these findings and develop interventions to rehabilitate nurses toward recovery.

Conclusion

This study was unique in that psychological factors inherent in the FAMCP and Pain Experience Psychological View model were assessed for a sample population of nurses with work-related injuries and illness. Nurses with WMSD reported psychological factors of pain (intensity, severity, and interference with recreational and work activities), and data analyses noted significant relationships with the personality trait of neuroticism and coping strategies of fear avoidance, depression, catastrophizing, and cognitive coping. The conceptual framework used, the FAMCP, "proposes that high levels of catastrophizing are related to elevated levels of pain severity, fear of movement, and depression" (Wideman et al., 2009, p. 49). The current study supports the finding that catastrophizing is associated with pain severity, fear avoidance, and depression.

Turk and Melzack (1992) linked pain to fear, and Reneman et al. (2007) tied pain related fear to activity avoidance. That fear avoidance was associated with pain severity and intensity is compatible with past study findings (Boersma & Linton, 2006; Peters et al., 2005). Furthermore, for nurses with WMSD, analyses showed relationships between fear avoidance with neuroticism, pain levels, and depression. This study supports the use of the FAMCP and Pain Experience Psychological View model to conceptualize the psychological effects of work related injury in the nurses with WMSD.

Future research is needed to confirm current study findings and to better understand nurses with WMSD in accordance with the FAMCP conceptual framework. Recommendations for future research include the following: (1) use longitudinal studies from the point of the WMSD to active rehabilitation, and (2) validate relationships between personality traits and coping strategies among those actively in physical rehabilitation. To address the long term goal of this study, psychological factors can be utilized to develop interventions that focus on both physical and psychological interventions of nurses with WMSD.

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Table 1

Setting, Sample and Recruitment of Licensed Nurses

	Communities		Survey Posted to Discussion Board		
Website	Discussion Board	# of Members	1st	2nd	Final
ANA NurseSpace			10/14/2014	10/30/2014	11/15/2014
	Advanced Practice Nursing	105	10/14/2014	10/30/2014	11/15/2014
	Community Clinical Documentation Improvement	80	10/14/2014	10/30/2014	11/15/2014*
	Health Policy Educators in Nursing Programs	41	10/14/2014	10/30/2014	11/15/2014
	Legal Issues in Nursing	109	10/14/2014	10/30/2014	11/15/2014
	Newly Registered Nurses	84	10/14/2014	10/30/2014	11/15/2014
	Nurse Advocates	71	10/14/2014	10/30/2014	11/15/2014
	Nurse Educator Community	92	10/14/2014	10/30/2014	11/15/2014
	Nursing	106	10/14/2014	10/30/2014	11/15/2014
	Nursing Informatics	70	10/14/2014	10/30/2014	11/15/2014*
	Other	11.2K	10/14/2014	10/30/2014	11/15/2014
	Research	544	10/14/2014	10/30/2014	11/15/2014
	Staff Nurses Greater Than 50 Years Old	17	10/14/2014	10/30/2014	11/15/2014
STTI The Circle					
	Global Member Forum	958	9/14/2014	10/6/2014	10/31/2014
	Kappa Kappa	149	9/14/2014	10/6/2014	10/31/2014
	Nursing & Health	241	9/14/2014	10/6/2014	10/31/2014

	Informatics				
	Caring for Others	215	9/14/2014	10/6/2014	10/31/2014
	Caring for Self	221	9/14/2014	10/6/2014	10/31/2014
	Healing Spaces	169	9/14/2014	10/6/2014	10/31/2014
	Professional Practice 1	359	9/14/2014	10/6/2014	10/31/2014
	Primary Nursing	38	9/14/2014	10/6/2014	10/31/2014
	Culture of Civility	188	10/6/2014	10/31/2014	11/15/2014
	Staffing	416	10/6/2014	10/31/2014	11/15/2014
	Sharing Relationship Based Care	174	10/6/2014	10/31/2014	11/15/2014
	Role-Based Practice	859	10/6/2014	10/31/2014	11/15/2014
	Workload	38	10/6/2014	10/31/2014	11/15/2014
INNA					
	Closed Facebook Group	75	9/14/2014	10/6/2014	11/15/2014

Note. ANA = American Nurses Association; STTI = Sigma Theta Tau International; INNA = Injured Nurse Network of America; (*) = Removed from ANA Discussion Community.

Table 2

Constructs, Concepts, Variables, and Instruments Utilized for this Study

Construct*	Concept*	Variables	Instrument
WMSD	WMSD	Location	WMSD HX
Attention	Pain	Intensity	NPRS
Interpretation	Pain	Severity	NPRS
		Interference	
	Personality	Extraversion	EPQ-BV
		Neuroticism	EPQ-BV
Coping Strategy	Depression	Depression	CES-D
	Fear Avoidance	Physical Activities	FABQ
		Work-related Activities	FABQ
	Catastrophizing	Catastrophizing	CSQ-24
	Diversion	Diversion	CSQ-24
	Reinterpreting	Reinterpreting	CSQ-24
	Cognitive Coping	Cognitive Coping	CSQ-24

Note. Construct* = Constructs in the modified "Pain Experience: Psychological View" (Linton, 2005), Concept* = Concepts in the "Fear Avoidance Model of Chronic Pain" (Asumdson et al., 2004; Vlaeyen & Linton, 2000); WMSD = Work-related Musculoskeletal Disorder, WMSD HX = Work-related Musculoskeletal Disorder History, NPRS = Numeric Pain Rating Scale, EPQ-BV = Eysenck Personality Questionnaire- Brief Version, CES-D = Center for Epidemiological Studies- Depression Scale, CSQ-24 = Coping Strategies Questionnaire- 24.

Table 3

Instruments and Reliability with Scoring and Interpretation Utilized for this Study

Instrument	Reliability*	Scoring	Interpretation
NPRS		possible score 0-10	↑ score the ↑ level of pain intensity/severity
EPQ-BV	EX (0.91)	EX: add all even item #'s; possible score 0-60	EX: ↑ score the ↑ level of extraverted behaviors
	NEU (0.90)	NEU: add all odd item #'s with 13 and 19 reversed; possible score 0-60	NEU: ↑ score the ↑ level of neurotic behaviors
CES-D	0.92	add all item #'s with 4, 8, 12, and 16 reversed; possible score 0-60	↑score indicates the presence of more depressive symptoms; > 16 suggests "High" levels of depressive symptoms [1]
FABQ	FABQpa (0.83)	FABQpa: add item #'s: 2, 3, 4, and 5; possible score 0-24	FABQpa: ↑ score the ↑ chance of fear avoidance with physical activity; score of > 15 = "High" levels of fear avoidance with physical activity [2]
	FABQw (0.83)	FABQw: add item #'s: 6, 7, 9, 10, 11, 12, and 15; possible score 0-42	FABQw: ↑score the ↑ chance of fear avoidance with work requirements; scores < 29 = "Low" and > 34 = "High" for risk of prolonged work restrictions [3]
CSQ-24	CAT (0.89)	CAT: add item #'s: 4, 5, 6, 11, 18, and 19; possible score 0-36	CAT: ↑ score the ↑ level of catastrophizing; ranges for "risk of poor outcome": (1) > 20 is "High", (2) 10-19 is "Medium", and (3) <9 is "Low" [4]
	DIV (0.90)	DIV: add item #'s: 2, 12, 13, 21, 21, and 22; possible score 0-36	DIV: ↑ score the ↑ level diversion
	REN (0.85)	REN: add item #'s: 1, 3, 7, 10, 14, and 23; possible score 0-36	REN: ↑ score the ↑ level of reinterpreting
	CC (0.85)	CC: add item #'s: 8, 9, 15, 16, and 17; possible score 0-30+20% of total score	CC: ↑ score the ↑ level of cognitive coping self-statements; ranges for "risk of poor outcome": (1) <15 is "High", (2) 16-20 is "Medium", and (3) >21 is "Low" [4]

Note. Reliability* = Cronbach's alpa for the WMSD licensed nurse (n = 124); WMSD = Work-related Musculoskeletal Disorder, NPRS = Numeric Pain Rating Scale, EPQ-BV = Eysenck Personality Questionnaire- Brief Version, EX = Extraversion Subscale, NEU = Neuroticism Subscale, FABQ = Fear Avoidance Belief Questionnaire, FABQpa = Fear Avoidance Belief Questionnaire Physical Activity Subscale, FABQw = Fear Avoidance Belief Questionnaire Work Subscale, CES-D = Center for Epidemiological Studies- Depression Scale, CSQ-24 = Coping Strategies Questionnaire- 24, CAT = Catastrophizing Subscale, DIV = Diversion Subscale, REN = Reinterpreting Subscale, CC = Cognitive Coping Subscale, (#'s) = numbers, (↑) = Higher, (>) = greater than, (<) = less than, [1] = (Radloff, 1977), [2] = (Crombez et al., 1999), [3] = (Fitz & George, 2002), [4] = (Harland and Ryan, 2013).

Table 4
Demographic Characteristics of the Licensed Nurses With and Without WMSD

		Licensed Nurses		
			WMSD	
		All (n = 243)	Yes (n= 124)	No (n= 119)
		Frequency (%)	Frequency (%)	Frequency (%)
Gender				
	Female	228 (93.8)	115 (92.7)	113 (95)
	Male	15 (6.2)	9 (7.3)	6 (5)
Age				
	≤ 29	21 (8.6)	4 (3.2)	17 (14.3)
	30-39	36 (14.8)	15 (12.1)	21 (17.6)
	40-49	49 (20.2)	20 (16.1)	29 (24.4)
	50-59	98 (40.3)	63 (50.8)	35 (29.7)
	60-69	36 (14.8)	20 (16.1)	16 (13.4)
	≥ 70	3 (1.2)	2 (1.6)	1 (0.8)
Ethnicity				
	Caucasian	198 (81.5)	108 (87.1)	90 (75.6)
	African American	19 (7.8)	6 (4.8)	13 (10.9)
	Other	26 (10.7)	10 (8.1)	16 (13.5)
Marital Status				
	Single	34 (14)	15 (12.1)	19 (16)
	Married/Partnered	166 (68.3)	83 (66.9)	83 (69.7)
	Widowed	8 (3.3)	3 (2.4)	5 (4.2)
	Divorced	35 (14.4)	23 (18.5)	12 (10.1)
Highest Level of Education Completed				
	LVN	2 (0.8)	1 (0.8)	1 (0.8)
	Diploma Nurse	2 (0.8)	1 (0.8)	1 (0.8)
	ADN	15 (6.2)	10 (8.1)	5 (4.2)
	BSN	90 (37)	38 (30.6)	52 (43.7)
	MSN	98 (40.3)	53 (42.7)	45 (37.8)
	Doctorate (PhD, DNP, Other)	36 (14.9)	21 (16.9)	15 (12.6)

Average Annual Household Income				
	$0 - $24,999	9 (3.7)	6 (4.8)	3 (2.5)
	$25,000 - $49,999	13 (5.3)	4 (3.2)	9 (7.6)
	$50,000 - $74,999	62 (25.5)	36 (29)	26 (21.8)
	$75,000 - $99,999	57 (23.5)	30 (24.2)	27 (22.7)
	$100,000 - $124,999	47 (19.3)	18 (14.5)	29 (24.4)
	> $124,999	55 (22.6)	30 (24.2)	25 (21)
Employment Setting				
	Academia	61 (25.1)	32 (25.8)	29 (24.4)
	Hospital	108 (44.4)	52 (41.9)	56 (47.1)
	Ambulatory Care/OPC/LTC	34 (14)	19 (15.4)	15 (12.5)
	Other	40 (16.5)	21 (16.9)	19 (16)
Most Recent Position/Title				
	Director/CNO/CNS/NP	34 (14.0)	17 (13.7)	17 (14.2)
	Manager/Supervisor	25 (10.3)	15 (12)	10 (8.4)
	Educator/Researcher	59 (24.2)	28 (22.6)	31 (26.1)
	Student (BSN, MSN, PhD/ DNP)	26 (10.7)	15 (12.1)	11 (9.3)
	Staff Nurse	79 (32.5)	37 (29.8)	42 (35.3)
	Other	20 (8.2)	12 (9.7)	8 (6.7)
Number of Years at Current Position				
	< 1 year	32 (13.2)	16 (12.9)	16 (13.4)
	1 - 5 years	118 (48.6)	50 (40.3)	68 (57.1)
	6 - 10 years	44 (18.1)	27 (21.8)	17 (14.3)
	11 - 15 years	20 (8.2)	14 (11.3)	6 (5)
	16 - 20 years	11 (4.5)	6 (4.8)	5 (4.2)
	≥ 21 years	18 (7.4)	11 (8.9)	7 (5.9)

Note. WMSD = Work-related Musculoskeletal Disorder; LVN = Licensed Vocational Nurse; ADN = Associate's Degree in Nursing; BSN = Bachelor's Degree in Nursing; MSN = Master's Degree in Nursing; PhD = Doctor of Philosophy; DNP = Doctorate in Nursing Practice; OPC = Outpatient Clinic; LTC = Long-term Care; CNO = Chief Nursing Officer; CNS= Clinical Nurse Specialist; NP = Nurse Practitioner.

Table 5

Independent Sample T-Test for Personality Traits and Depression Scores for Licensed Nurses with WMSD¹ and Without WMSD²

	Levene's Test for Equality of Variances		t-test for Equality of Means						
								95% CI of the Difference	
	F	Sig.	t	df	*p*	Mean Difference	Std. Error Difference	Lower	Upper
Neuroticism	2.348	0.127	-1.622	241	0.106	-1.947	1.2	-4.311	0.418
Extraversion	0.032	0.857	0.966	241	0.335	1.103	1.142	-1.147	3.353
Depression	3.496	0.063	-3.947	241	0.000	-5.179	1.312	-7.765	-2.594

Note. WMSD¹ = (n = 124), WMSD² = (n= 119); CI = Confidence Interval; Levene's Test for Equality of Variances (equal variances assumed); $p > .0001$ (2-tailed).

Table 6

Prevalence of the Initial WMSD[1], Other Body Regions Affected, and Reported Involvement

			Involvement With Other Body Regions				
Initial Site	Frequency (%)	Affects Other Body Regions	Frequency	Neck	Upper Extremities	Back	Lower Extremities
Neck Region	14 (11.3)	8	31	8	6	17	0
Upper Extremities	17 (13.7)	6	21	8	6	6	1
Back Region	72 (58.1)	17	53	6	6	35	6
Lower Extremities	21 (16.9)	0	45	2	1	34	8

Note. WMSD[1] = (n = 124).

Table 7

Frequency of Pain Interference in Licensed Nurses with WMSD[1]

	Frequency (%)		
Activity	Yes	No	N/A
Social	49 (39.5)	72 (58.1)	3 (2.4)
Recreational	72 (58.1)	49 (39.5)	3 (2.4)
School	15 (12.1)	74 (59.7)	35 (28.2)
Work	43 (34.7)	73 (58.9)	8 (6.5)
Daily	64 (51.6)	57 (46.0)	3 (2.4)

Note. WMSD[1] = (n = 124).

Table 8

Mean and Standard Deviation for Psychological Factors in Nurses with WMSD[1]

Psychological Factor	*M*	SD
Pain Intensity	4.85	3.20
Pain Severity[1]	2.69	2.53
Pain Severity[2]	4	2.99
Pain Severity[3]	3.35	2.63
Neuroticism	15.06	10.01
Extraversion	25.65	8.89
Depression	14.33	10.99
Fear Avoidance[1]	20.09	10.27
Fear Avoidance[2]	12.73	6.66
Fear Avoidance[3]	32.81	14.71
Catastrophizing	5.42	6.59
Diversion	15.14	9.28
Reinterpreting	7.99	7.84
Cognitive Coping	22.12	8.88

Note. WMSD[1] = (n = 124); SD = Standard Deviation; *M* = Mean; Pain Severity[1] = Pain Severity at Present; Pain Severity[2] = Pain Severity in Last Month; Pain Severity[3] = Pain Severity Overall; Fear Avoidance[1] = Fear Avoidance Belief Questionnaire Work Subscale; Fear Avoidance[2] = Fear Avoidance Belief Questionnaire Physical Activity Subscale; Fear Avoidance[3] = Fear Avoidance Belief Questionnaire Total.

Table 9

Pearson Product Moment Correlations Between Pain, Personality Traits, and Psychological Coping Factors (n = 124)

Psychological Coping Factor	Pain				Personality Trait	
	Intensity	Severity[1]	Severity[2]	Severity[3]	Neuroticism	Extraversion
Depression	.352**	.418**	.389**	.421**	.733**	-.257**
Fear Avoidance[1]	.489**	.497**	.503**	.524**	.317**	.099
Fear Avoidance[2]	.241**	.193*	.283**	.253**	.058	.014
Fear Avoidance[3]	.450**	.435**	.479**	.480**	.247**	.076
Catastrophizing	.515**	.585**	.603**	.622**	.352**	-.026
Diversion	.452**	.462**	.461**	.483**	.021	.093
Reinterpreting	.342**	.379**	.375**	.395**	.019	.081
Cognitive Coping	.330**	.282**	.244**	.274**	-.095	.033

Note. Severity[1] = Pain Severity at Present, Severity[2] = Pain Severity in Last Month, Severity[3] = Pain Severity Overall; Fear Avoidance[1] = Fear Avoidance Belief Questionnaire Work Subscale, Fear Avoidance[2] = Fear Avoidance Belief Questionnaire Physical Activity Subscale, Fear Avoidance[3] = Fear Avoidance Belief Questionnaire Total; (**) = Correlation is significant at the 0.01 level (2-tailed), (*) = Correlation is significant at the 0.05 level (2-tailed).

Table 10

Pearson Product Moment Correlations Among the Psychological Coping Factors (n = 124)

	DEP	FABQw	FABQpa	CAT	DIV	REN	CC
DEP	1						
FABQw	.339**	1					
FABQpa	.067	.488**	1				
CAT	.502**	.549**	.247**	1			
DIV	.158	.219*	.112	.307**	1		
REN	.149	.142	-.001	.347**	.473**	1	
CC	.068	.080	.018	.135	.461**	.425**	1

Note. DEP = Depression, FABQw = Fear Avoidance Beliefs Questionnaire work subscale, FABQpa = Fear Avoidance Beliefs Questionnaire physical activity subscale, CAT = Catastrophizing, DIV = Diversion, REN = Reinterpreting, CC = Cognitive Coping; (**) Correlation is significant at the 0.01 level (2-tailed), (*) = Correlation is significant at the 0.05 level (2-tailed).

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EDUCATION

PhD	The University of Texas Health Science Center at Houston, TX	2015
MSNA	Lamar University at Beaumont, TX	2007
BSN	Lamar University at Beaumont, TX	2004
ADN	Lamar State College at Port Arthur, TX	2001
LVN	Lamar State College at Port Arthur, TX	1999

LICENSURE

Texas	Texas Board of Nurse Examiners	Active, 2000 - 2015

PROFESSIONAL EXPERIENCE

Lamar University Beaumont, TX	Nurse Educator	2007 - present
Lamar University Beaumont, TX	Graduate Teaching Assistant	2005-2007
Park Place Medical Center Port Arthur, TX	Registered Nurse	2000-2005
Schlesinger Geriatric Center Beaumont, TX	Licensed Vocational Nurse	1999-2000
Hillcrest Elementary Nederland, TX	Paraprofessional Physically and Mentally Challenged	1997-1999

HONORS & AWARDS

Daisy Faculty Award
Lamar University 2014

Daisy Faculty Award Nominee
Lamar University 2011, 2013

Harrington Nurse Educator Fellowship
Lamar University 2007, 2011

Advanced Education Nursing Traineeship
Lamar University 2006-2007

PRESENTATIONS

"Nurses' Knowledge and Attitudes toward Pain Management of the Client" 2008
Sigma Theta Tau Kappa Kappa Research Day, Beaumont, TX.

"Nurses' Knowledge and Attitudes toward Pain Management of the Client" 2008
National Social Science Association: Professional Development Conference, Albuquerque, NM.

"Nursing Students Perspective to Academic Success: A Qualitative Study" 2011
Sigma Theta Tau Kappa Kappa Research Day, Beaumont, TX.

"Talk to a Mannequin" or "Interact with a Human": Advantages and 2014
Outcomes of Using Simulated Patients with BSN Students.
15th International Modeling and Role-Modeling Conference. Erlinger, KY.

"An Innovative Simulation Approach to Teaching the Nursing Process" 2014
Texas Organization of Baccalaureate and Graduate Nursing Education Award
Edinburg, TX. (Award Winner, Presentation)

" eASE into Nursing Safety and Quality". QSEN 2015 National Forum, 2015
San Diego, CA. (Poster Presentation)

PUBLICATIONS

National Social Science Association. (2008). Nurses' Knowledge and Attitudes toward Pain Management of the Client. *National Social Science Proceedings, 40*(2), 117-128.

PROFESSIONAL SERVICE

American Nurses Association 2006-2015

Texas Nurses Association 2006-2015

American Holistic Nurses Association 2009-2015

Sigma Theta Tau International 2004-2015

Phi Kappa Phi Honor Society 2004-2015