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Hanson, Heather E. *The Relationship Between Psychosocial Factors and Work-Related Musculoskeletal Disorders in Hospital Nurses in Wisconsin*

Abstract

The aim of this paper was to examine the relationship between perceived psychosocial factors (PSF's) and work-related musculoskeletal disorders (WRMD's) that hospital nurses experience in Wisconsin and to present initiatives that hospital nurses felt their employer could take to improve PSF's in their work environment. Based on the findings, several areas for future research were also considered.

Results of this study examined multiple psychosocial factors that presented a relationship between PSF's and WRMD's in hospital nurses in Wisconsin. Specifically, PSF's related to workload, resources (lack of staff), direct bullying and gender inequalities were found to be associated with neck and low back pain in study participants. Some strategies to reduce PSF's in a hospital environment included improvement of organizational factors (e.g. staffing, workload), training for new supervisors to improve employee engagement and productivity, addressing gender inequality issues, and improving the quality of on-the-job training.

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Last but not least, “thank you” to the University of Wisconsin-Stout for offering me the honor and opportunity to be a part of the Ed.S. program in Career and Technical Education. I will make the best of what I have learned through my education and experiences at the university to further the improvement of myself and others, and also within the communities in which we live and work. With the time I am blessed to have on this earth, I hope to help make the world a better place.

“I hope that my achievements in life shall be these - that I will have fought for what was right and fair, that I will have risked for that which mattered, and that I will have given help to those in need. That I will have left the earth a better place for what I’ve done and who I’ve been.” – C. Hoppe

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Chapter I: Introduction

Many studies have shown that there is a strong relationship between the physical demands of jobs and work-related musculoskeletal disorders (NIOSH, 1997). Work-related musculoskeletal disorders (WRMD's) "are injuries or dysfunctions affecting muscles, bones, nerves, tendons, ligaments, joints, cartilages, and spinal discs" (Costa & Viera, 2009, p. 285). There are many common types of WRMD's such as (but not limited to) carpal tunnel syndrome, tendonitis, muscle strains, ligament sprains, thoracic outlet syndrome, and rotator cuff tendonitis. WRMD's have a direct effect on employees as well as their employers. In the United States, it is estimated that work-related musculoskeletal disorders are the cause for over 600,000 injuries and illnesses per year (Occupational Safety and Health Administration [OSHA], 2014). According to the Bureau of Labor Statistics (2017), the nursing industry had the highest incidence rates of nonfatal occupational injury and illness cases with days away from work, restricted work activity, or job transfer. In 2016, the National Institute for Occupational Safety and Health (NIOSH) noted that employers suffer many effects of WRMD's including a severe economic burden due to high costs of absenteeism, lost productivity, lost wages, and increased health care, disability, and worker's compensation costs. Direct costs for workers' compensation related to WRMD's are estimated to be as high as \$20 billion dollars per year (OSHA, 2014). Indirect costs for workers' compensation costs related to WRMD's (such as costs related to hiring and training replacement workers) are estimated to be \$100 billion dollars per year.

In order to reduce the direct and indirect costs of WRMD's, it is important to understand the risk factors present in physically demanding job tasks that may cause them. Biomechanical risk factors are one of many factors present in physically demanding job tasks that may cause WRMDs. These risk factors may present themselves in everyday tasks that include awkward

postures, high forces, long durations, and repetitive movements (Bernal, 1997; Gallagher & Heberger, 2012, Hoogendoorn, Poppel, Bongers, Koes, & Bouter, 1999; Silva, Silva, & Gontijo, 2017). These “everyday tasks” may present risk factors such as the overexertion of muscles and may cause MSD’s. In a review of 63 longitudinal studies, “excessive repetition, awkward postures, and heavy lifting” were the most commonly reported biomechanical risk factors for causing WRMD’s (Costa & Viera, 2009, p. 318).

In addition to biomechanical factors, research has shown a relationship between psychosocial factors (PSF’s) and WRMD’s (Silva, Silva & Gontijo, 2017; Lang, Ochsmann, Kraus, & Lang, 2012). “Psychosocial factors at work refer to interactions between and among work environment, job content, organisational conditions and workers' capacities, needs, culture, personal extra-job considerations that may, through perceptions and experience, influence health, work performance and job satisfaction” (International Labour Organisation, 1986, p. 9). Cognitive, social environmental, organizational and psychological factors are psychosocial factors that contribute to WRMD’s (Silva, Silva, & Gontijo, 2017). There are a wide range of behaviors that are influenced by high-performance work factors that may cause WRMD’s (Barling, Kelloway, & Iverson, 2003). There is a relationship between physically demanding jobs and the influence on the physiological response of workers causing job stress which results in the prevalence of WRMD’s (Lang et al., 2012). Job stress from PSF’s such as a lack of social support, job dissatisfaction and monotonous work is significantly associated with the occurrence of musculoskeletal pain (Baek et al., 2017). Stress from a frequent job change due to manufacturing need affected workers, resulting in a “statistically significant increase in neck/shoulder symptoms” and threefold increase in “the risk of hand/arm disorders” (Gerr et al., 2014). A meta-analysis by Bertnal et al., (2015) identified an association in seventeen studies

between work-related psychosocial factors and MSD's including "low back, neck, shoulder, upper extremity, knee, and or/ pain at any anatomical site".

Statement of the Problem

Workplace injuries and illnesses are costly for the worker and the employer. According to the Bureau of Labor Statistics (BLS) in 2013, 33% of injury and illness cases were due to work-related musculoskeletal disorders. They are also the most common cause of lost or restricted work days for employees. As the result of a workplace injury or illness, employees may suffer painful effects of the injury itself, including the physical and mental stressors of rehabilitation. Their injuries could also result in partial or permanent disability. Employers suffer the financial effects as they spend as much as \$20 billion in direct costs and \$100 billion a year in indirect costs for compensation costs related to WRMD's (OSHA, 2014).

Nurses are one of the employee groups most likely to be at risk of a WRMD (OSHA, 2013). According to the "Facts About Hospital Worker Safety" (2013), "more than 90 percent of hospitals say they have systems or programs in place for managing employee safety and health". Despite the amount of safety and organizational controls in place in a hospital environment, certain variables of the job and the environment itself continue to present factors that create physical and mental stressors for their employees. A variety of factors can influence the development of WRMD's. Although the effects and impacts of biomechanical factors on the development of WRMD's is well-documented, the consideration of less obvious factors such as psychosocial factors need further evaluation.

Nursing is one of the most common jobs in the field of "Healthcare". Healthcare is the "largest source of jobs" in the United States (Thompson, 2018). Without an understanding of the correlation between psychosocial factors in the development of WRMD's, hospital nurses are

likely to continue experiencing the effects of these psychosocial factors, which can lead to negative consequences such as burnout, more frequent or severe injuries and increased costs for the employer. “Organizational support should be maximized to optimize the physical and mental health of workers” to prevent workplace injury (Kiani & Khodabakhsh, 2014). There is a need to examine the relationship to develop strategies and solutions to improve psychosocial factors in the workplace. An improvement in the negative impact of psychosocial factors in the workplace may result in fewer workplace injuries and illnesses and a reduction in the overall cost of WRMD’s.

Purpose of the Study

The purpose of this study is to examine the relationship between perceived psychosocial factors and WRMD’s that hospital nurses experience in Wisconsin.

Research Objectives/Questions

This thesis will answer the following questions:

1. What are the WRMD symptoms and PSF’s that hospital nurses in Wisconsin experience?
2. What is the relationship between WRMD symptoms and the PSF’s that hospital nurses experience in Wisconsin?
3. What are the initiatives that hospital nurses in Wisconsin feel could be taken by their employer to improve PSF’s in their work environment?

Importance of the Study

The study will help to identify the WRMD symptoms and psychosocial factors experienced by hospital nurses and the correlation between them. By identifying the relationship between WRMD symptoms and psychosocial factors, we will be able to further understand how

to reduce psychosocial factors for hospital nurses. Improving the negative impact of psychosocial factors will reduce workplace stressors and improve the overall psychological well-being of employees and reduce WRMD's.

Limitations of the Study

This study is limited in scope using only one industry (nursing). Findings may not generalize to other industries, including other areas of health care. The use of a convenience sample results in a low external validity, as is not representative of the entire nursing population (e.g. age, sex, tenure). The scope of the study may also be a limiting factor, as the type of nurses recruited for this study were broadly defined as "hospital nurses in Wisconsin" and not categorically defined by their nursing role (e.g. primary care vs. emergency room, vs. quality). Another limitation is the use of self-reported data, which is not often verified by a third-party. Self-reported data may contain various personal biases. Subjects may not remember past experiences accurately or may exaggerate outcomes. The use of collection data focusing on overall worker perceptions may present a level of distortion.

Definition of Terms

The definitions outlined below assist the reader in understanding the terms in relationship to the specific nature of the research being performed.

Biomechanical risk factors. Risk factors that result from physical movement(s) that cause added stress to the natural way the human body moves. This may include repetitive motion, awkward or sustained postures, excessive force and prolonged sitting and standing.

Carpal tunnel syndrome. An injury or dysfunction of the hand and fingers caused by compression of the median nerve in the wrist which can cause pain, tingling, and numbness.

Cognitive risk factors. Risk factors that may affect an individual's overall health related to cognitive abilities such as attention, executive and visuospatial function, memory, and language.

Environmental risk factors. Risk factors to include a wide array of conditions that are related to one's personal or work surroundings such as poor sanitation, waste management, the absence or shortage of clean water, poor lighting, excessive heat/cold, loud environments, exposure to hazardous chemicals/radiation, etc. that may affect an individual's overall health.

Individual risk factors. Risk factors that are attributes or characteristics that are singular to a person such as obesity, tobacco and alcohol use, sedentary lifestyle, etc. that may affect their overall health.

Ligament sprains. The stretching or tearing of ligaments in the body.

Muscle strains. The stretching or tearing of a muscles or tendons in the body.

Organizational risk factors. Risk factors that may affect an individual's overall health that are related to unfavorable work practices such as lack of policies, unsafe procedures, short staffing, poor culture, etc.

Psychological risk factors (aka psychosocial factors). Risk factors that may affect an individual's overall mental health such as stressful life events, lack of coping resources, level of risk taking, lack of social support, personal beliefs and attitudes, etc.

Rotator cuff tendonitis. An injury or dysfunction of the shoulder where the muscles and tendons are inflamed and or irritated and causes chronic pain. If left untreated, this can lead to chronic stiffness of the shoulder.

Social risk factors. Risk factors that include vertical and horizontal variables such as age, sex, marital status, number of children, residence, race/ethnicity, nationality, level of education, income, and housing that may affect an individual's overall health.

Tendonitis. An injury or dysfunction where bodily tissue connecting muscle to bone becomes inflamed.

Thoracic outlet syndrome. An injury or dysfunction where the space between the collarbone and first rib is compressed, which pinches the blood vessels or nerves and causes pain in the shoulders, neck and numbness in fingers.

Chapter II: Literature Review

Musculoskeletal disorders (MSD's) are common injuries in the workplace and are also known as work-related musculoskeletal disorders (WRMD's). The prevalence and risk of developing WRMD's is well-documented (Putz-Anderson et al., 1997). Several studies have also noted the prevalence and risk for developing WRMD's in the nursing field (Alexopoulos et al., 2003; Alexopoulos et al., 2005; Ericksen, 2003; Gopal et al., (2012), Harcombe & McBride, 2009), Karahan et al., 2009; Magnago et al., 2007; Magnago et al, 2010, Solidaki et al., 2010; Tinbu et al., 2010). One of the potential causes of WRMD's is due to biomechanical factors. Biomechanical factors are physical stressors that cause strain or injury to muscles, joints, ligaments, tendons and bones. When biomechanical factors are present in job tasks in the workplace, they can cause WRMD's. In a review of 63 studies, common biomechanical factors that have been reported for potential causal relationships in the development of WRMD's were excessive repetition, awkward postures, and heavy lifting (Costa & Vieira, 2009). Other work-related biomechanical factors that may cause WRMD's include forceful exertions, static work, temperature extremes (e.g. cold stress), mechanical compression (e.g. grasping sharp edges of tool handles) inadequate lighting, glare and vibration (e.g. hand-arm, body). Due to the variance in factors that may cause WRMD's, it has been difficult for studies to determine the relationship between them, as WRMD's are multifactorial in nature. There are factors other than biomechanical risk factors that may be related to WRMD's. To understand how to reduce the overall risk of WRMD's, evaluating potential relationships between other "non-biomechanical" risk factors for WRMD's is necessary. These non-biomechanical risk factors include individual, organizational, and psychosocial factors. Although most risk factors for WRMD's are well-

defined and familiar in nature, psychosocial risk factors are widely defined and include many different conditions. There is not a concrete definition for risk factors deemed as “psychosocial”.

Psychosocial risk factors can be defined by a variety of domains. These domains consist of different “work organization factors” which can include “various aspects of job-content, organizational characteristics, interpersonal relationships at work, temporal aspects of the work and task, financial and economic aspects, and community status” (Putz-Anderson et al., 1997, p. 470). Specific examples within these domains may include job characteristics such as long work hours, little or no degree of control over workload, low autonomy, lack of management support, bullying, competitiveness, mental demands, job clarity, poor work environment, equity issues, and other relationship issues.

Research has shown an association between psychosocial factors and WRMD’s. “Psychosocial factors associated with work design, work social supports, and individual responses to workplace stress can be reasonably assumed as risk factors for higher rates of work-related musculoskeletal disorders” (National Research Council, 1999). One of the most prevalent work areas that has shown an association between psychosocial factors and WRMD’s is in the nursing field.

In a meta-analysis on “work-related psychosocial risk factors and musculoskeletal disorders in hospitals nurses and nursing aides”, seventeen studies that presented “psychosocial demands” were reviewed (Bernal et al., 2015). Results of this study suggested a relationship between psychosocial factors and WRMD’s. The study also noted that it is likely that WRMD’s may be reduced by improving the psychosocial factors in the work environment. Bernal et al., (2015) found that most common WRMD’s nurses experienced were located in the back, neck and shoulder. Different areas of the body presented pain dependent on specific psychosocial

factors. Occurrence of pain was identified by prevalence and or incidence and noted at various anatomical body sites.

High psychosocial demands-low job control was associated with prevalent and incident low back pain, prevalent shoulder pain, prevalent knee pain, and prevalent pain at any anatomical site. Effort-reward imbalance was associated with prevalent WRMD's at any anatomical site. Low social support was associated with incident low back pain" (Bernal et al., 2015, p. 635). According to Bernal et al., (2015), WRMD's are one of the leading causes of disability in hospital nurses and nursing aides. (p. 636)

A study by Friemann, et al., (2016) found an association between psychosocial factors and musculoskeletal pain among university hospital nurses. Psychosocial factors were assessed using 85 items that were grouped into 24 scales, which covered the following domains. These domains included work demands; work organization and job contents; interpersonal relationships and leadership; the work-individual interface; values in the workplace and mental health problems. The significance of each psychosocial domain was evaluated to determine the impact of psychosocial factors and mental health problems on musculoskeletal pain. Mental health problems were also evaluated by using 24 items grouped into six scales. Self-reported scores for the identification of psychosocial factors and mental health problems were self-reported by nurses. The self-reported factors that had the highest mean scores were expectations of hiding emotions, meaning of the work, role clarity, job dissatisfaction, trust regarding management, and burnout.

The prevalence of musculoskeletal pain was evaluated in six anatomical areas of the body (lower back, neck, shoulder, elbow, wrist/hand, and knee). According to the study, 70 percent of participants reported musculoskeletal pain within the past year, in which lower back pain was

most prevalent. Approximately 64 percent of participants reported musculoskeletal pain within the past month, in which neck pain was most prevalent form most participants. The most significant associations between psychosocial factors and musculoskeletal pain as reported by nurses in the past year and month were mental health problems, specifically stress, somatic stress symptoms, and burnout. Other significant associations between psychosocial factors and musculoskeletal pain in the past year were job dissatisfaction, work pace, and lack of justice and respect. Other significant associations noted in the past month were work demands, emotional demands, and work-family conflict (Frieman et al., 2016).

Amin et al., (2014) found an association between psychosocial factors and the prevalence of WRMD's in nurses working in public hospitals. Five psychosocial risk factors of WRMD's according to body regions were evaluated in public hospital nurses. These psychosocial risk factors included psychological job demand, decision latitude, co-worker support, supervisor support, and social support. Out of nine body regions that were evaluated to determine the prevalence of WRMD's, 73.24 percent of nurses reported having symptoms in at least one body region, with the neck identified as the area causing the most discomfort or pain (48.94%). Discomfort or pain was also evaluated in multiple body regions. These "regions" were defined as region one through region four. Region one included the neck, shoulders, and upper back. Region two included the arms and wrists. Region three included the lower back. Region four included the hips, knees, ankles, and feet. More than half (54.82%) of nurses experienced discomfort and pain in two body regions, which included region one (59.74%) and region four (52.45%). Results of the study showed a significant association between the psychosocial risk factors and WRMD's in difference body regions.

A high-level prevalence of chronic and persistent fatigue in emergency and critical care nurses has also been associated with musculoskeletal pain in body regions including the neck, shoulder, upper and lower back, and foot regions (Rahman et al., 2017). In a secondary study by Rahman et al., (2017), forearm pain, shoulder pain, and low back pain were also significantly linked to psychosocial factors, specifically work-family conflict among emergency and critical care nurses. Work-family conflict influenced the relationship between emotional demands and stress, which contributed to 61.5% of chronic fatigue. Links between other psychosocial factors such as stress, burnout, and acute fatigue were also present.

Karahan et al., (2009) also noted psychological stress (in addition to work activities) was one of the causal factors for many back injuries, as 77.1% of nurses had a high prevalence of low back pain among a variety of hospital workers. The most prevalent type of WRMD in the nursing industry appears to be low back pain. The highest incidence of low back pain has been noted among healthcare workers (Bejia et al., 2005; Bos et al., 2007; Landry et al., 2008). Among hospital workers, nurses often experience low back pain more often than others (Omokhodion et al., 2000; Corona et al., 2005). Ribeiro et al., (2017) also found a high prevalence (63.1%) in low back pain in primary health care nurses.

Although work tasks create biomechanical factors that may cause WRMD's, evidence shows that there is relationship between psychosocial factors and WRMD's. It is important to examine this relationship, as it may lead to further understanding of how employers can improve the overall psychological well-being of employees in the workplace to reduce the overall risk of WRMD's.

Chapter III: Methods and Procedures

The purpose of this study is to examine the relationship between perceived psychosocial factors and WRMD's that hospital nurses experience in Wisconsin. The study used a qualitative study design. Based on specific criteria, a convenience sample was used to determine study participants. Study participants were provided a hard copy of the "NMQ-E" to fill out during the first part of the interview to collect information on perceived musculoskeletal pain. The second part of the interview evaluated PSF's using questions adapted from the "QPS 34+". To evaluate psychosocial factors, the questions were adapted from the "QPS 34+", which is a shortened version of the QPS Nordic Questionnaire. This study was performed to gain valuable information regarding the relationship between perceived PSF's and WRMD's that hospital nurses experience, provide insight to what workplace interventions hospital nurses felt could be made by their employer to reduce PSF's and offer recommendations for future studies.

Method of the Study

The purpose of this study was to examine the relationship between psychosocial factors and WRMD's that hospital nurses experience in Wisconsin. In order to examine this relationship, information was gathered from nurses regarding their perception of psychosocial factors and musculoskeletal disorders experienced at work.

Design of the Study

The design of the study is a qualitative research study. The focus is to provide an understanding of the relationship between the perceived psychosocial factors and WRMD's in hospital nurses in Wisconsin. A qualitative study design is most appropriate for this study because it focuses on the experiences lived by people (Al-Busaidi, 2008). When personal experiences are interpreted, they create meaning of perceptions by defining them from their

perspective. These “interpretive perspectives found in the humanities and social sciences that emphasize the importance of understanding, from the viewpoint of the people involved, how individuals and groups interpret, experience, and make sense of social phenomena” (Pope, et al., 2002).

Sample Selection

Criterion sampling was used in this study. Participants selected met specified criteria, which included a convenience sample of five nurses that work at hospitals in Wisconsin. This sample size was recommended in consideration of the availability of time and resources, as well as the accessibility of study participants to ensure research questions were adequately addressed.

Instrumentation

Study participants were provided a hard copy of the “NMQ-E” to fill out during the first part of the interview to collect information on perceived musculoskeletal pain. The second part of the interview portion evaluated PSF’s using questions adapted from the “QPS 34+”.

To evaluate psychosocial factors, the questions were adapted from the “QPS 34+”, which is a shortened version of the QPS Nordic Questionnaire. In a study by Tabanelli (2017), 33 study instruments were identified and evaluated to provide an overview of the various tools used to measure and evaluate psychosocial factors. The QPS Nordic Questionnaire aligns best with study, as the objective of the questionnaire is to measure and evaluate “psychological/social factors as potential determinants of motivation, health, and well-being” (Tabanelli, et al., 2007).

To evaluate WRMD’s, the “NMQ-E” was used. The NMQ-E is an extended version of the original Nordic Questionnaire. The Nordic Questionnaire is a standardized and reliable questionnaire that has been used in many studies to analyze musculoskeletal symptoms in an ergonomic or occupational health context (Kurinka, et al., 1987). The Nordic Musculoskeletal

Questionnaire (as cited in Crawford, 2007) “can be used as a questionnaire or a structured interview, however significantly higher frequencies of musculoskeletal problems were reported” when the NMQ was used as a questionnaire. The NMQ-E was selected as the best fit as an expansive tool for this study because it was developed “to collect greater information regarding musculoskeletal pain” (Dawson, et al., 2009, p. 517).

Procedures Followed

Five survey participants were recruited using social media (e.g. Facebook). The researcher and participants met individually for the interview in a private meeting room. The questions used from the adapted version of the “QPS 34+” and NMQ-E were used to gather the appropriate information regarding the evaluation of the perceived psychosocial and musculoskeletal factors in hospital nurses in Wisconsin. The interviews were performed one-on-one in a private meeting room and were recorded on the “Voice Recorder PRO” iPad app. Study participants were freely be able to participate in the survey research, with the ability to stop at any time.

Method of Analysis

The recorded interviews were personally transcribed. Data was organized appropriately by themes to address research questions. Information was grouped into categories based on their similarities to develop themes and determine patterns relevant to the perceived psychosocial factors and WRMD’s to develop a theory regarding the relationship between them.

Chapter IV: Results and Analysis

The purpose of this study is to examine the relationship between perceived PSF's and WRMD's that hospital nurses experience in Wisconsin. Using a qualitative study design, five hospital nurses participated individually in a two-part interview. The first part of the interview was used to collect information on perceived musculoskeletal pain. The second part of the interview portion evaluated PSF's using questions adapted from the "QPS 34+". The following results will identify what perceived PSF's and WRMD symptoms hospital nurses in Wisconsin experienced. Results of the perceived effects of WRMD's symptoms that hospital nurses experienced are also identified.

Demographics

Five females participated in this study. Four participants were 35-44 years old. One participant was 25-34 years old. Primary occupational categories were: RN/Quality Inpatient Specialist, RN/System Project Management-Project Manager, RN-Floor Staff Nurse & Charge Nurse, RN-Wound Care Nurse, and RN-Primary Charge Nurse. Average years worked as a nurse were 14.5 years. Average years worked in as a nurse in a hospital setting were 14.1 years. Two participants work for a non-profit hospital. Two participants work for a for-profit hospital. One participant works for a government hospital. All of the participants work in the Western region of Wisconsin.

Extended Nordic Musculoskeletal Questionnaire (NMQ-E)

In order to identify what WRMD symptoms hospital nurses in Wisconsin experience, the NMQ-E was used to identify the prevalence of an ache, pain or discomfort in various body regions in each participant. All participants identified they experienced an ache, pain or discomfort in the neck area. Four of five participants identified they have experienced an ache,

pain or discomfort in the shoulders, upper back and low back. Two participants identified pain in the hips/thighs. One participant identified an ache, pain or discomfort in the elbows. One participant also identified an ache, pain or discomfort in the ankles/feet.

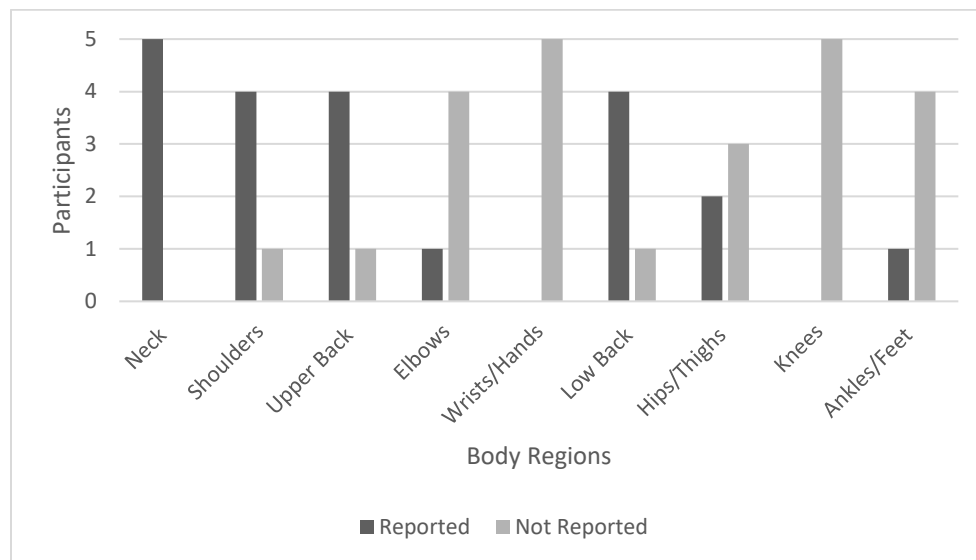


Figure 1. Lifetime prevalence of an ache, pain or discomfort in hospital nurses.

In the last 12 months, all of the participants identified an ache, pain or discomfort in one or more body regions. Four participants identified pain in the neck area. Three of five participants identified an ache, pain or discomfort in the shoulders, upper back and low back within the past 12 months. Two of five participants identified an ache, pain or discomfort in the shoulders and hips/thighs within the past 12 months. One participant identified an ache, pain or discomfort in the elbows. One participant also identified an ache, pain or discomfort in the ankles/feet.

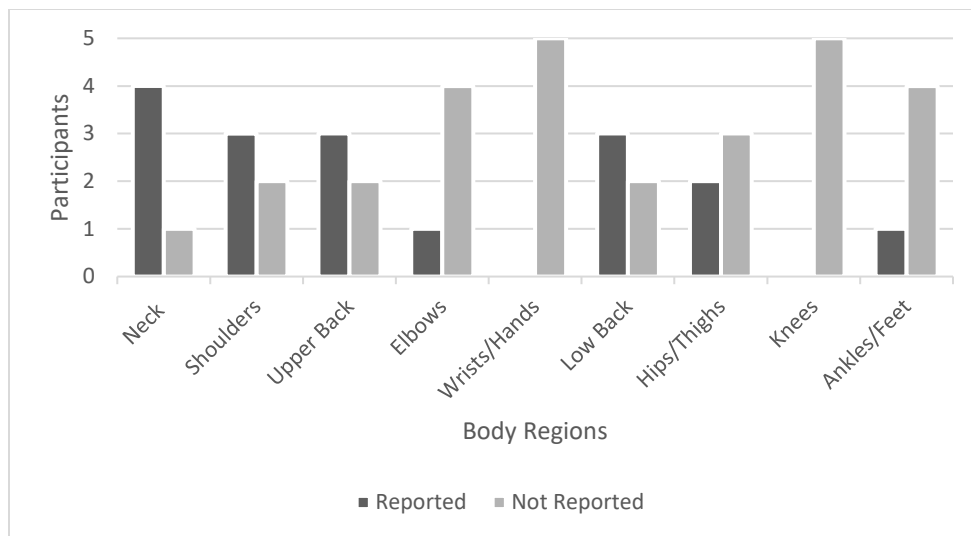


Figure 2. Yearly prevalence of an ache, pain or discomfort in hospital nurses.

Within the past month, three of five participants identified an ache, pain or discomfort in the shoulder region. Only one out of five participants identified an ache, pain or discomfort that existed in the neck, upper back, elbows, low back, and hips/thighs.

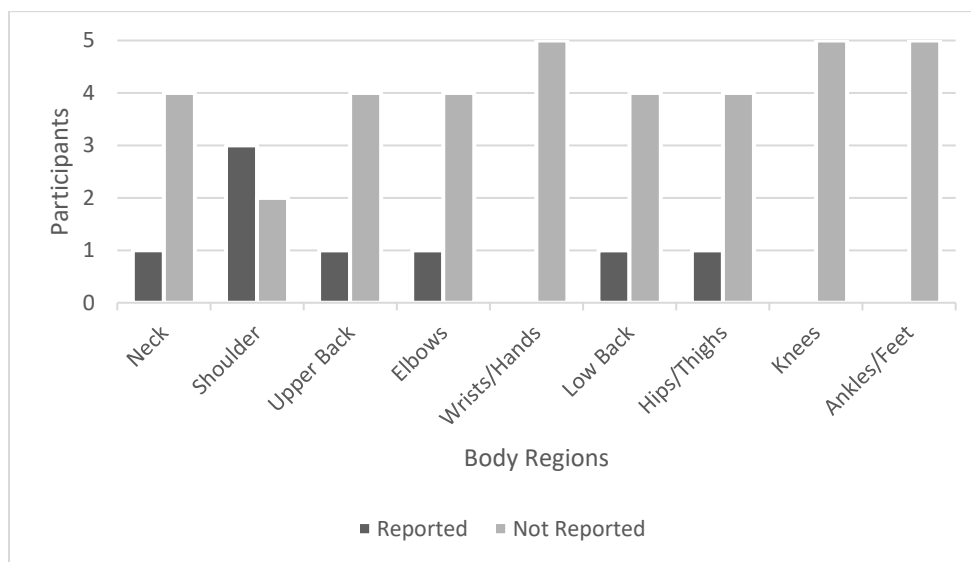


Figure 3. Monthly prevalence of an ache, pain or discomfort in hospital nurses.

All of the participants identified that the ache, pain or discomfort experienced in one or more body areas has caused them to seek medical treatment. All of the participants have also

used medication because of the ache, pain or discomfort caused in one or more body areas. Two out of five participants noted the ache, pain or discomfort prevented them from doing normal work.

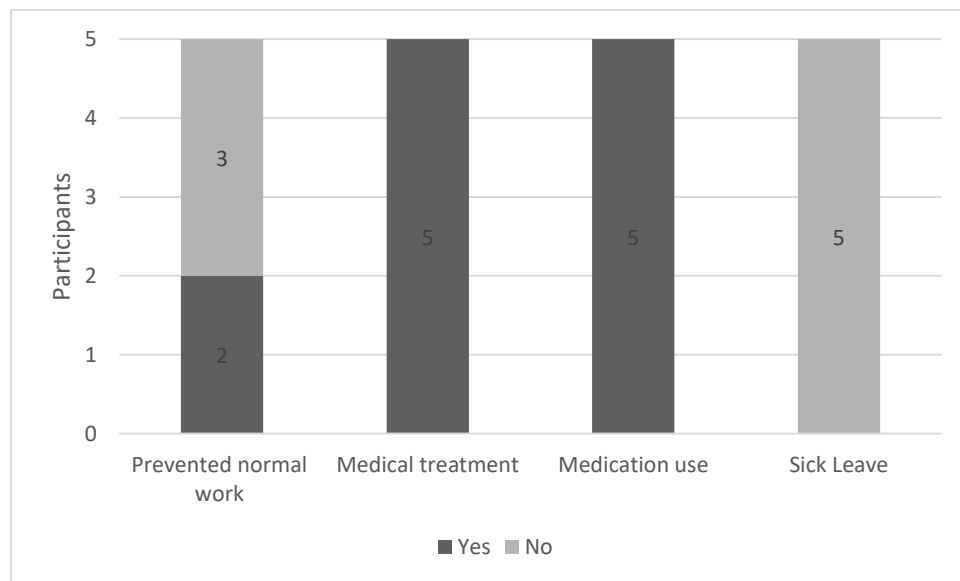


Figure 4. Reported yearly effects of an ache, pain or discomfort in hospital nurses.

Psychosocial Factors (PSF's)

Five measures were used to determine PSF's that hospital nurses in Wisconsin experience. These PSF's include "Bullying/Harassment", "Inequalities", "Resources", "Support" and "Workload".

Bullying/harassment. Bullying/Harassment were defined as participants who experienced bullying/harassment themselves and or witnessed the bullying/harassment of a co-worker. Three out of five participants stated they felt they experienced bullying/harassment directly at work within the last six months. Two out of five participants stated they had seen co-workers experience bullying/harassment at work within the last six months.

Inequalities. "Inequalities" were defined as "gender inequalities" or "age-related inequalities". Three out of five participants stated they felt there were gender inequalities in how

employees were treated at their workplace. Two out of five participants stated they felt there were age-related inequalities in how employees were treated at their workplace.

Resources. “Resources” were defined as “staffing” and “training”. Four out of five participants stated they lack staffing at work, which causes stress. Two out of five participants stated they feel they more training is needed to be successful at work.

Support. “Support” was defined as from supervisors, co-workers, friends, family, and relatives. One out of five participants felt that her supervisor was unsupportive. One out of five participants felt that their co-workers were unsupportive.

Workload. “Workload” was defined as “work pace” and “work tasks”. All of the participants felt that their work tasks were stressful due to additional work-related challenges (e.g. “organizational barriers”, excess charting requirements, lack of staffing). Four out of five participants stated that they felt that their work was “fast-paced” or quick decisions were needed on a regular basis during the scope of their work day.

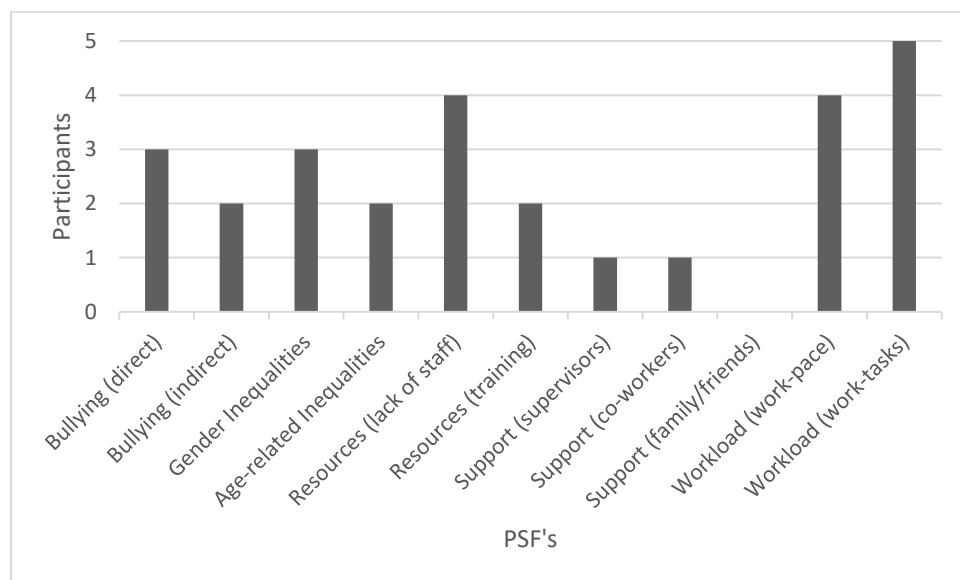


Figure 5. Reported Psychosocial Factors (PSF's) in hospital nurses.

Psychosocial Factors (PSF's) and Work-Related Musculoskeletal Disorders (WRMD's)

The most common PSF's overall were "workload" (work tasks = 5/5), "resources" (lack of staff = 4/5), "bullying" (direct = 3/5) and "inequalities" (gender = 3/5). Four out of five participants most frequently experienced PSF's in the workplace. Of the four participants that most frequently experienced PSF's the workplace, the most common ache, pain or discomfort was in the neck (3/5) and low back (3/5).

Chapter V: Discussion, Conclusions and Recommendations

Many studies have examined the relationship between physical stressors and WRMD's; however, there is less research that examines the relationship between PSF's and WRMD symptoms experienced by hospital nurses. Results of this study will provide information regarding the perceived relationship between PSF's and WRMD's in hospital nurses in Wisconsin and may further guide policy and administrative decisions in hospital settings. Having a clear understanding of the PSF's and WRMD's that impact hospital nurses is significant because PSF's may have a negative effect on the human body resulting in WRMD's which may result in increased organizational costs (e.g. workplace injuries and workers' compensation costs). Understanding the perceived relationship between PSF's and WRMD's will help us to develop strategies and solutions to improve PSF's in the workplace and may result in implications for future research. An improvement of psychosocial factors in the workplace may also result in fewer workplace injuries and illnesses resulting in a reduction in the overall cost of WRMD's. Therefore, the purpose of this study was to evaluate the perceptions of PSF's and WRMD's in hospital nurses in Wisconsin. Additionally, this study sought to provide insight to what workplace interventions hospital nurses felt could be made by their employer to reduce PSF's and offer recommendations for future studies. This study focused on the following questions to help determine the perceived relationship between PSF's and WRMD's and what interventions hospital nurses felt could be made by their employer to improve PSF's in their work environment.

1. What are the WRMD symptoms and PSF's that hospital nurses in Wisconsin experience?

2. What is the relationship between WRMD symptoms and the PSF's that hospital nurses experience in Wisconsin?
3. What are the initiatives that hospital nurses in Wisconsin feel could be taken by their employer to improve PSF's in their work environment?

Study participants were recruited using social media (e.g. Facebook). This research study utilized a qualitative study design, including a convenience sample of five hospital nurses that participated individually in a two-part interview to determine the perceived relationship between PSF's and WRMD's. The first part of the interview was used to collect information on perceived musculoskeletal pain. The second part of the interview evaluated PSF's using questions adapted from the "QPS 34+". The qualitative results were analyzed for the emergence of themes and patterns and then grouped to determine results for quantitative measurement. The instrumentation used was designed to identify perceptions of the relationship between PSF's and WRMD's in hospital nurses in Wisconsin, as well as identify initiatives that hospital nurses in Wisconsin feel could be taken by their employer to improve PSF's in their work environment. In this chapter, data and results relative to each of the research questions will be discussed as well as conclusions and recommendations for future studies.

Discussion

Aches, pains, and discomfort are physical health outcomes that are manifested in the human body and can be caused by many factors, leading to MSD's. MSD's are "a multidimensional problem" (Wiitavaara et al., 2007, p. 1388). Because of the many factors that may lead to MSD's, it is difficult to understand the causality. MSD's are often cited as "multifactorial" in nature (Bongers et al., 1993; Evanoff, Dale & Descatha, 2014, Lelis et al., 2012; Punnett & Wegman, 2004). Aches, pains and discomfort are often considered to be part of

the normal aging process of the body. They can also be the result of physical movement or biomechanical strain. All of the study participants noted they have “ever” experienced an ache, pain, or discomfort in one or more of nine body regions evaluated in this study.

Aches, pains, and discomfort are also commonly reported as a result of occupational work. Occupational work that requires physical demands such as handling heavy loads, awkward postures, repetitive movement or vibration can cause WRMD’s. Costa and Viera (2010) found that excessive repetition, awkward postures, and heavy lifting were ‘the most commonly reported biomechanical risk factors with at least reasonable evidence for causing’ WRMD’s. Nursing is one of the most common occupations that has reported aches, pains, or discomfort which can be associated with WRMD’s (Alexopoulos, Burdorf & Kalokerinou, 2003, 2005; Barzideh, Choobineh & Tabatabaee, 2014; Edlich et al., 2005, Eriksen, 2003; Harcombe et al., 2009, 2014; Karahan et al., 2009; Shieh et al., 2016; Smith et al., 2004, 2005; Sveinsdottir & Gunnarsdottir, 2008; Tinubu et al., 2010). They are also one of the most likely employee groups to be at risk of a WRMD (OSHA, 2013). Tinubu et al., (2010) noted there is variance in the prevalence rates of WRMD’s in nurses but they “have been generally high.” Within this study, four out of five participants noted they had an ache, pain, or discomfort within one or more body regions within the past 12 months. The highest prevalence of an ache, pain, or discomfort within the past 12 months was noted in the neck and upper back (three out of five participants). Many studies have shown a high prevalence of MSD’s or WRMD’s in multiple body areas (Rathore, Attique, & Asmaa, 2017; Barzideh, Choobineh & Tabatabaee, 2014; Fonseca & Fernandes, 2010; Riberio, Serraheira, & Loureiro, 2017; Widanarko et al., 2011). Although many studies found a higher prevalence of WRMD’s over a 12-month period, there were similarities and differences in the body parts participants identified that presented pain and discomfort. The differences in the body

regions identified where study participants noted a higher prevalence of pain and discomfort could be due to the variance in study design, including the different self-reporting tools used to measure pain and discomfort in body regions. Nurses that were evaluated in previous studies also worked in different areas of nursing (e.g. primary care, emergency room). Different areas of nursing require different responsibilities and job tasks. For example, some nurses are required to perform more “hands on” lifting than others during patient care which may present more musculoskeletal pain or discomfort, where other nurses may have less physical lifting requirements for patient care and more paperwork or charting responsibilities. (Fonseca & Fernandes, 2010; Karahan et al., 2009; Shieh et al., 2016; Tinubu et al., 2010). Differences also could be due to other factors, such as “individual characteristics” that are known to be associated with MSD’s. These “individual characteristics” are “age and sex, occupational risk factors and non-work-related exposures” (Bernal et al., 2015, p. 636). Various stressors may cause WRMD’s and may be physical, mental, or a combination of both. Cognitive, social environmental, organizational and psychological factors are psychosocial factors that contribute to WRMD’s (Silva, Silva, & Gontijo, 2017). There are wide range of behaviors that are influenced by high-performance work factors that cause WRMD’s (Barling, Kelloway, & Iverson, 2003). There is a relationship between physically demanding jobs and the influence on the physiological response of workers causing job stress which results in the prevalence of WRMD’s (Lang et al., 2012). Many studies have examined the relationship between physical stressors and WRMD’s; however, there is less research that examines the relationship between PSF’s and WRMD symptoms experienced by hospital nurses. It is important to examine PSF’s, as they may have a negative effect on the human body resulting in WRMD’s which may result in increased organizational costs (e.g. workplace injuries and workers’ compensation costs). This study was

performed to examine the association between WRMD's and PSF's, which may result in implications for future research to develop strategies and solutions to improve psychosocial factors in the workplace. An improvement of psychosocial factors in the workplace may result in fewer workplace injuries and illnesses resulting in a reduction in the overall cost of WRMD's.

There are many PSF's within the nursing environment which may affect WRMD's. These PSF's are often categorized or grouped into factors such as, but not limited to: job strain, job control, job context, support, bullying/harassment, effort-reward imbalance, overload, role conflict, relationships at work, burnout and recognition. This study evaluated five PSF's, which were categorized into the following factors: bullying/harassment, inequalities, resources, support, and workload.

The first PSF that was evaluated was bullying/harassment. "Bullying" was defined as experiencing bullying/harassment directly or witnessing the bullying of a co-worker. Results indicated that four out of five participants experienced bullying/harassment within the last six months. Three out of five participants experienced bullying/harassment directly. Workplace bullying/harassment is known to have harmful effects on one's physical and mental health (Djurkovic, McCormack & Geasimir, 2005; Giorgi, 2010; Leymann & Gustafsson, 1996; Vega & Comer, 2005). Bullying is "linked to increased psychological distress levels" (Demir et al., 2012, p. 376). Co-workers who witness bullying are also impacted by the harmful effects of bullying (West et al., 2014). Lutgen-Sandvik, Tracy and Alberts's study (as cited in West et al., 2014) found the harmful effects of bullying that witnesses have reported are "lower levels of job satisfaction and higher levels of stress and a deterioration of both physical and mental health as evidenced by feelings of guilt and fear, insomnia, and headaches". The type of bullying/harassment that study participants experienced was either direct (e.g. verbal attacks) or

indirect (e.g. social media, gossiping to others). Participant E stated she was directly bullied by a co-worker who applied for the same job and did not get the position. Participant E felt that her co-worker was “judging her” and saying bad things, which caused her to feel very stressed. Participant D stated she was very stressed by bullying/harassment by an extremely negative comment directed towards her on social media that was posted by a co-worker. This made interactions with her co-worker at work very stressful with the conflict created by the social media post. “Blurred boundaries” of the use of mobile communication platforms and technologies at work further complicate online bullying, especially through the use of popular platforms such as Facebook at Twitter (West et al., 2014). There is often crossover use of social medial tools to communicate for “work” and boundaries may be lacking in regard to the use of social media and other mobile platforms in the work environment, adding organizational challenges in online bullying prevention. The effects of workplace bullying (including cyberbullying) are well-documented. Many researchers have studied the consequences of workplace bullying and found that it is “psychologically and organizationally related” (Demir & Rodwell, 2012; Hoedl & Cooper, 2000; Mikkelsen & Einarsen, 2002; Quine, 2001; Simons, 2008). Bullying and harassment can have a significant impact on an organization and on the individual and “the costs tend to have a have a domino effect, creating additional impact” (Vega & Comer, 2005, p. 106).

The second PSF that was evaluated in the study was “inequalities”. These inequalities were defined as “gender inequalities” or “age-related inequalities”. In this study, three out of five participants felt they experienced “gender inequalities” at their workplace. Participant B felt there were “more men than women”, describing a “physician-led” male dominated healthcare system. Participant D felt there was “not a good mix of males and females on the floor”.

Participant E described the gender inequalities as “male nurses climb the management scale faster”, that “they are not on the floor long” prior to being promoted versus their female counterparts. Participant E also felt it is well-known and widely talked about on the floor between co-workers that male nurses climb the management scale faster than female nurses at their organization. Blackwell Science Ltd. (1999) noted that although women have greater experience and qualifications in nursing versus men, men are still “climbing the nursing career ladder much quicker than women” (p. 527). Male nurses may have more “attractive positions” that result in a higher wage and image than female nurses (Ayala et al., 2014). “Gender inequalities are systems inefficiencies that contribute to clogged health worker educational pipelines recruitment bottlenecks, attrition, and worker maldistribution in formal and non-formal health workforces” (Newman, 2014, p. 1). Gender-based discriminatory policies and practices in the workplace may cause psychosocial stress and have a negative effect on the mental health of women (Platt, Prins, Bates, & Keyes, 2016).

The third PSF that was evaluated was “resources”. Resources were defined in this study as “staffing” and “training”. Four out of five study participants noted they felt “stress” due to lack of staff in their departments. Study participants also felt they had substantial paperwork requirements to complete on a regular basis (e.g. charting, audit-related). Participant C stated she felt nurses “are rushed into doing more with less”. Participant D felt that due to time constraints and lack of staff, nurses were “not charting fully”. Study participants felt that the paperwork requirements are very demanding and that it would be favorable to have additional staff hired to assist with those paperwork requirements to reduce stress. Study participants also noted they felt they did not have enough time to complete both paperwork requirements and patient care activities successfully. Participant C felt she was “stretched a lot thinner due to speed of patient

turnover” and stated, “it feels like we do not have enough time with patients”. Participant E felt that if “more support staff were provided, it would allow for regular staff to get their normal jobs done and see more patients where there is a real need for care”. Study participants felt that the patient care was also affected negatively due to the lack of time they had due to the speed of patient turnover requirements (which varied between hospital settings). One of the many causes of stress at work is “understaffing” (Bhui, 2016). Lack of staffing can lead to overwhelming stress and job dissatisfaction in nurses (Brooks & Anderson, 2004; Chang, 2005; Purcell, Kutash, & Cobb, 2011). Although lack of training was not a significant factor in this study, two out of five study participants had notable experiences regarding training at their organizations.

Participant D felt their organization did not prepare staff well for a large project and stated it was “very stressful” and “at one point (she) was in the bathroom crying” due to how much stress it caused. Participant D also felt that the classes nurses were required to take were “not applicable for the real nursing world”, stating “we had to teach ourselves to get it right”. Although one of the attractive features of the nursing profession is the support of continuing education (Price & Reichert, 2017), it can be a stressful experience if the training provided is not related to the work that is performed. Participant E discussed areas where she felt more training was required and how it was a financially and emotionally “stressful” experience. Price and Reichert (2017) found that there was a lack of support (time or funding) for nurses later in their careers. Although four out of five nurses in this study noted that their organization paid for their education-related needs, after Participant E was hired, she was informed she would have to pay out-of-pocket for a required certification to keep her newly-appointed job. She was required to complete the certification within six months of her hiring date and it involved approximately \$3,000 in out-of-pocket costs.

The fourth PSF that was evaluated was “support”, which was defined as “support from supervisors, co-workers, friends, family, and relatives”. Social support is an important factor in reducing stress in the workplace. “Social support can, for example, buffer the negative effect of psychological stressors on employee health, and co-workers and supervisors are valuable sources of information and expertise” (Koponen et al., 2013, p. 2). Four out of five participants felt their supervisor was supportive. Participant B stated that her supervisor is “supportive overall”, however “she is newer and doesn't value opinions sometimes...but has an open-door policy”. Participant C felt that her relationship with her supervisor “was better at the beginning, not lately” and felt that “other issues” were related to her supervisor being disengaged which caused her to feel stressed. Participant C also noted that she felt her supervisor was “young and inexperienced”, which she felt may be part of the reason for the lack of support she was currently receiving at work. Van Woerden’s study (as cited in Hammig, 2017) noted that “the associations...found were strongest for social support at work (from superiors and colleagues) compared to social support from other networks or sources like family, friends and neighbors”. The role of social support is critical in the workplace, especially in the nursing field. Social support from supervisors and co-workers helps reduce job stress (Beehr et al., 2003; Oginska-Bulik, 2005) and “musculoskeletal ill-health” (Woods, 2005).

The fourth PSF that was evaluated was “workload”. Workload was defined in this study as “work pace” and “work tasks.” Nurses often have a wide variety of work tasks for which they are responsible to complete their jobs, often in a fast-paced environment. All of the study participants noted they felt the lack of time to complete required work tasks caused “stress”, regardless of the duration of their shift. Job stress corresponds with the level of time pressures in the nursing environment (Barzideh, Choobineh, & Tabatabaee, 2014). Three out of five study

participants described their work as “fast-paced” and that they are required to make “quick decisions”, causing them to feel stressed. Role ambiguity and workload are stressors that were “positively related to individual strains” (Beehr et al., 2003, p. 225). Having an efficient and effective workflow to complete work tasks is important in reducing stress at work. Within the nursing environment creating a favorable workflow can be challenging because it affects issues and roles present at different organizational levels (Cain & Haque, 2008). Participant D felt a recent organizational change was the reason for an increase in work tasks due to “higher expectations and standards” to meet desired organizational metrics, which resulted in a “less patient-focused and more task and doctor oriented” work environment. Data analytics in healthcare is used to measure organizational outcomes and improvements in nursing care at the individual level by looking at trends in various population or community groups (Salmond and Echevarria, 2017). Raising expectations and standards to achieve high-quality patient care is important; however, increasing organizational metrics to achieve these results may be inefficient. Increasing required organizational metrics may increase the number of job tasks nurses are required to complete. Nurses may have less time available due to the increase in organizational metric requirements, resulting in a decrease in the level of high-quality patient care. Participant C felt she “does not have enough time with patients” due to “increased paperwork”. “Lack of time” was also cited as a factor by study participants due to the “stress” caused by the increase in technical knowledge requirements needed to perform (what are now considered to be) routine job tasks, including the time it takes to complete them. Unnecessary variability in patient demand can cause stress in nurses (Litvak et al., 2005). Job stressors in ICU’s are known to be higher than in other departments (Mrayyan, 2009). Participant D noted that “patients who used to be in the Intensive Care Unit (ICU) years ago” are now located on her

floor (which is not ICU). These patients “require much more care and attention”, which is “stressful”. Participant D felt that it is "harder and harder to take on more complex patients" in conjunction with her normal day-to-day job requirements. Participant C defined her job as "challenging" and stated that “you need a wide range of skills to be able to accurately diagnose patients” which causes stress.

Research has shown a relationship between PSF’s and WRMD’s (Silva, Silva & Gontijo, 2017; Lang, Ochsmann, Kraus, & Lang, 2012). Although biomechanical factors may be a contributing factor, it is important to recognize other workplace stressors that may be associated in the development of WRMD’s to help reduce or eliminate them. Although this study used a convenience sample, associations were found between PSF’s and aches, pains, and discomfort identified by study participants in various body parts. Feedback from study participants was important to understand their viewpoints regarding their perceptions of the relationship between their experiences in the workplace relative to PSF’s and the development of potential WRMD’s from the aches, pain or discomfort they felt they experienced. Four out of five participants felt there was a relationship between the PSF’s and the aches, pain or discomfort they experienced within the last 12 months. Participant B felt that when she does “not have enough time” she is “not happy” and the result is “tension headaches and pain due to [the] stress”. Participant C felt that she experiences stress due to “work” and due to physical stress from “items” that can be heavier (e.g. hanging pagers, rovers/phones with heavy cases, mobile computers, equipment). Participant D felt that she has “increased stress in the neck and shoulders” and due physical “stressors of the job” such as “boosting a patient in bed or job transfers”. Participant E stated she “definitely feels” that she experiences “high emotional stressors” and “personally carries a lot of stress in the neck and shoulders” due to work. The first thing Participant E felt she notices “neck

tension” and then “immediately a headache” when she experiences stress at work. Participant E also felt it is noticeable to herself and others around her at home, that she is more “tired and crabby” when she experiences stress at work.

Study participants were also asked if they felt there were things that could be changed at their workplace that would help to reduce or eliminate the stressors (PSF’s) experienced at their jobs. Each participant’s feedback was unique to their occupational category. Participant A felt that there was “not really” much that could be done in her current role. She noted that there was a “Safety Department” available for ergonomic assessments when needed. Participant B felt that ergonomic improvements such as a “standing desk” would be beneficial. She also felt that having more balance is important and recognized that there are certain “organizational barriers” present that may cause difficulty in reducing stressors at work. Participant B also felt that additional staff would be beneficial to assist with excess clerical-type work and that it would “help take the load off”. Participant C felt that she it would be beneficial if her supervisor were more supportive, “engaged” and “more of a voice for the unit”. Participant D noted several items that she felt would help reduce or eliminate workplace stressors, such as organizational improvements to focus on patient-centered care versus a metric-driven work environment. Participant D also felt that paperwork requirements were excessive in many areas and caused an increase in stress. Participant D also felt that ergonomically she needs to use “good body mechanics and (safe-patient handling) equipment more when needed instead of take the shorter route...because it’s quicker and easier to move patients that way”. Participant E felt that “more support staff were provided, it would allow for regular staff to get their normal jobs done and see more patients where there is a real need for care”.

Conclusions

Results of the study are consistent with the hypothesis that there is a relationship between PSF's and WRMD's in hospital nurses in Wisconsin. Specifically, PSF's related to workload, resources (lack of staff), direct bullying and gender inequalities were found to be associated with neck and low back pain in study participants. There is consistent evidence within existing literature that has found a relationship between PSF's and WRMD's (Bernal et al., 2015; Lang, Ochsmann, Kraus, & Lang, 2012; Silva, Silva & Gontijo, 2017).

There were several workplace interventions that study participants felt could be made individually and by their employer to reduce PSF's and WRMD's in the workplace. Basic ergonomic principles of the use of "good body mechanics" on a more regular basis and "taking the time to use (safe-patient handling) equipment" were noted. The use of office ergonomic assessments and standing desks were also mentioned to reduce workplace stress. Improvement of organizational factors such as an increase in staffing to improve the distribution of workload would offer a two-fold improvement, as it could reduce the amount of excess clerical work and increase the ability for nursing staff to provide more patient-centric care to help to reduce stress. Training for new supervisors may also be helpful to improve employee engagement and productivity among nursing staff. Ensuring that the quality of on-the-job training is adequate for nursing staff could help to reduce stress, as well as the financial support to complete required training certifications. Addressing the existing issues of gender inequality for female nurses to ascend the organizational hierarchy through effective HR policy management would help to diversify the workplace and reduce stress. Effective HR policy management regarding acceptable use of mobile communication platforms and technologies at work to reduce the risk of online bullying would help to reduce stress. "Combining and integrating "person-focused" strategies

designed to build nurses' ability to manage stress at the individual level with "organization-focused" strategies that eliminate stressful working conditions is critical to the reduction and prevention of job stress among nursing professionals" (Roberts & Grubb, 2014, p. 62). Study results support the theory that reducing "organizational barriers" is an important factor when considering strategies to implement effective interventions to reduce PSF's and WRMD's.

Recommendations

The use of a more standard set of terms to define "psychosocial" factors for research purposes would be beneficial. There is a lack of consistency in existing literature regarding what are defined as "psychosocial" or "psychological" factors (Bernal et al., 2015; Lang, Ochsmann, Kraus, & Lang, 2012). Consistency in terminology and definition of these "psychosocial" factors would allow future researchers to group data more easily and accurately according to certain characteristics. This may improve consistency in results which could increase reliability within the study itself. The use of more reliable data can lead to a better determination of what strategies and interventions are most effective to reduce PSF's and WRMD's.

Future studies examining the relationship between psychosocial factors and WRMD's would benefit from the use of a larger sample size that would ensure that the results are representative of the entire population, which would increase the external validity of the study.

Future studies are also necessary to investigate the relationship between PSF's and WRMD's within similar organizational environments. Narrowing the scope of the occupational industry (e.g. healthcare vs. manufacturing) and specific jobs within industries (e.g. emergency room nurses vs. nurses' aides) would help develop a clearer framework for examining research problems and allow researchers to determine which strategies and interventions to reduce PSF's and WRMD's are the most meaningful within a specific trade or profession.

Due to the multifactorial nature of MSDs, future studies should evaluate the effectiveness of implementing various strategies to reduce the risk of PSF's and WRMD's in hospital nurses. Ergonomic and psychosocial factors are known to play a role in causing health issues in workers (González-Muñoz & Chaurand, 2015). All factors, including non-biomechanical factors should be considered, as work-related stressors may cause work-related injuries. Longitudinal studies should be performed using validated instruments to evaluate a number of strategies, including organizational and ergonomic interventions to determine their effectiveness in reducing workplace stressors such as PSFs.

Determining the best strategies and interventions to reduce PSFs and WRMDs is critical to improve stressful work conditions and may include the need for more than one approach. Although organizational-focused strategies are important, future research should examine the benefits of also using "person-focused" strategies (such as coping skills or the use of stress management techniques) that help employees manage stress at an individual level (Robert & Grubb, 2013). The use of coping strategies at an individual level may help employees accept their stressors and reduce the overall level of stress they experience (Shirey, 2006; Srinivasan & Samuel, 2014).

Specific to nursing populations, the use of the newest Nordic Musculoskeletal Questionnaire (NMQ-E2) would be beneficial to future studies to evaluate the relationship between PSF's and WMRD's. The NMQ-E2 was designed "to collect more information regarding musculoskeletal symptoms in all nine body regions and their work-relatedness, as an instrument...to gather evidence about the impact of fitness levels on occupational musculoskeletal disorders among nurses" (Pugh et al., 2015). The evidence gathered from the use of the NMQ-2 "conveniently measures musculoskeletal symptom severity enabling

proactive, preventative initiatives and better management of the associated risk of injury” which will provide a better understanding of the relationship between PSF’s and WRMD’s (Pugh et al., 2015).

Future research should also examine multiple factors that may have a relationship in the development or exacerbation of musculoskeletal pain to prevent work-related injuries such as WRMD’s and reduce the risk of costly workers’ compensation claims. Although compensability of workers’ compensation claims is determined by law, “establishing a date of injury is something that is open for negotiation by the statute” in Wisconsin and can ultimately have a significant impact on the cost of a claim (Mark Junio, personal communication, November 20, 2018). Musculoskeletal disorders in nurses...are a significant cost to healthcare providers and affected individuals” (Pugh, 2015). Individual risk factors may increase the likelihood of MSD’s and can cause significant challenges in determining compensability as a result can have a tremendous effect on the overall cost of the of workers’ compensation claims. Organizations have no control over individual risk factors. Researchers should examine the use of a diverse strategy that focuses on management of multiple risk factors that cause workplace stress (e.g. organizational, individual, psychosocial, biomechanical), which may prove to be a valuable investment to help prevent workers’ compensation injuries. “The effects of psychosocial work factors on new or recurrent injury risk appear to differ by previous injury experience, suggesting the need for differing preventive strategies in hospital workers” (Lee, You, Gillen, & Blanc, 2015, p.1141). The use of diverse, preventive strategies to manage the risk of workplace injuries is necessary through the fundamental understanding of the relationship of a variety of workplace stressors to prevent WRMD’s and costly workers’ compensation claims.

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