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Upper Extremity Orthopedic & Neurological Issues, An Exploratory Study Focusing On Protective & Preventative Strategies Using Practicing Occupational Therapists

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UPPER EXTREMITY ORTHOPEDIC & NEUROLOGICAL ISSUES, AN
EXPLORATORY STUDY FOCUSING ON PROTECTIVE & PREVENTATIVE
STRATEGIES USING PRACTICING OCCUPATIONAL THERAPISTS

by

Megan Klein, MOTS and Shaina Simonson, MOTS

Advisor: Janet Jedlicka, PhD, OTR/L, FAOTA

An Independent Study

Submitted to the Occupational Therapy Department of the

University of North Dakota

In partial fulfillment of the requirements

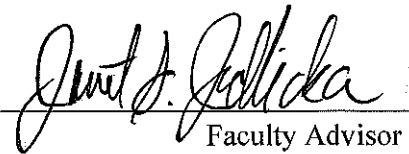
for the degree of

Master of Occupational Therapy

Grand Forks, North Dakota

May 9, 2020

This Independent Study, submitted by Megan Klein, MOTS and Shaina Simonson, MOTS in partial fulfillment of the requirement for the Degree of Master of Occupational Therapy from the University of North Dakota, has been read by the Faculty Advisor under whom the work has been done and is hereby approved.



Faculty Advisor

3-9-20

Date

PERMISSION

Title: Upper Extremity Orthopedic & Neurological Issues, An
Exploratory Study Focusing on Protective & Preventative Strategies Using
Practicing Occupational Therapists.

Department: Occupational Therapy

Degree : Master of Occupational Therapy

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Signature Megan Klein Date 2/27/2020

Signature Shana Snodson Date 2/26/2020

TABLE OF CONTENTS

LIST OF FIGURES.....	iv
LIST OF TABLES.....	vi
ACKNOWLEDGEMENTS.....	vii
ABSTRACT.....	viii
CHAPTERS	
I. INTRODUCTION.....	1
II. REVIEW OF LITERATURE.....	5
III. METHODOLOGY.....	15
IV. RESULTS.....	19
V. DISCUSSION OF FINDINGS.....	40
REFERENCES.....	45
APPENDICES.....	49
Appendix A.....	50
Appendix B.....	68
Appendix C.....	70
Appendix D.....	72

LIST OF FIGURES

Figure		Page
Figure 1	Prevalence of Certifications Among Practicing Occupational Therapists.....	20
Figure 2	Prevalence of Practice Settings Among Practicing Occupational Therapists.....	21
Figure 3	Number of Hours Working on Upper Extremities Among Practicing Occupational Therapists.....	22
Figure 4	Prevalence of Area of Pain/Discomfort Among Practicing Occupational Therapists.....	24
Figure 5	Pain level Associated with Injury Among Practicing Occupational Therapists.....	25
Figure 6	Symptoms Experienced Related to Injury.....	26
Figure 7	Perceived Level of Severity Due to Symptoms Related to Injury.....	27
Figure 8	Identified Causes of Symptoms and Pain Among Practicing Occupational Therapists.....	28
Figure 9	Treatment Methods that Aggravate Pain Among Practicing Occupational Therapists.....	29
Figure 10	Number of Occupational Therapists that Use Physical Agent Modalities (PAMs) to Alleviate Pain.....	31

Figure 11	Protective and Preventative Strategies Used by Practicing Occupational Therapists.....	32
Figure 12	Relationship Between Work and Injury Among Practicing Occupational Therapists.....	34
Figure 13	Association Between Work Setting and Experiencing Pain.....	37
Figure 14	Relationship Between Age, Years Experience, and Hours Working With Upper Extremity Injury and Pain Severity.....	38

LIST OF TABLES

Table		Page
Table 1	Frequency and Percentage of Patients Seen Per Day and Length of Treatment Sessions.....	22
Table 2	Frequency and Percentage Regarding the Length of Time Practicing and Total Hours Per Week Worked.....	23
Table 3	The Association Between Demographics and Work Setting to Pain.....	36
Table 4	The Relationship Between Demographics and Work Setting to the Average Level of Pain.....	39

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ABSTRACT

Upper Extremity Orthopedic & Neurological Issues, An Exploratory Study Focusing on Protective & Preventative Strategies Using Practicing Occupational Therapists.

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Purpose: The purpose of this study was to identify the frequencies of injuries, causes, and protective and preventative strategies for practicing occupational therapists when working with upper extremity injuries. There has been limited research pertaining specifically to work-related injuries among practicing occupational therapists in upper extremity rehabilitation has been done. For this study, researchers examined the prevalence of occupational injury, pain, risk factors, and prevention strategies among practicing upper extremity occupational therapists.

Methodology: An exploratory survey research design was implemented following approval from the University of North Dakota (UND) Institutional Review Board on August 14, 2019. Potential occupational therapists were contacted through the University of North Dakota Occupational Therapy Fieldwork Database maintained by the Occupational Therapy Department. The survey link was also posted on selected social media sites, and respondents were encouraged to forward the link to eligible upper extremity/hand therapy professionals. Survey questions pertained to demographics,

workplace, symptoms and pain, and methods used to alleviate upper extremity issues.

Following data collection, descriptive and inferential analyses of data were completed.

Results: Of the 40 respondents who comprised the final sample, 26 occupational therapists working with upper extremity injuries reported experiencing specific injuries or areas of pain/discomfort in their upper extremity when providing treatment. The most prominent area of pain/discomfort was found to be in the thumb. In addition, respondents who indicated working in a private outpatient setting had a significantly higher pain level on average while hospital outpatient settings had significantly lower pain level on average. The average pain level appeared to increase as age, years working, and hours worked per day increased; however, no significance was found among the three demographic categories due to a low number of respondents. Joint mobilization was reported to be the most common treatment method used by practicing upper extremity occupational therapists that aggravated their pain. Stretching was reported to be the most common preventative strategy used by 77.5% of respondents. The results also showed a strong correlation between how injury affects work and how work affects injury.

Conclusion: This study identified the prevalence of injuries and causes among practicing occupational therapists. Additionally, protective and preventative strategies used by practicing therapists that have been incorporated into practice to prevent injuries were reported. Results were consistent with the literature; however, continued research would be beneficial to identify specifically how preventative and protective strategies could be used and how work affects injury and how injury affects work.

Chapter I

Introduction

In 2017, the Bureau of Labor Statistics reported hospital workers have a high incidence of injury and illness (6.0 cases per 100 full-time workers) when compared to other employees working in manufacturing (3.5 cases per 100 full-time workers) and construction (3.1 cases per 100 full-time workers) (Dressner, 2017). The Department of Labor and Industry of Minnesota reported nearly 72% of the injuries reported by healthcare providers in hospitals were due to overexertion, with strains and sprains accounting for 52% of the injuries (Zaidman, 2018).

Healthcare is one of the fastest-growing industries worldwide. In the United States (U.S.) alone, healthcare employs 18 million people (Abdulmoughni et al., 2019). As the rate of healthcare employment increases, the rate of work-related injuries will also increase (Abdulmoughni et al., 2019). Work-related injuries are frequently under-reported by healthcare professionals. This may be related to individuals not perceiving them as chronic or severe. The purpose of this independent study is to explore the incidence of work-related injuries among occupational therapists practicing in the area of upper extremity rehabilitation and hand therapy. There is little current evidence that focuses on work-related injuries in the profession of occupational therapy.

The researchers were inspired to pursue this independent study based on a previous study conducted in Australia (Caragianis, 2002). Caragianis (2002) surveyed

Australian therapists and found that 75% of 148 reported injuries were considered work-related by the 73 participants involved in the study. The researchers were unable to find any specific information for occupational therapists practicing in the United States.

Based on a literature review, the researchers developed a survey designed to focus on the prevalence of orthopedic and neurological work-related issues among occupational therapy practitioners practicing specifically in upper extremity rehabilitation. Based on the responses from participants, data was analyzed using a Statistical Package for Social Sciences (SPSS) program. The quantitative data collected from the surveys were gathered and analyzed using descriptive and inferential statistical measures.

Theoretical Framework

The two primary theoretical frameworks used to guide the development of the survey included the Biomechanical Frame of Reference and Person-Environment-Occupation (PEO) Model. The Biomechanical Frame of Reference focuses on the core mechanics and posture of the human body. This frame of reference is fundamental to the work of upper extremity and hand anatomy, physiology, and kinesiology aspects of occupational therapy (Radomski & Trombly-Latham, 2014). Interventions for this targeted population generally includes manual therapy, joint mobilization, splinting, and massage. The participants in this study responded to a survey pertaining to the daily movements of the practitioners' joints and their postural positioning while completing upper extremity interventions.

The PEO model narrows in on the relationships between person, environment, and occupation (Hinjosa, Kramer, & Royeen, 2017). This model identifies these three key components of the participant responses, which assists with indicating the most

prominent setting and cause of work-related injuries in upper extremity rehabilitation practices. Often occupational therapists working with clients who sustained upper extremity injuries are assisting with rehabilitation so the individual is able to functionally participate in meaningful occupations that may have been hindered or lost.

Statement of the Problem

Occupational therapy is focused on helping clients; therapists may neglect their own well-being while providing therapeutic services. In exploring literature it became apparent that there is a need for more information/research regarding the prevalence of injury and strategies for prevention of injury for therapists working in upper extremity rehabilitation. Literature regarding hand therapy, upper extremity rehabilitation, and best practice were reviewed. Only one article (Caragianis, 2002) specifically focused on work-related injuries of occupational therapists practicing in upper extremity rehabilitation. The researchers wanted to identify the frequency of upper extremity injuries, causes, and strategies used to protect occupational therapists when working within this population.

Assumption

It was anticipated that participants would provide honest and genuine responses when completing the survey. The researchers also assumed participants would forward the email to colleagues practicing in upper extremity rehabilitation.

Scope and Delimitation

Researchers created a survey for occupational therapists practicing primarily in upper extremity rehabilitation and hand therapy. Approval from the University of North Dakota Institutional Review Board was obtained. Participants that chose to complete the

survey had a 3-week period to do so. Informed consent was integrated into this process, presenting as the first question of the survey. The survey consisted of 32 questions. The survey was anonymous. The researchers did not request specific information on educational background or regional location. The online survey was sent to potential participants through email and also posted on social media sites, completion depended on internet access.

Importance of the Study

The preventative and protective strategies used by occupational therapists practicing in upper extremity rehabilitation settings were the key focus of this study. Chronic and acute musculoskeletal and neurological conditions occur among the healthcare professional population, and oftentimes these instances are a result of work-related practices. There is current research pertaining to the occurrence of work-related injuries for other healthcare disciplines such as nursing, massage therapy, and physical therapy (Anderson, 2018; Campo & Darragh, 2010; Gyer, Michael, & Inklebarger, 2018; Nordin, Leonard, & Thye, 2011; Rossettini, Rondoni, Schiavetti, Tezza, & Testa, 2015; Yao et al., 2019). However, there is limited literature regarding work-related injuries among practicing upper extremity occupational therapists.

Chapter II provides a more thorough and in-depth review of existing literature. It addresses existing research regarding the need for protective and preventative strategies for healthcare professionals and supports working with upper extremities.

Chapter II

Literature Review

Chapter II provides a literature review of published literature pertaining to occupational therapy and other healthcare professionals practicing in upper extremity rehabilitation and hand therapy. This review focuses on hand therapy, upper extremity rehabilitation, prevention and wellness, risks, and prevalence of conditions among upper extremity and hand therapists. It concludes with information on workman's compensation issues.

Hand Therapy and Upper Extremity Therapists

In 1989, the Hand Therapy Certification Commission (HTCC) created a voluntary certification program for occupational therapists and physical therapists to specialize in hand rehabilitation (Keller et al., 2016). Becoming a certified hand therapist (CHT) requires a minimum of three to five years of clinical practice consisting of a minimum of 4,000 hours directly in hand therapy. In addition, individuals must pass a certification exam. In order for CHTs to remain competent in hand therapy practice, a therapist is required to recertify every five years (Keller et al., 2016).

Short et al. (2018) defined this advanced level of clinical practice as *“the art and science of rehabilitation of the upper limb, which includes the hand, wrist, elbow and shoulder girdle. It is a merging of occupational and physical therapy theory and practice that combines comprehensive knowledge of the structure of the upper limb with function*

and activity. Using specialized skills in assessment, planning, and treatment, hand therapists provide therapeutic interventions to prevent dysfunction, restore function and/or reverse the progression of pathology of the upper limb in order to enhance an individual's ability to execute tasks and to participate fully in life situations” (p. 1). The current CHT population is 85%, occupational therapists. Additionally, 7% of occupational therapists/CHTs are younger than 35 years old while on the other end of the spectrum 25% will likely retire within the next 10 years (Short et al., 2018). Becoming a CHT requires high competency and knowledge of upper extremity anatomy, physiology, and kinesiology, especially of course of the hand (Short et al., 2018).

There are additional certifications an occupational therapist can pursue while in practice that are useful in physical disability settings. The most common including physical agent modalities (PAMs), certified lymphedema therapist, functional tone management arm training, and instrument-assisted soft tissue mobilization (American Journal of Occupational Therapy, 2012; Cheatham, Lee, Cain, & Baker, 2016; Pendleton & Schultz-Krohn, 2013; Radomski & Trombly-Latham, 2014). The American Journal of Occupational Therapy (2012) describes PAMs as tools that assist with preparation for purposeful and occupation-based tasks and activities. PAMs are devices that assist individuals with musculoskeletal, neurological, or skin conditions/disorders that primarily improves their occupational performance and function (American Journal of Occupational Therapy, 2012). A certified lymphedema therapist may provide manual lymph drainage, compression therapy, or wound care to reduce the swelling and control pain (Radomski & Trombly-Latham, 2014). Therapists can also provide functional tone management (FTM) arm training programs to address weakness using a SAEBO orthosis.

This may improve functional grasp and release for clients with neurological issues. (Pendleton & Schultz-Krohn, 2013). A therapist may also become certified in providing instrument-assisted soft tissue mobilization, including the use of specific instruments to decrease pain and increase range of motion within the tissue (Cheatham et al., 2016).

Common Interventions

Prevention and Wellness

Occupational therapists are trained and educated on how to specifically provide treatment to patients with upper extremity injuries to reduce and prevent injuries. Similar preventative strategies should be taken as a practicing therapist when experiencing work-related injuries. Caragianis (2002) found that 99% of hand therapists recommended improved ergonomic work-station design, better equipment in the work setting, correct posture, and correct body mechanics as possible preventative strategies.

Careful attention should be taken in setting up work environments specifically focusing on modifications to work techniques incorporated to prevent or reduce the factors associated with an injury. A simple modification may include alternative activities such as using the non-affected hand and good techniques from the start to avoid and protect the affected hand from overuse and aggravating factors (Caragianis, 2002; Gyer et al., 2018). In addition, Caragianis (2002) found that altering the frequency of manual therapy, avoiding uncomfortable positions, improving the use of body mechanics, and performing stretching and muscle relaxation exercises were strategies that could be implemented to avoid injuries among practicing hand therapists. In a systematic review completed by Gyer et al. (2018) it was found that common preventative strategies used by physical therapists and other health professionals were to use the ulnar border of their

hand, reinforcing hands/thumbs with splints or tape, avoiding stressful positions, and changing position while providing therapy. These authors also recommended taking regular rest breaks, avoiding excessive workload, and reducing patient contact hours to help reduce the risk of injury (Gyer et al., 2018).

The workplace environment contributes to physical and psychological risk factors. Workplace preventative strategies include using manual lift devices, raising beds or work-stations to an appropriate height, use of aids when needed, rest breaks between treatments, and attempting to reduce each therapists schedule of patients requiring manual therapy (Caragianis, 2002; Gyer et al., 2018; Rossettini et al., 2015). Rossettini et al. (2015) recommended providing awareness about work-related pain by introducing pre- and post-graduation trainings, that primarily focused on the appropriate practice of manual techniques. In addition to providing additional training to practitioners, Alnaser (2015) and Darragh, Campo, and King (2012) recommended prevention and wellness programs to reduce occupational injuries and in return increase productivity, improve quality of care, and the overall cost of injuries. Recommended programs included safe patient handling and movement prevention in regards to reducing work-related injuries within the workplace. Programs would need to be targeted toward specific practice settings and patient populations in order to effectively address the risks (Alnaser, 2015; Darragh et al., 2012).

Limited research is found on specific tools that could be used in prevention for practicing healthcare providers; however, Gyer et al. (2018) found that the instrument-assisted soft tissue mobilization (IASTM) may be an effective tool to use when providing soft tissue therapy but further research is needed on the effectiveness of it. IASTM is a

soft tissue treatment that can be used on tendons, muscles, and fascia to reduce pain (Kim, Jun Sung, & Lee, 2017). It is an instrumental tool used to provide a deep penetration to improve function and range of motion (Cheatham et al., 2016).

Anderson (2018) focused primarily on the body mechanics of massage therapists. The basic information regarding body mechanics when practicing forceful and manual treatment is relevant to occupational therapy practice (Anderson, 2018). This includes: avoiding movement beyond perpendicular angles, the use of supporting tools, keeping joints in straight alignment, and proper postural stances (Anderson, 2018).

Risks and Prevalence of Conditions Among Upper Extremity/ Hand Therapists

The importance of adequate upper extremity function is essential to engage in meaningful occupations. Occupational therapists focus on reducing any debilitating conditions that pose a barrier to participating in meaningful occupations. When working in a physical disability setting, occupational therapists often treat patients who are having difficulty with upper extremities. There is an abundance of research conducted that focuses on the most effective interventions for treating different physical disabilities (Alnaser, 2015; Anderson, 2018; Anyfantis & Biska, 2017; Caragianis, 2002; Darragh et al., 2012; Gyer et al., 2018; Rossettini et al., 2015). However, the workload and impact these specific treatments and interventions have on practitioners can easily go unnoticed.

Darragh et al. (2012) and Nordin et al. (2011) found the leading cause of chronic pain and physical disability is work-related musculoskeletal upper extremity conditions. Nordin et al. (2011) considered factors such as gender, body mass index, clinical placements, and years of experience among the sample of physiotherapists working in Malaysia (Nordin et al., 2011). The research findings indicate the lifetime prevalence of

upper extremity conditions is reported to range between 40% to 91% for physiotherapists. Additionally, 12-month prevalence of upper extremity conditions is reported to range between 58% to 91% (Nordin et al., 2011). The research identified hands, wrists, upper and lower back, and neck as the most common areas affected after practicing manual and/or extensive hands-on treatment for long periods of time (Nordin et al., 2011). This is in contrast to the findings of Anyfantis and Biska (2017) that indicated that 45.5% of work-related injuries were primarily found to occur in the shoulder.

Alnaser (2015) studied upper extremity conditions in occupational therapy practitioners. Over a 12-month period, muscle strain (52%) and lower back pain (32%) were considered to be the most prevalent body parts injured within the sample (Alnaser, 2015). The most common injuries occupational therapists experienced included symptoms associated with the wrist and hand (Darragh et al., 2012 & Nazari, Hossaini Mahjoob, Tapak, & Mortazavi, 2017). Therapists who are required to intensely use their upper extremities to provide efficient services to clients can face the potential of developing a work-related injury. Therapists working in upper extremity and hand therapy are especially prone to work-related injuries and conditions such as arthritis and cumulative trauma disorders due to repetitive fine motor activities.

Manual therapy is considered to be strongly associated with injury among practicing occupational therapists (Anyfantis & Biska, 2017; Darragh et al., 2012). Darragh et al. (2012) collected data from occupational therapy and physical therapy practice areas and found manual therapy and transfers/lifts to account for 54% of the work-related injuries across all practice settings. Therapists indicated that repetitive

motion, force, and sustained postures contributed to wrist and hand injuries when providing manual therapy treatment (Darragh et al., 2012).

Occupational therapists are at risk for developing work-related injuries. Risk factors include poor work posture, mobilization, splint fabrication, and excess workload (Caraginis, 2002). In addition, Darragh et al. (2012) concluded that other activities such as increased force, repetitive motion, and fatigue contributed to injury. Cumulative trauma injuries account for 77.9% of the manual therapy injuries (Darragh et al, 2012). Manual therapy techniques, repetitive workloads, treating multiple patients on a daily basis, working while injured, weakness of the thumb muscles, hypermobility, and instability of the thumb joints also puts therapy professionals at risk (Gyer et al., 2018). Manual therapy technique is considered to contribute to upper extremity injuries specifically in the thumb among younger physical therapists due to less experience in knowing the proper force or position of hands and fingers while providing manual therapy treatment (Rossettini et al., 2015).

Psychological issues may also contribute to the development of work-related injuries. Alnaser (2015) found major psychological factors included high job demands, continuing to work despite pain or not fully recovering due to financial issues, fear of stigma from co-workers, fear of job loss, and to avoid being perceived as incompetent. Rossettini et al. (2015) found that not meeting patients' expectations in a timely manner could lead patients to seek another healthcare professional, consequently leading to financial loss.

According to the Bureau of Labor Statistics (2019) employment for occupational therapists is expected to increase 24% by 2026, this could result in an increased number

of therapists at risk for developing an upper extremity or neurological issue if preventative measures and adaptive equipment needs are not implemented. Additionally, experience is associated with fewer injuries and loss of work. Alnaser (2015) found inexperienced occupational therapy assistants were at a greater risk for injury and needed additional training to prevent occupational injuries. Similarly, Rossettini et al. (2015) found 60% of physical therapists who had between 6 to 20 years of experience were less likely to develop thumb injuries or pain when compared to others who had worked for less than 5 years (Rossettini et al., 2015). Anyfantis and Biska (2017) indicated that work-related injuries are significantly less frequent among therapists age 50 and above compared to therapists who are 30 years old or younger. The results of Anyfantis and Biska's (2017) research study concluded that 5% of work-related injuries occur within the first 5 years of practice; however, the symptoms gradually increase the longer a therapist has worked. There were no significant differences between men and women regarding upper extremity injuries (Anyfantis & Biska, 2017).

Activities associated with injury are specific to practice settings. Darragh et al. (2012) found different response rates among practice areas for outpatient, pediatrics, acute care/inpatient, skilled nursing facility, and home care. Among the therapists working in outpatient settings, 71.1% of respondents identified manual therapy contributing to injury. For therapists working in pediatrics (26.8%), acute/care/inpatient rehabilitation (52.7%) and skilled nursing (41.7%), indicated transfers and lifting to be the most common activity related to injury (Darragh et al., 2012). As for home health care, 29.4% of respondents reported strain/sprains to the shoulder when carrying equipment and supplies within the home (Darragh et al., 2012). Similarly, Nordin et al.

(2011) reported the prevalence of upper extremity conditions based on the clinical settings of the therapists. It was discovered that 31% of upper extremity conditions occurred in outpatient settings, 14% occurred in neurological rehabilitation, and 12% occurred in elderly care facilities.

Workman's Compensation

Workman's compensation for healthcare work-related injuries accounts for \$7.4 billion in the U.S. alone (Bureau of Labor Statistics, 2019). A recent study conducted by Abdulmoughni et al. (2019) discovered that hospitals in the U.S. recorded 253,700 work-related injuries. This results in a rate of 6.8 work-related injuries and illnesses for every 100 full-time employees for the year 2011 (Abdulmoughni et al., 2019). Additional statistics found 248,100 occupation-based injuries and illnesses in 2012, which contributed to approximately 58,000 people missing work (Abdulmoughni et al., 2019).

Absences due to work-related injuries pose additional challenges for healthcare workers. Like most careers, one individual's work is connected to another's. If an occupational therapist is absent for a long period of time, their clientele still need services. Though many facilities may hire a part-time occupational therapist to take over while an employee is absent; in many cases, fellow occupational therapy colleagues have to assume the caseload of their injured coworker, while also tending to their current clientele. In such cases, occupational therapists can potentially overload their bodies which can cause a chain-reaction of work-related injuries (Abdulmoughni et al., 2019).

Summary

Chapter II presented a review of the literature addressing hand therapy certification and issues involved in providing upper extremity rehabilitation and common intervention strategies performed. In addition, a review of literature pertaining to preventative strategies, the prevalence of injuries in healthcare professionals, and workman compensation issues were described. It is essential for occupational therapists to practice self-care and be aware of their own occupational engagement, performance, and function. The aim of this study is to identify the incidence of upper extremity orthopedic and neurological issues and describe the preventative and protective strategies implemented by practicing occupational therapists. Chapter III describes the methodology used for the development and implementation of this research study.

Chapter III

Methodology

Both researchers are interested in practicing in physical rehabilitation, specifically upper extremity/hand therapy. In exploring literature it became apparent to the researchers that there is a need for more information regarding prevention in therapists working in upper extremity rehabilitation. The researchers are also interested in work-related injuries among practicing upper extremity therapists and preventative and protective strategies that could be incorporated into practice.

Literature Review

Researchers completed a thorough review of literature pertaining to upper extremity orthopedic and neurological issues. Protective and preventive strategies among practicing occupational therapists were also researched. Databases were accessed through the University of North Dakota's library system including CINAHL and PubMed. Search terms used included: *work-related injuries*, *occupational therapy*, *health professionals*, *upper extremity injuries*, *prevalence*, *risks*, and *occupational injuries*. Terms were used in various combinations to expand the search on available literature.

Target Population

The target population met the following inclusion criteria: (1) occupational therapist practitioners and occupational therapy assistants, (2) provide upper extremity rehabilitation or certified hand therapist, and (3) therapists working in the practice area of

rehabilitation and physical disability as their primary practice area. Exclusion criteria included: (1) therapists working in mental health, pediatrics or another practice setting.

Recruitment of Participants

The researchers and the advisor reached out to potential survey respondents through the University of North Dakota Occupational Therapy Fieldwork Database. The database was used to send out the study information to health care facilities in the upper Midwest that had practicing occupational therapists and occupational therapy assistants employed at their facility. Respondents were encouraged to forward the Qualtrics link to eligible employees or additional upper extremity/hand therapy professionals. An announcement requesting participation was posted to the UND Alumni Facebook pages and OT4OT Facebook sites. In addition, emails were sent to hand therapists known by the researchers requesting participants to complete the survey. All potential respondents were provided the URL to access the survey, which increased ease of accessibility. There were a total of 40 surveys completed.

Ethical Considerations

The University of North Dakota's Institutional Review Board (IRB) approved this study on August 14, 2019 (case number: IRB-201908-032). Appendix B provides a copy of the official IRB approval letter. Once a respondent clicked the link, he or she was required to read through the informed consent statement for the intended study. The informed consent was included as the first screen of the online survey. It explained the purpose of the study, the procedures to follow, the potential risk of participation. By selecting "Agree" participants were consenting participation in the online survey. Refer to Appendix A to view informed consent. No personal information was collected.

Research Design

The researchers used a survey design to collect data from occupational therapists practicing primarily in upper extremity/hand therapy. The research design was exploratory in nature and was comprised of an online survey for data collection. The goal was to understand issues related to workplace injuries and prevention and protective strategies.

Instrumentation and Data Collection

A survey was developed based on a literature review and key areas identified. We developed questions that pertained to occupational therapists and occupational therapy assistants practicing in upper extremity rehabilitation in order to gain an understanding of perceptions and experiences of the relationship between work-related injuries and strategies implemented to protect themselves. The survey was critiqued by a certified hand therapy occupational therapist and an experienced research methodologist. Following revisions, the survey was sent to two CHT's to review for face validity; and modifications were made to the survey. The complete survey is located in Appendix A.

The survey was developed using the University of North Dakota's Qualtrics program. This online system is a secure program and all respondents were required to consent to partake in this research study. Respondents used any device of their choice to access the Internet to complete the online survey (i.e. computer, I-pad, mobile device, etc.). Completion of the survey was done in an online format from a location and time that was convenient for the respondent. Data collection began on September 5, 2019, and concluded on September 30, 2019. All data was reported in aggregate form only.

Data Analysis and Findings

Prior to the completion of data analysis, a statistician exported and organized the survey data from Qualtrics. The statistician then transferred all data collected to an SPSS program. A total of 44 respondents participated in the survey; however, four of the surveys were incomplete. The four incomplete surveys were not included in the data analysis, resulting in a total of 40 respondents to comprise the total sample. The results of the data analysis are provided in Chapter IV.

Chapter IV

Data Analysis

Chapter IV provides the descriptive and inferential data analyses of the survey results. Some of the survey questions were not answered by all 40 respondents, which led to missing data in portions of the study. This may have been due to the skip logic associated with portions of the survey. Refer to Appendix C to see a full list of research questions.

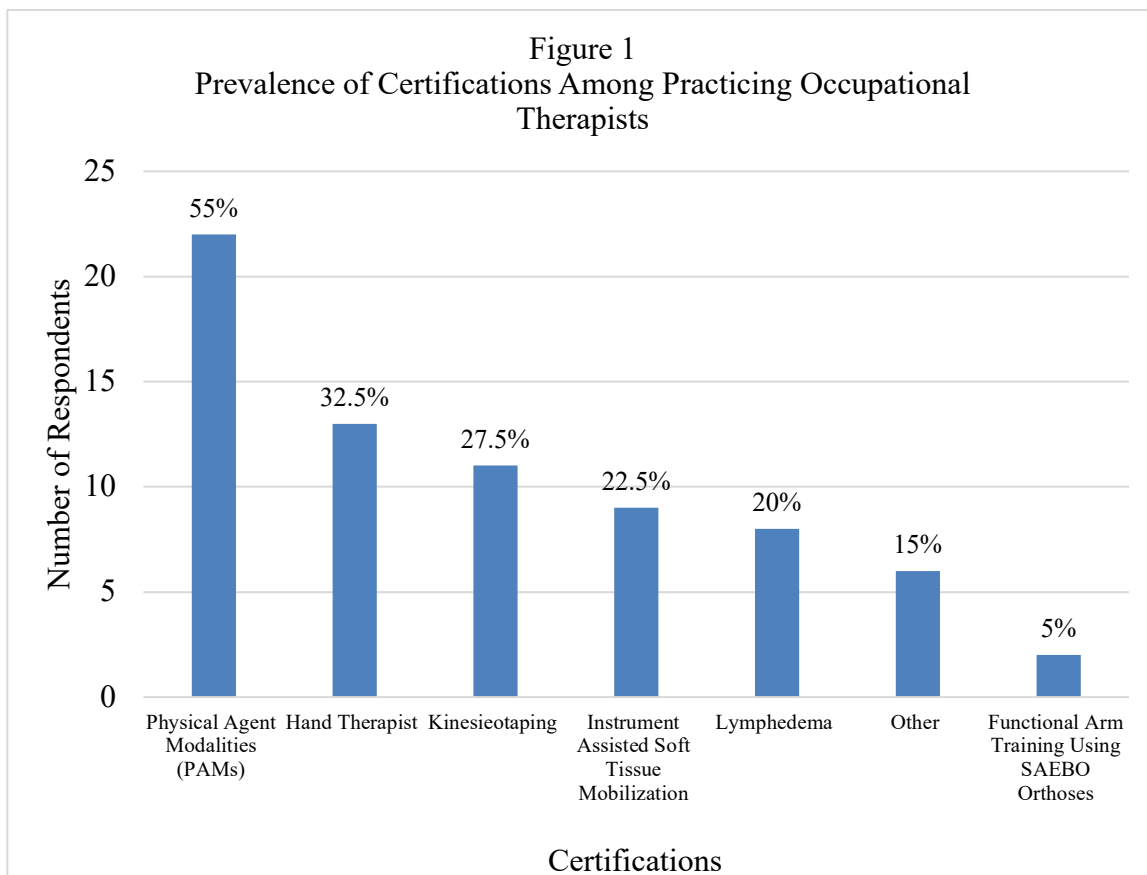
Descriptive Analysis

Demographics

Forty respondents comprised the final study sample. Total female respondents were 37 (92.5%) and total male respondents were 3 (7.5%). The results revealed that the highest age range of respondents included ages 46-52 years old (25%), followed by 39-45 years old (22.5%), 60-66 years old (10%), 18-24 years old (7.5%), 32-38 (7.5%), and 53-59 (5%) years old.

Respondents were asked to select all certifications they may hold. Prevalence of certifications are shown in Figure 1. Six options were provided in the survey with an additional text box for participants to add additional certifications. Individuals selected between one and four certifications, with the majority selecting one certification. The most common certification respondents reported to have included physical agent modalities (PAMs) (55%). The second most frequent certification obtained included hand therapy (32.5%). Neuro-developmental treatment was one response option that was not

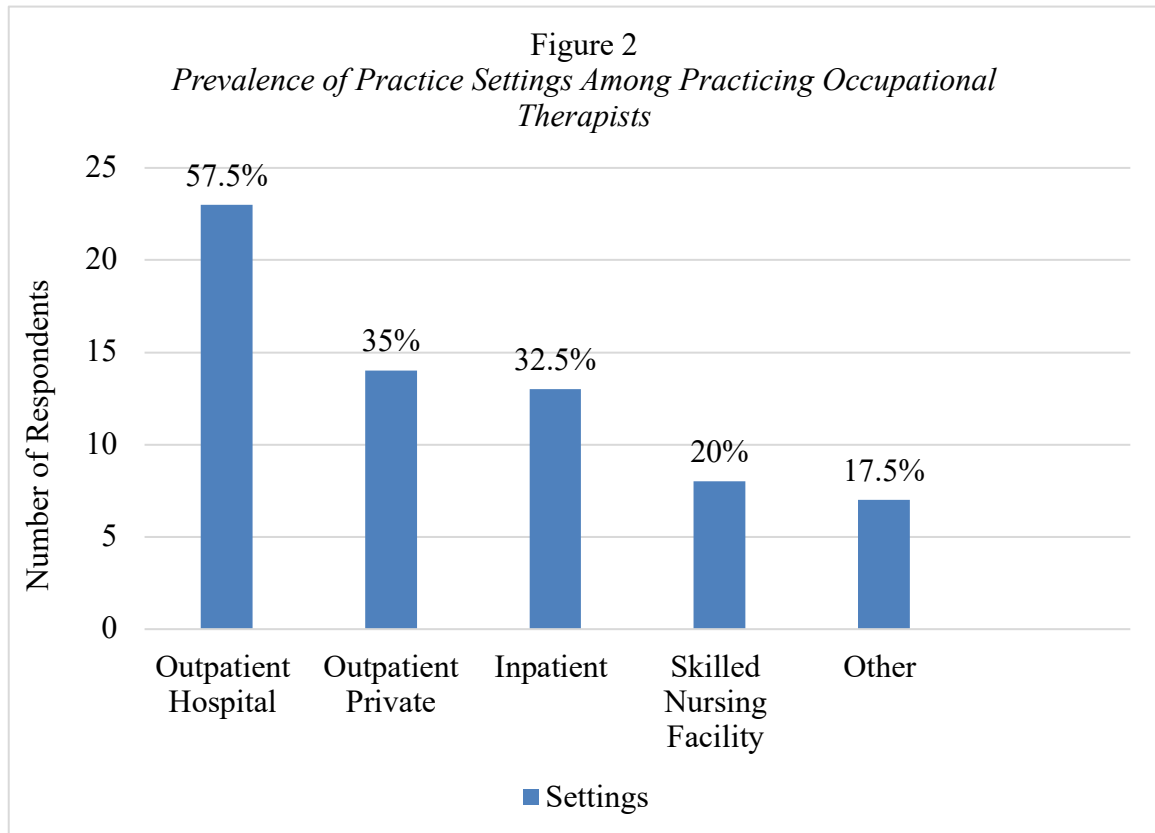
selected by any of the respondents. Respondents that selected “other” were provided a textbox to indicate additional certifications. The other certifications included: dry needling, functional capacity evaluation (FCE) and ergonomics, Lee Silverman Voice Treatment (LSVT BIG), and yoga instructing.



Workplace

Figure 2 represents the prevalence of practice settings among practicing occupational therapists. Respondents were provided with the opportunity to select all that apply. One practice setting was selected by 2/3 (62.5%) of respondents with one respondent selecting up to three different practice settings. Over half of respondents (57.5%) reported to practice in hospital-based outpatient settings. An additional 35% of respondents reported to practice in private outpatient clinics. No respondents reported

practicing in a school setting. Respondents that selected “other” were provided a textbox to indicate what setting they practice in. The other settings respondents reported included: academia, assisted-living facilities, and home health.



Among these settings, 32.5% of the total respondents reported seeing three or fewer patients with upper extremity/hand injuries each day. Table 1 represents both the frequency and percentage of patients seen per day and length of treatment sessions. A total of 20% of respondents reported seeing four to six patients with upper extremity/hand injuries each day. On average, the length of treatment sessions reported by over half of the respondents (51.3%) was 45 minutes.

Table 1

Frequency and Percentage of Patients Seen Per Day and Length of Treatment Sessions

Patients seen per day	N	%	Length of treatment sessions	N	%
<3	13	32.5%	30 minutes	10	33.3%
4-6	8	20.0%	45 minutes	16	51.3%
7-9	10	25.0%	60 minutes	15	15.4%
10+	9	22.5%			

An estimated hours per day working on upper extremity injuries was created from the number of patients and the length of treatment sessions, which is represented in Figure 3. About half of the respondents were found to work on upper extremity injuries less than 4 hours a day while the other half of respondents worked more than 4 hours per day on upper extremities. An estimated 20% of the respondents worked approximately 6 or more hours per day providing upper extremity treatment.

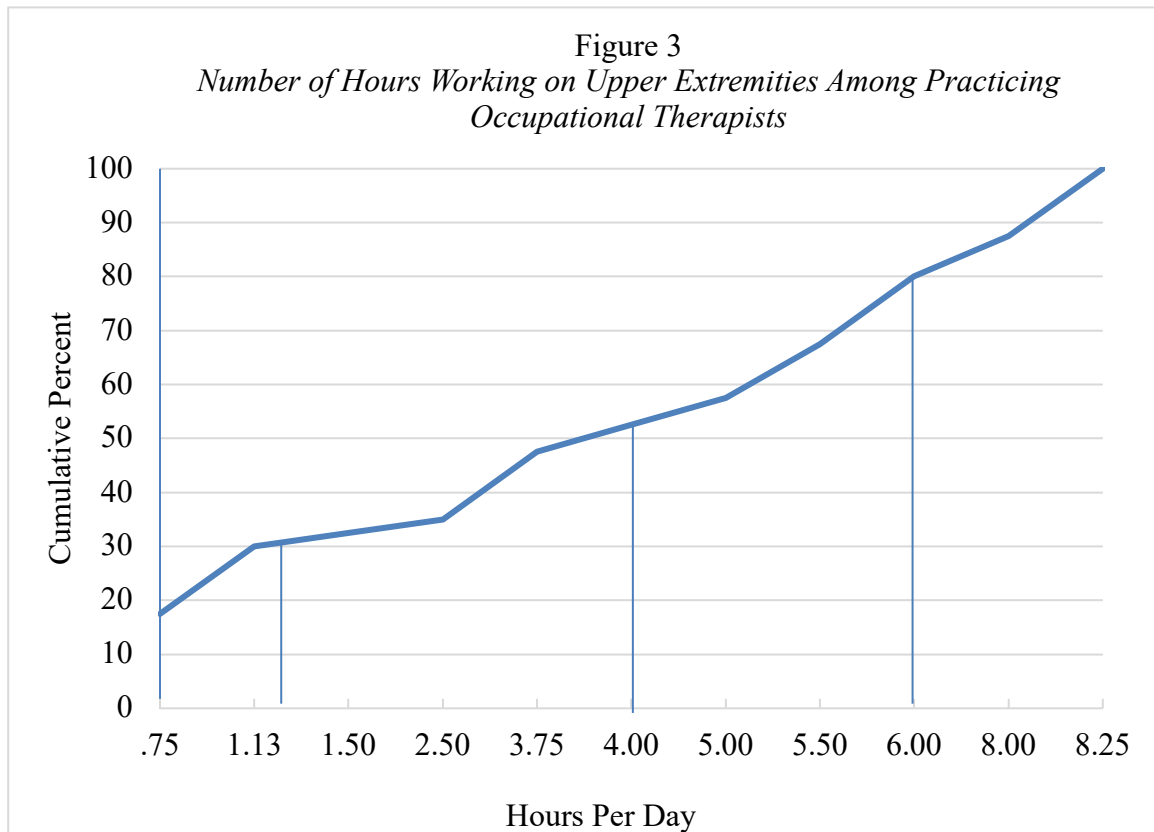


Table 2
Frequency and Percentage of Regarding the Length of Time Practicing and Total Hours Per Week Worked

Length of time practicing as an occupational therapist	N	%	Hours per week worked	N	%
<10 years	14	35%	<10	1	2.5%
10-24 years	15	37.5%	10-20	1	2.5%
25+ years	11	27.5%	21-30	2	5.0%
			31-40	27	67.5%
			>40	9	22.5%

As shown above, Table 2 represents the frequency and percentage regarding the length of time practicing as well as the total hours per week worked for all respondents. The majority (67.5%) of the respondents reported working 31-40 per week. Only 9 practicing occupational therapists reported working more than 40 hours per week. With well over half of the total respondents practicing full-time, the expectancy for work-related injuries increases. The average number of years practicing was approximately 17 years ($M=16.985$ $SD= 11.426$), ranging from less than one year of practice to 40 years. The researchers grouped the responses into 3 different categories of length of time practicing. 35% of respondents indicated being a licensed occupational therapist for less than 10 years, 37.5% for 10-24 years, and 27.5% for 25 or more years. There were 2 respondents that reported they have been practicing occupational therapists for 40 years.

Symptoms and Pain

All 40 individuals reported areas of pain and/or discomfort as shown in Figure 4. Respondents were asked to check all that apply for this survey question. The most prominent area of pain/discomfort reported was in the thumb (37.5%). The least common area of pain/discomfort reported by respondents was in the forearm (2.5%). Respondents

were given an additional response option “please list any specific injuries” and were provided a textbox to provide additional information. Reported conditions included: carpal tunnel syndrome, carpometacarpal osteoarthritis, lateral epicondylitis, and carpometacarpal pain.

Of the total respondents that participated in the initial questions of the survey, 26 (65%) reported that they experienced specific injuries or areas of pain/discomfort in their upper extremity when providing treatment, while 35% (n=14) reported they did not. A maximum of five different areas of pain/discomfort were selected were selected among the respondents, with one area being the most common selected (22.5%). Of the 26 respondents reporting an injury, they also rated their pain level using a ten-point sliding scale.

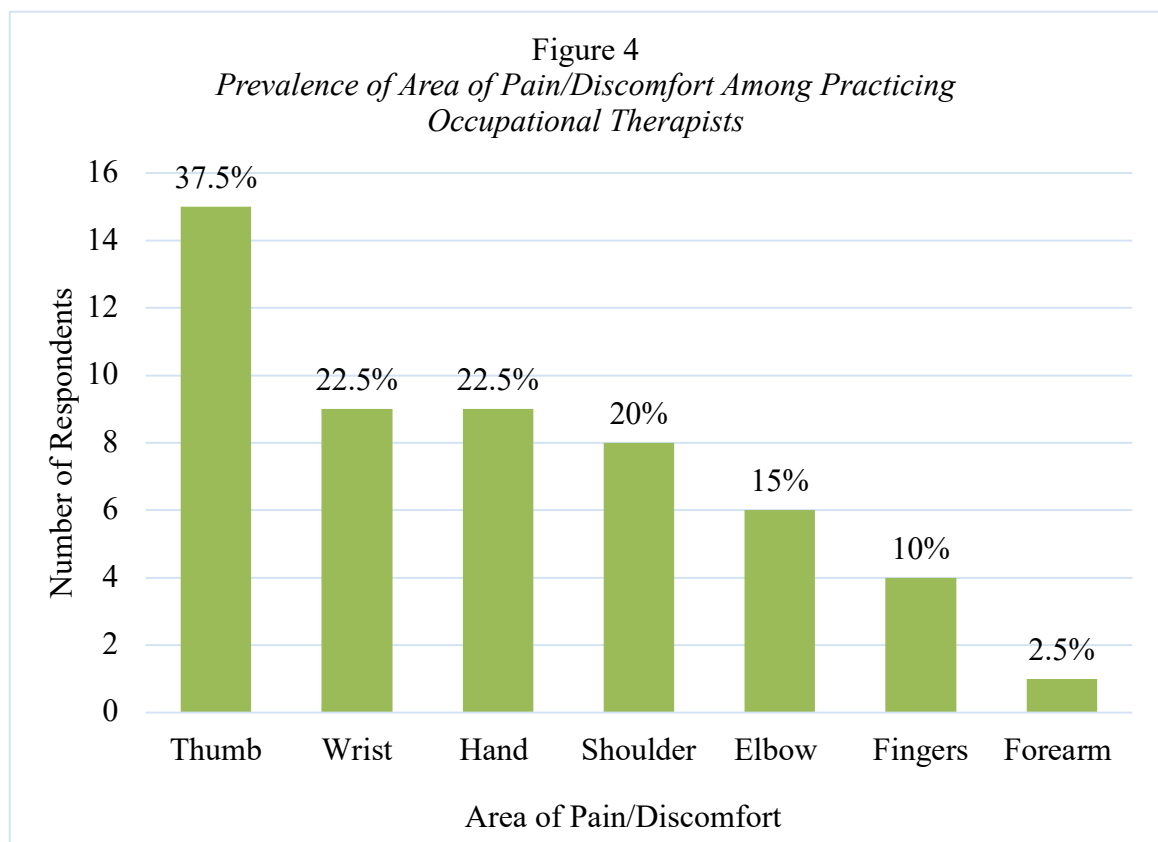
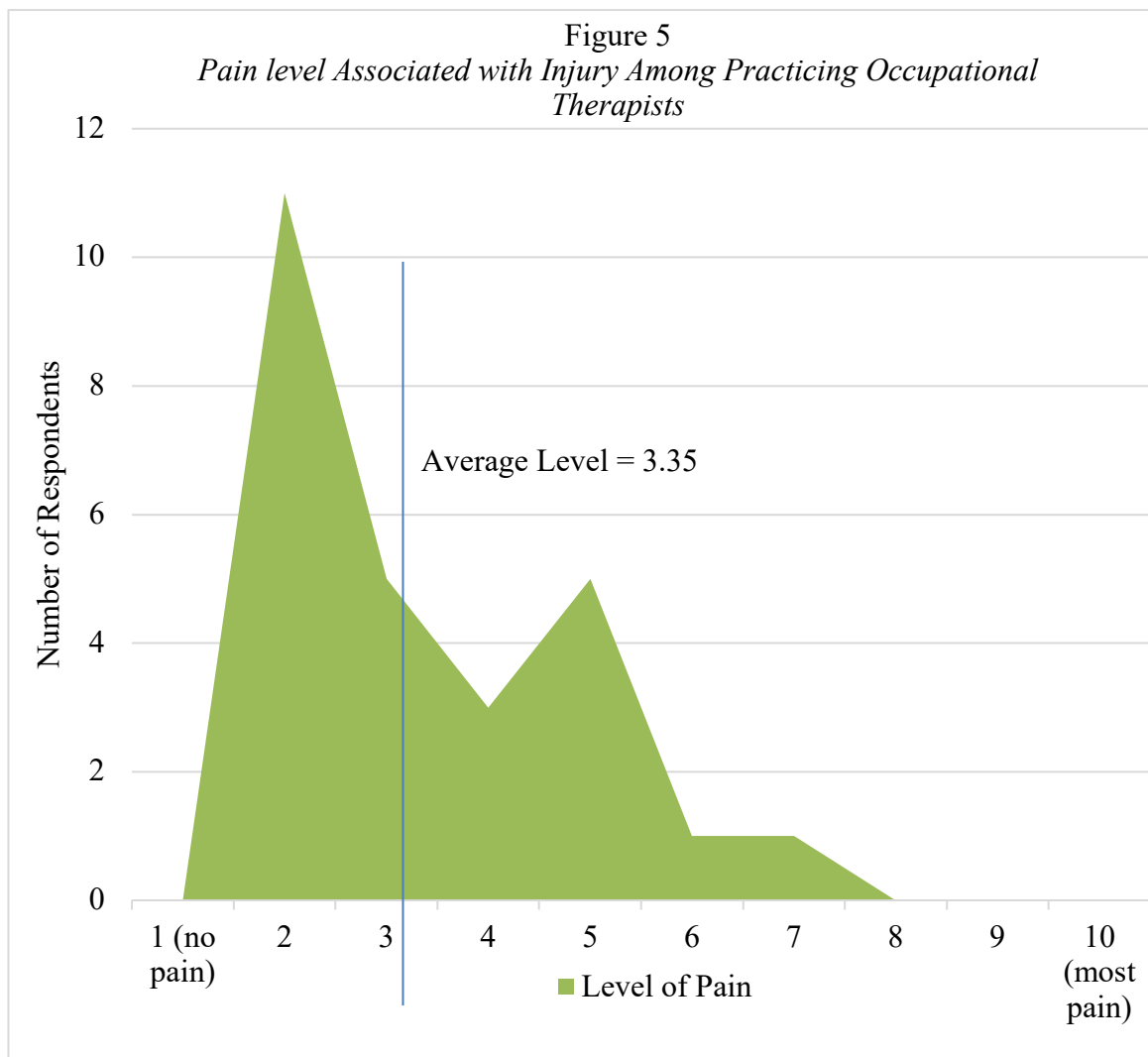
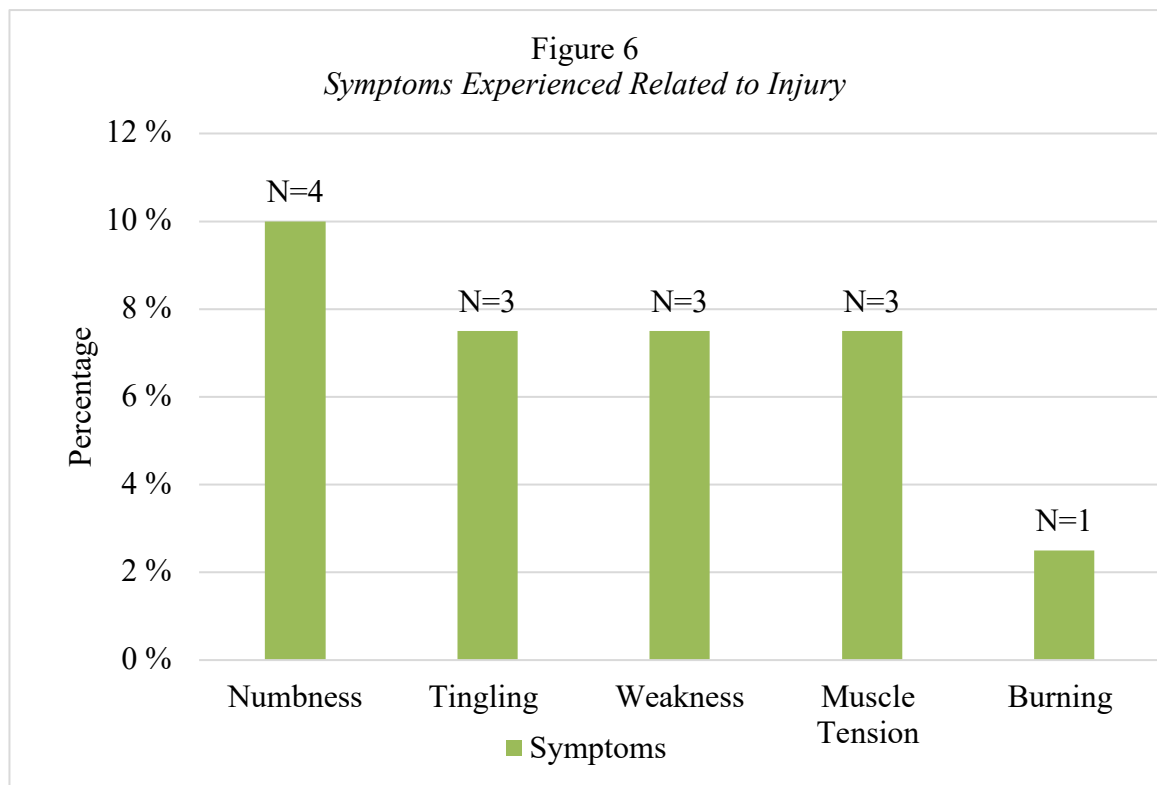


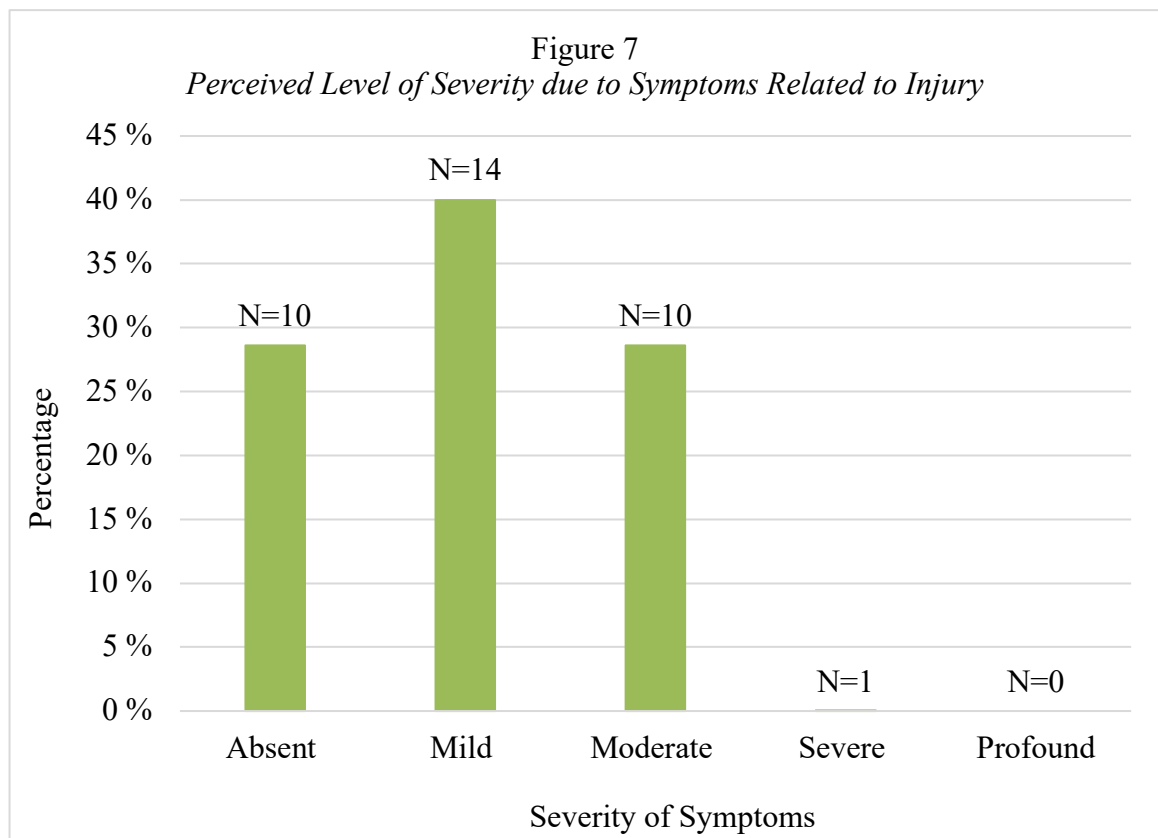
Figure 5 illustrates the level of pain associated with their injury. The most common pain level response was reported to be level 2 (42.3%) with the highest level of pain being 7 (2.5%), resulting in the average level of pain among practicing occupational therapists to be 3.35 (SD=1.495).



All 40 respondents provided responses of symptoms related to their injury and pain/discomfort when providing treatment which is illustrated in Figure 6. Respondents were able to select all symptoms that apply. A total of four different symptoms were reported by 12.5% of the respondents. The most common type of symptom experienced by practicing occupational therapists was reported to be numbness (10%). There were no reports of edema or sensory loss among the practicing occupational therapists.

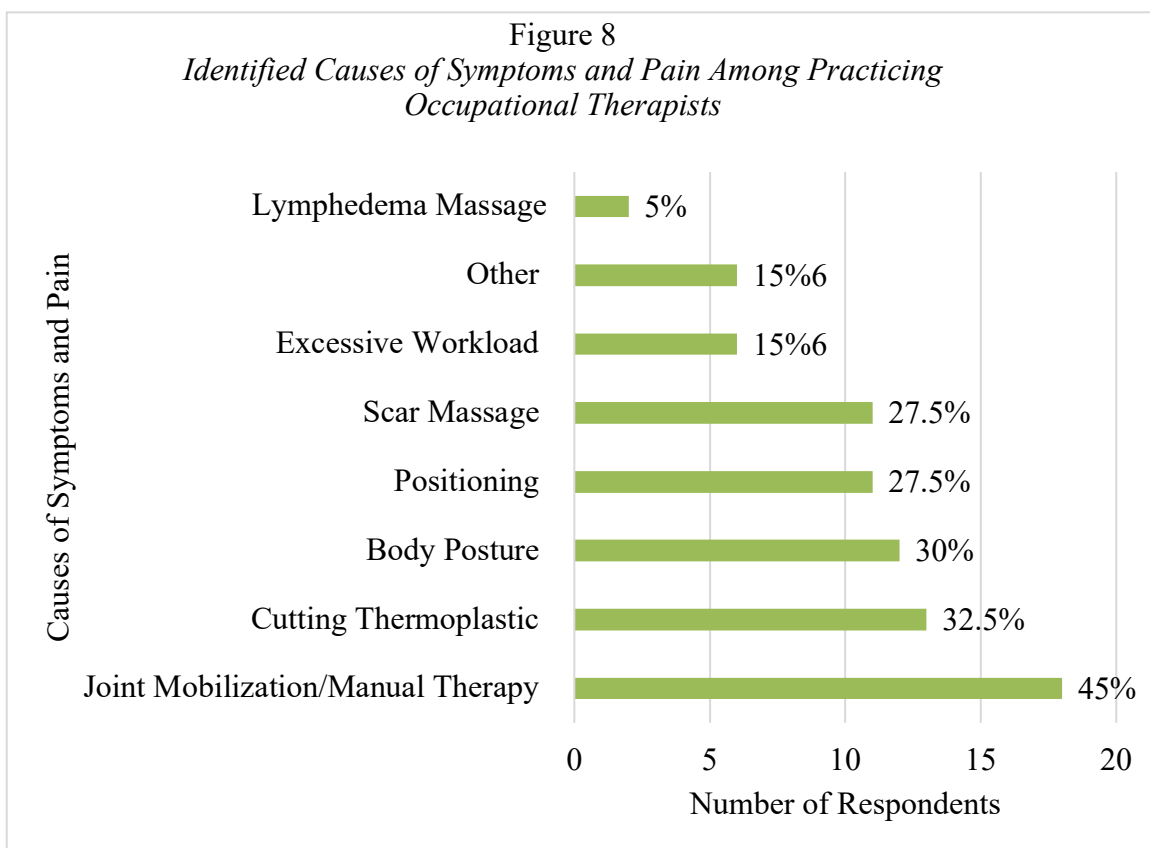


In addition, respondents were asked to indicate the severity of symptoms using a five-point Likert scale. A total of 35 respondents provided their perceived severity of symptoms as shown in Figure 7. The most common level of severity was reported to be mild (40%). No respondents reported profound level of severity related to their symptoms. Resulting in a mean score of 2.06 (SD= .838).



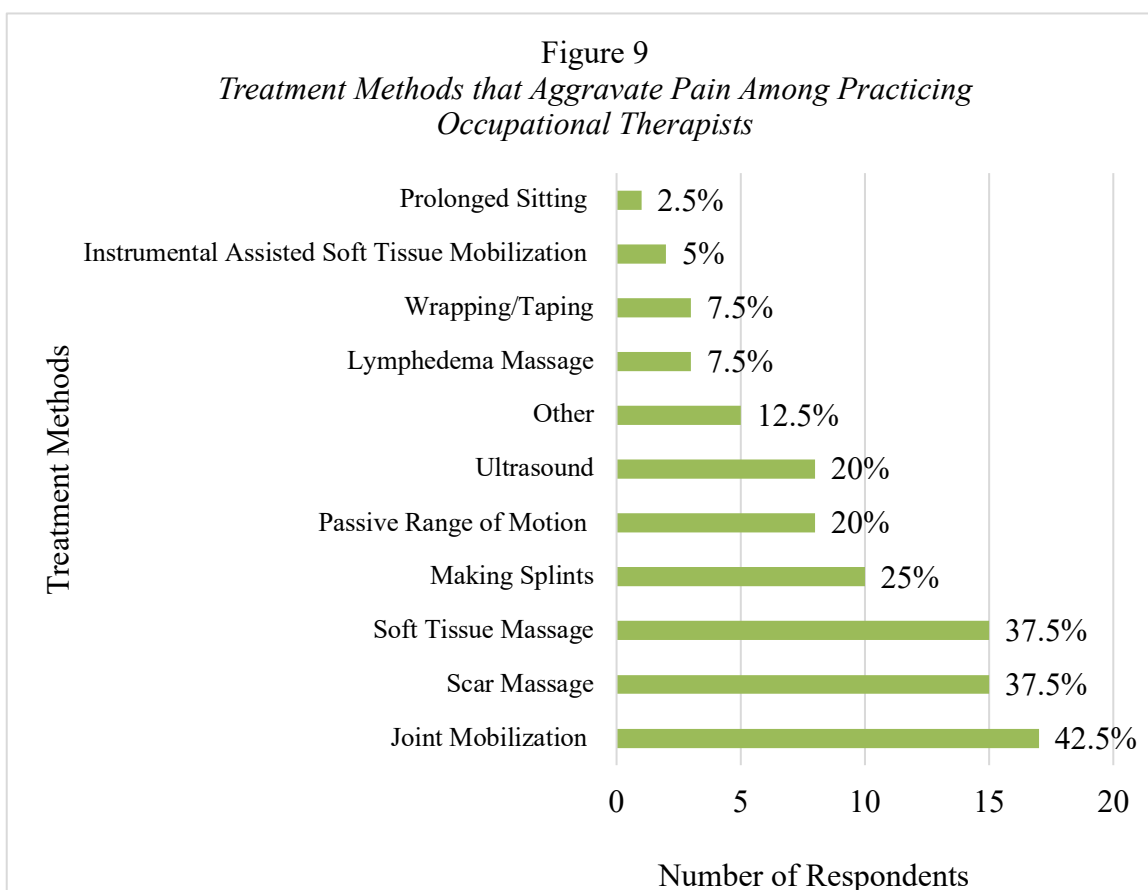
Causes of symptoms and pain reported are summarized in Figure 8. All 40 respondents provided responses of suspected causes of symptoms and pain with the option to select all that apply. 62.5% of respondents chose between two and six causes of symptoms and pain. The most prevalent causes of symptoms and pain was due to providing joint mobilization/manual therapy to patients (45%, n=18). The least common perceived cause was reported to be lymphedema massage (5%). Individuals were given a

textbox to identify any other perceived causes. Responses included: having a previous diagnosis of osteoarthritis, additional recreational activities that further aggravate injury, lack of support with clinic setup and exercises, poor posture, pushing heavy/full supplies carts, typing for documentation, and ultrasound treatments.



As represented in Figure 9, respondents reported specific treatment methods or activities that aggravate their own injury in the work setting when using their upper extremity. This survey question allowed respondents to check all that apply. A range of 0 to 7 treatment methods or activities that aggravate their own injury were selected with the majority (22.5%) of respondents selecting up to three different methods that aggravate their pain. The largest percentage of respondents indicated joint mobilization to aggravate their injury/injuries with prolonged sitting being the least common. An “other” category

was provided which included 5 responses. Responses included, assisting patients into standing, pulling on the gait belt, documentation, hands on treatment with patients, setting up hot and cold packs, setting up patients with exercises, demonstrating, taking items out of cabinets and putting them away multiple times per day, and mouse work with the computer.



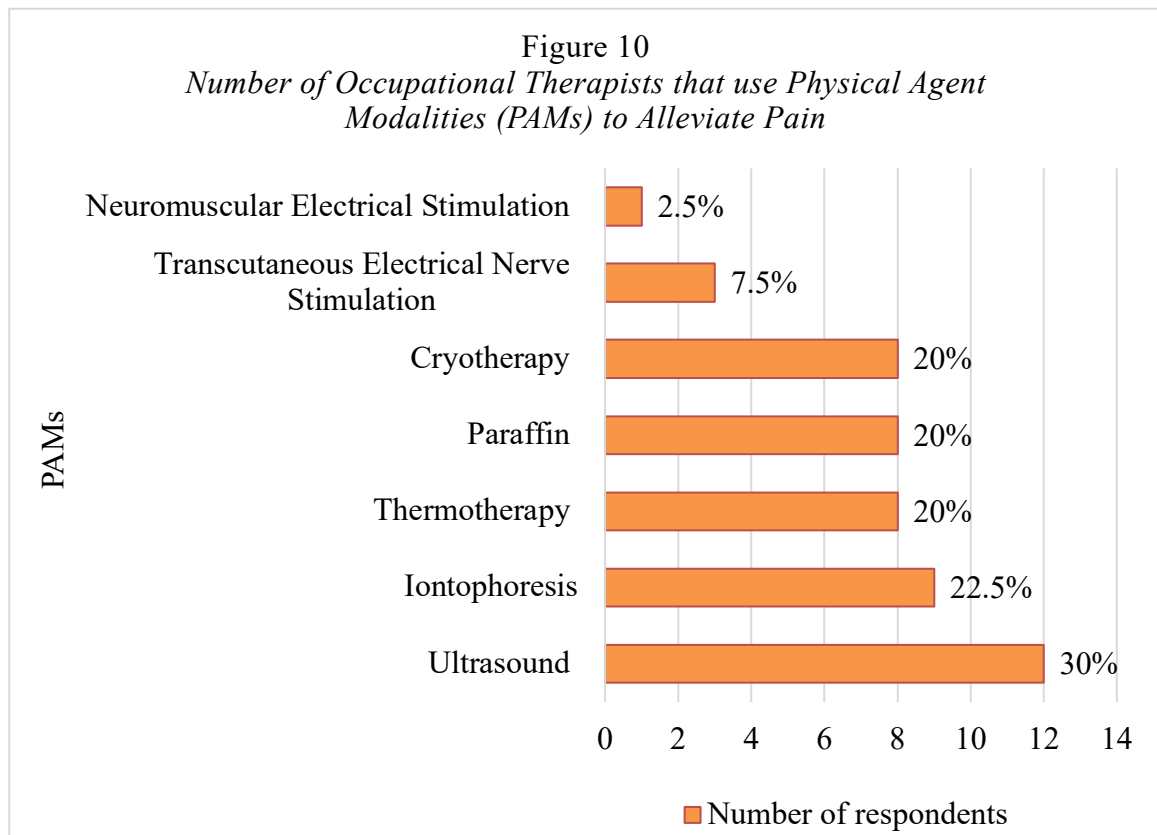
When asked about injuries being caused by or made worse through participation in work-related activities, there were 35 total responses. As many as 60% (n=21) reported their injury was caused by or made worse by work, while 14 (40%) reported it was not. Of the 35 respondents, 25 (71.4%) reported that their injury had no influence on their work performance while 5 (28.6%) reported “other.” Within the other category responses included: adjusting/modifying treatment methods, positioning, proper tool use, using non-

dominant hand, alternating activities that cause increased strain/stress with those that do not, being uncomfortable during the work day, having to learn new skills to approach work differently, changing grip when using ultrasound wand, intermittent use of night orthoses to control symptoms, providing less manual therapy techniques to patients due to own personal pain, and shifting to a management position with less patient care responsibilities.

The vast majority of respondents (38 out of 40) indicated use of hand tools in practice. Nine indicated hand tools used within their job to aggravate their condition, these included instrumental assisted soft tissue mobilization, hawk tools, ultrasound wand, knife-cutting thermoplastic, scissors, snips to cut orthoplast, and having to manually push rivets into orthoses with their thumbs.

Methods Occupational Therapists use to Alleviate Upper Extremity Problems

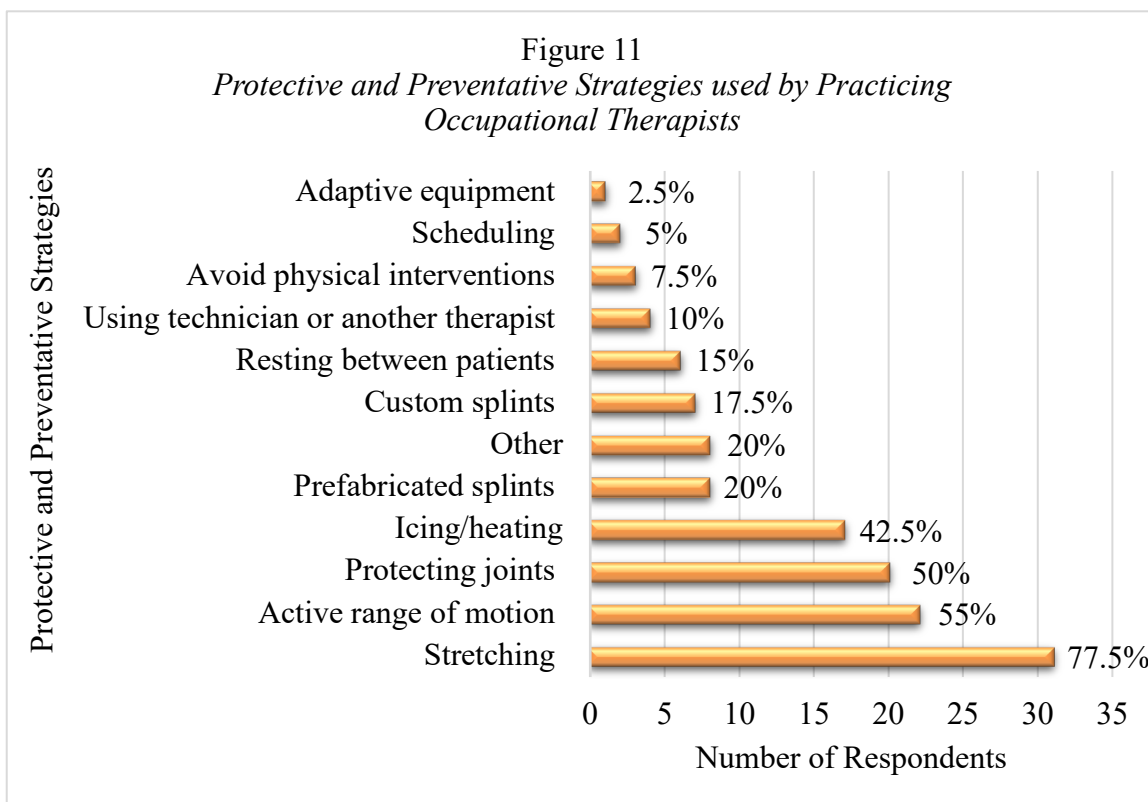
In this section respondents were able to select all the methods that they used to alleviate their pain and symptoms. Respondents were able to select all that apply for physical agent modalities (PAMs) they use to alleviate their pain and symptoms. A total of 42.5% of the respondents chose between one and five different PAMs they use to alleviate their pain and symptoms. The most common PAMs used among 40 practicing occupational therapists was reported to be ultrasound (30%). In addition to the PAMs provided in Figure 10 there were four options included on the survey that no respondents reported to use including: whirlpool, fluidotherapy, phonophoresis, and functional electrical stimulation. As for PAMs used per week, a total of 15 respondents indicated use throughout each week. 13 indicated use of PAMs once per week, while two used PAMs two to five times per week.



A total of five respondents indicated modification of hand tools to help prevent pain and other symptoms in relation to their injury. The tools modified were listed by the respondents, including ergonomic chair and desk set up, sit to stand desk, adjustment of manual tissue tool use and posture, hammer, rivet tool, scissors, writing utensils, and the modification of hand position. For how often these tools are used per week when treating clients included one respondent indicating 2-5 times per week and the remaining four reported to use the tools 10 or more times per week.

Respondents in the study were asked to provide prevention/protective strategies that they incorporate into their daily routine. Results are summarized in Figure 11. All respondents indicated use of preventative and protective strategies and were provided the opportunity to select all that apply. A range of zero to nine strategies were selected

among the respondents with three strategies being the most common selected (30%). Results indicated stretching to be one of the most common, 77.5% (n=31). Other preventative and protective strategies suggested by participants included activity modification, dynamic stability exercises, handling equipment differently, sleeping with elbows in extension, using heat, kinesiotaping, instrumental soft tissue mobilization technique, and using the uninjured extremity.

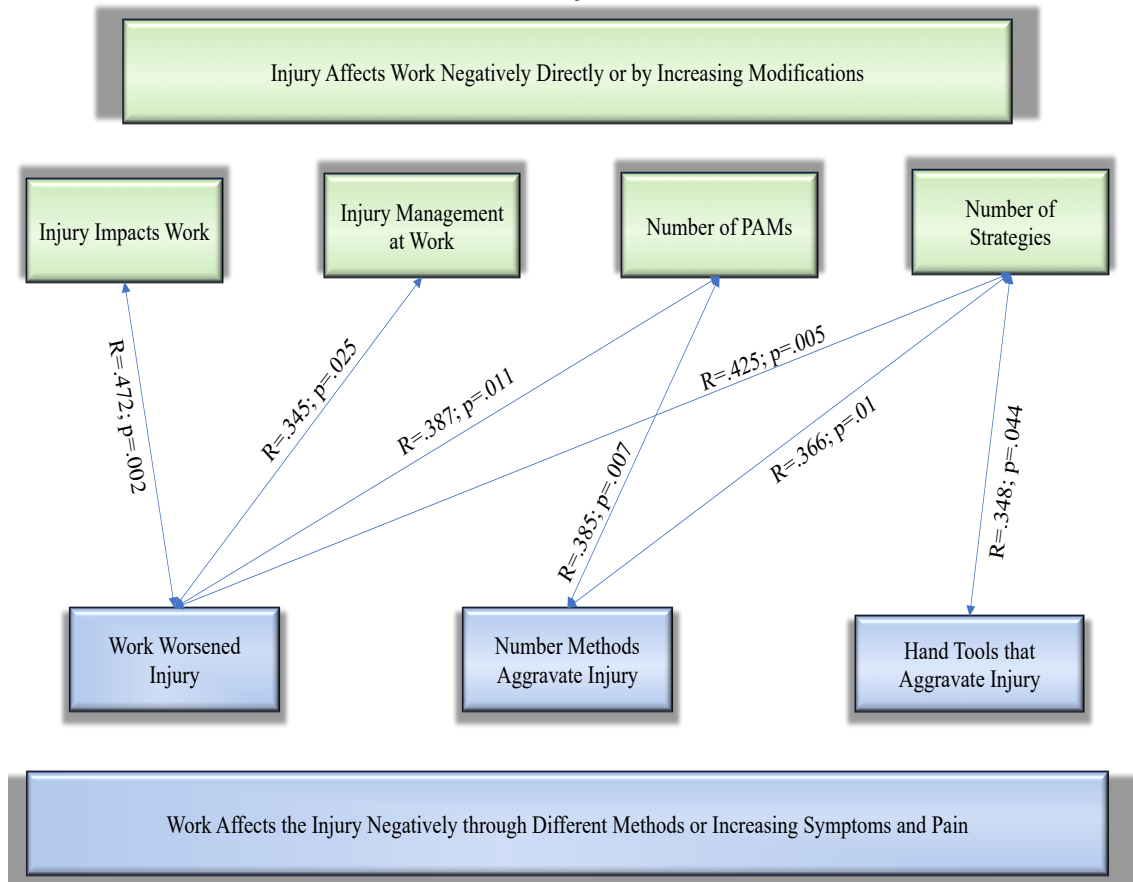


Of the 40 respondents, 33 reported how they managed their injury when working with clients. Twenty-one (63. 6%) reported that their pain related to their work-related injury is subtle, so they are able to work through it. Respondents that indicated, I do not notice it when working with clients was reported by, 21.2% (n=7). Approximately 6.1% (n=2) reported having to take breaks when working with clients. Three respondents (9.1%) answered other and provided specific responses in the textbox provided including:

changing typing station and overcompensating with unaffected upper extremity, wearing custom orthotics, and activity modifications.

What relationships were found between work and injury among practicing upper extremity occupational therapists? Figure 12 displays the correlation between variables related to how injury affects work and variables related to how work affects injury. A significant correlation is indicated by a p value less than or equal to .05. The work affects injury variable "*work worsened injury*" is correlated to all 4 injury affects work variables. These show a strong relationship, as seven of the twelve possible correlations were significant. There were two composite variables created to measure how work affects injury negatively through different methods or increasing symptoms and pain (injury worsened by work, number of methods that aggravate injury, and hand tools that aggravate injury) and injury affects work negatively directly or by increasing modifications (impact of injury on work, how injury is managed at work, number of PAMs used, and number of strategies used). The average injury that affects work score was 6.40 (SD= 4.31). The average work that affects injury score 6.48 (SD= 5.01). These scores demonstrated a highly significant relationship between the two primary variables ($r=.611$, $p<.001$).

Figure 12



Inferential Analysis

The following section outlines the additional analyses that were conducted on the data collected from the survey and a discussion on the significance of the data reported. Chi-square correlation coefficient, one-way ANOVA, and independent t-tests were utilized for the data analysis.

Research question one was: Is there an association between how demographics affect pain experienced among practicing occupational therapists? Categorical demographic and work setting variables were tested for association with the respondent having or not having pain using Chi-Square statistics (Table 3). Respondents over the age of 45 were far more likely to have pain (81.3% compared to 50% or 58%). No

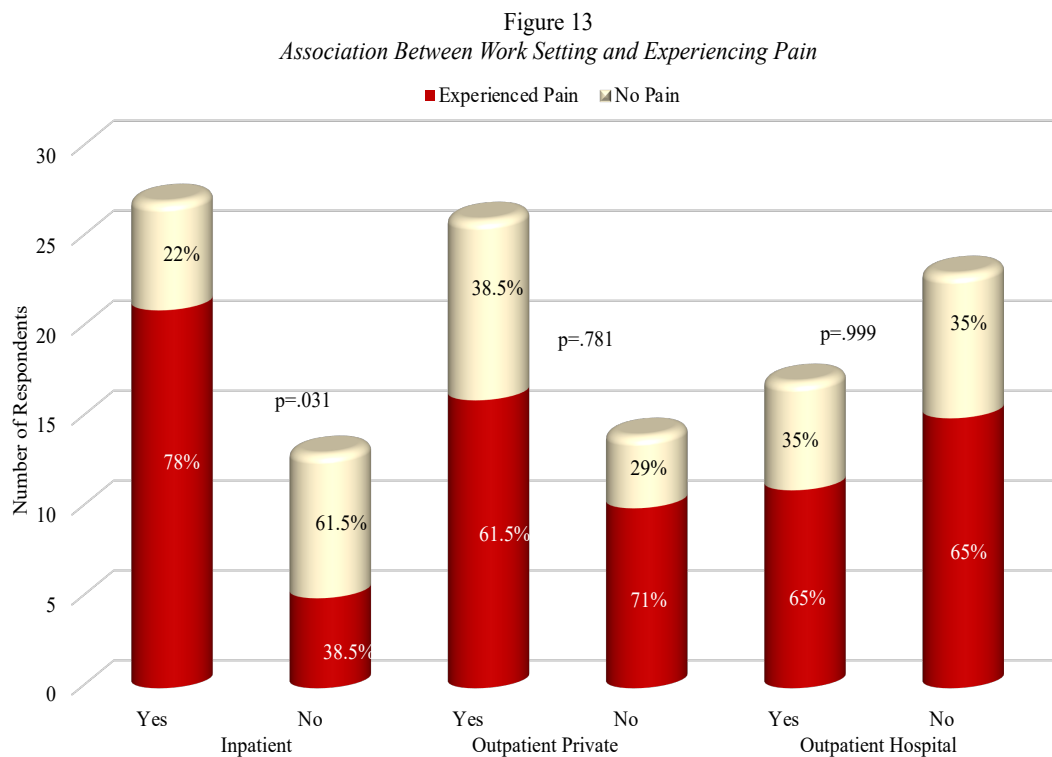
significance was found ($p = .194$) likely due to only three respondents over 45 experienced no pain. Pain had mild association with respondents who spent two or more hours per day working on upper extremity injuries (71%, $p = .213$). Pain was noted to be higher in respondents who reported to work for more than 25+ years (90.9% compared to 64.3% and 46.7%) though this was not significant ($p = .065$) likely due to only one respondent working for more than 25 years indicating no pain. No significance was found ($p = .697$) between pain and respondents being certified in hand therapy (63% to 69%). No significance was found between the association of pain and respondents being certified in PAMs (67% to 64%, $p = .842$). Pain had no association between respondents being certified in Kinesiotaping (62% to 73%, $p = .528$).

Table 3

The Association Between Demographics and Work Setting to Pain

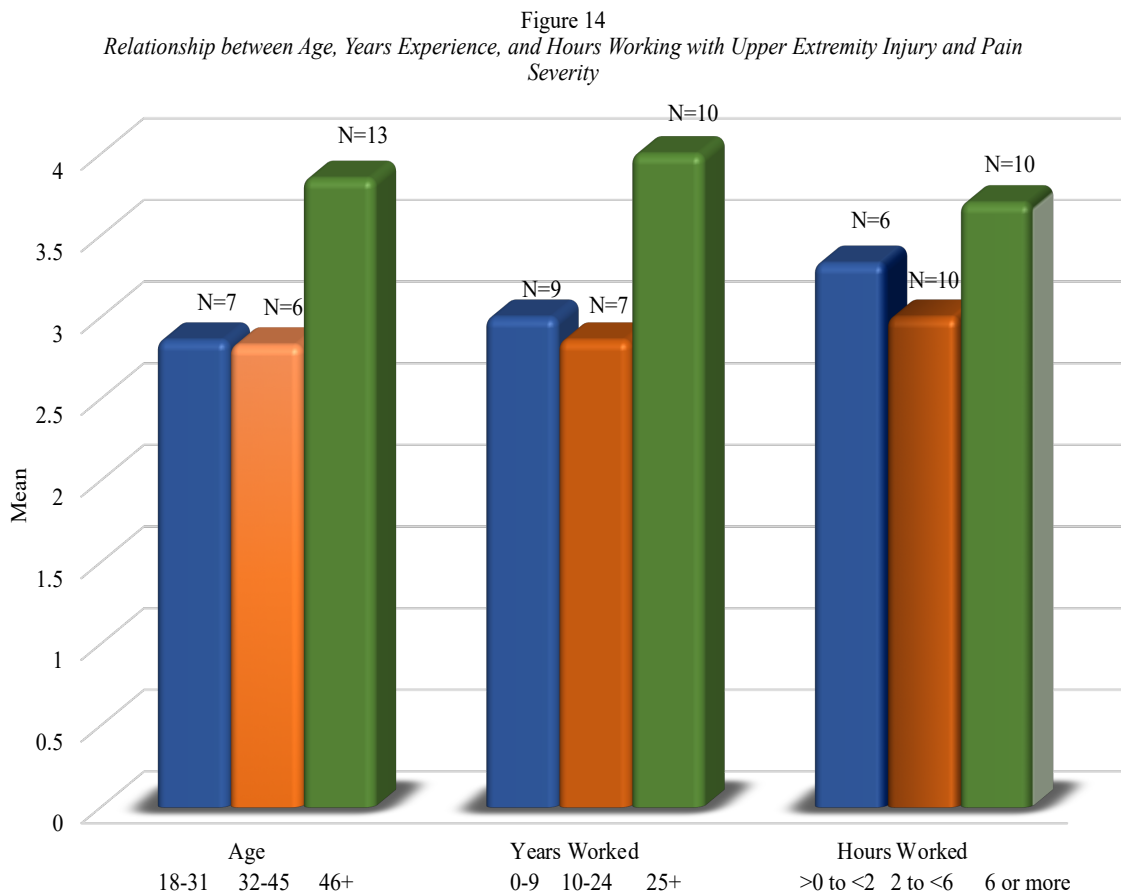
	No Pain		Pain		Chi-Square	p
	N	%	N	%		
Age					3.278	.194
18-31	5	41.7%	7	58.3%		
32-45	6	50.0%	6	50.0%		
46 +	3	18.8%	13	81.3%		
Inpatient Setting	6	22.2%	21	77.8%	5.962	.031
No	8	61.5%	5	38.5%		
Outpatient	10	38.5%	16	61.5%	.077	
Private						.781
No	4	28.6%	10	71.4%		
Outpatient	6	35.3%	11	64.7%	.000	1.00
Hospital						
No	8	34.8%	15	65.2%		
HrsDy3					3.096	.213
>0 to > 2	7	53.8%	6	46.2%		
2 to <6	4	28.6%	10	71.4%		
6+	3	23.1%%	10	76.9%%		
Year Practice					5.465	.065
0-9	5	35.7%	9	64.3%		
10-24	8	53.3%	7	46.7%		
25+	1	9.1%	10	90.9%		
Hand Therapists	10	37.0%	17	63.0%	.152	.697
No	4	30.8%	9	69.2%		
PAMs	6	33.3%	12	66.7%	.040	.842
No	8	36.4%	14	63.6%		
Kinesiotaping	11	37.9%	18	62.1%	.398	.528
No	3	27.3%	8	72.7%		

Figure 13 represents the association of how work setting affects experiencing pain. Significantly more respondents in inpatient settings were noted to experience pain (78% to 38%, $p = .031$) while working in other settings was found to have no significance associated with experiencing pain.



Research question two: Is there a relationship between how demographics affect pain level? These variables were also compared with average pain level using an independent t-test (for variables with only two categories) and one-way ANOVA (multiple categories). Pain level was measured using a five point Likert scale. Average pain level appeared to increase as age, years working, and hours worked per day

increased as shown in Figure 14. No significance was found among the three demographic categories due to a low number of respondents.



The relationship between demographics and work setting to the average level of pain is reported in Table 4. Respondents who indicated working in a private outpatient setting had a significantly higher pain level on average (4.30 to 2.75, $p=.007$) while hospital outpatient settings had significantly lower pain level on average (2.80 to 4.09, $p=.026$). Respondents who indicated working in an inpatient setting had a low pain level average (2.40 to 3.57, $p=.117$). No significance was found for average pain level for respondents who indicated being certified hand therapists (3.89 to 3.06, $p=.183$). Respondents who indicated being certified in PAMs had a lower pain level average (2.86

to 3.92, $p = .071$). Respondents who indicated certification in kinesioteaping had no significant pain level average (3.50 to 3.28, $p = .734$).

Table 4

The Relationship between Demographics and Work Setting to the Average Level of Pain

	N	Mean	S.D.	F	p
Age Level				1.514	.241
18-31	7	2.86	1.215		
32-45	6	2.83	1.329		
46+	13	3.85	1.625		
Years of Practice				1.654	.213
0-9	9	3.00	1.323		
10-24	7	2.86	.900		
25+	10	4.00	1.826		
Hours per day				.528	.597
>0 to <2	6	3.33	1.751		
2 to <6	10	3.00	1.633		
6 or More	10	3.70	1.252		
	N	Mean	S.D.	t	p
Private Outpatient Setting	10	4.30	1.567	2.938	.007
No	16	2.75	1.125		
Outpatient Hospital Setting	15	2.80	1.146	-2.367	.026
No	11	4.09	1.640		
Inpatient setting	5	2.40	.548	-1.625	.117
No	21	3.57	1.568		
Hand Therapists	9	3.89	1.764	1.370	.183
No	17	3.06	1.298		
PAMs	14	2.86	.949	-1.892	.071
No	12	3.92	1.832		
Kinesioteaping	8	3.50	1.604	-.344	.734
No	18	3.28	1.487		

Chapter V

Discussion of Findings

Upper extremity orthopedic and neurological issues are a concern among practicing occupational therapists. In exploring literature it became apparent that there is a gap in research regarding prevention for therapists working in upper extremity rehabilitation. With only one article by Caragianis (2002) specifically focusing on work-related injuries of occupational therapists practicing in upper extremity rehabilitation, there is limited research on this population. The intent of this study was to explore this area, as well as identify frequencies of injuries, causes, and protective and preventative strategies for practicing occupational therapists.

Prevalence

Participants in this study consisted of 40 practicing upper extremity occupational therapists. In total, 26 (65%) respondents reported experiencing specific injuries or areas of pain/discomfort in their upper extremity when providing treatment. In addition, when asked about their injuries being caused by or made worse through participation in work-related activities, there were 35 total responses with 60% reporting their injury was caused by or made worse, while the remaining 40% reported it was not.

Previous studies found age to be related to work-related injuries. Rossettini et al. (2015) found 60% of therapists who had between 6 to 20 years of experience were less likely to develop thumb injuries or pain when compared to others who have been working for less than 5 years. Anyfantis and Biska (2017) also found that injuries are significantly

less frequent among therapists age 50 and above compared to therapists who are 30 years old or younger. In this current study, average pain level appeared to increase with age, years worked, and hours worked per day; however, no significant correlations were found between the three categories.

The researchers were anticipating a high number of hand therapists completing the survey because of the specific injury and population it focuses on. However, data gathered through this research study did find the most common certification reported to be physical agent modalities (PAMs) (55%) followed by hand therapy (32.5%).

Areas of Pain/Discomfort

The areas of the upper extremity affected by pain/discomfort were also identified by all 40 respondents. The most prominent area of pain/discomfort reported was found to be in the thumb (37.5%) followed by the wrist and hand (22.5%). The outcome of this research is congruent with previous studies that indicate the wrist and hand to be the most common area affected by practicing occupational therapists (Darragh et al., 2002; Nazari, Mahjoob, Tapak, & Mortazarvi, 2017).

According to an analysis of data gathered during research, over half of the participants (57.5%) reported practicing in hospital-based outpatient settings. An additional 35% of participants reported practicing in private outpatient clinics, 32.5% in inpatient settings, and 20% in skilled nursing facilities. Through inferential analysis, research found that significantly more respondents in inpatient settings were noted to experience pain while other settings were found to have no significance associated with experiencing pain. However, the results of this current study found that respondents who indicated working in a private outpatient setting had a significantly higher pain level on

average while hospital outpatient settings had a significantly lower pain level on average. From previous studies, different practice settings demonstrated higher prevalence of work-related injuries. Darragh et al. (2012) found that 71.1% of respondents working in outpatient settings identified manual therapy contributing to injury and the same for 52.7% of respondents working in acute care/inpatient rehabilitation settings. Similar to our study, the highest cause of symptoms and pain leading to injury involved activities such as joint mobilization/manual therapy. As for specific treatment methods that aggravate their pain or cause injury identified through this research study, included 42.5% of respondents indicating joint mobilization followed by both scar massage and soft tissue massage being reported by 37.5%. This suggests that manual therapy techniques are a major source of upper extremity injury among practicing occupational therapists.

Protective and Preventative Strategies

Protective and preventative strategies in relation to symptoms of injury showed similar trends to those reported in previous studies by Darragh et al, 2002; Gyer et al., 2018; and Rossettini et al., 2015. As in previous studies, protective and preventative strategies included using manual lift devices, raising workstations, use of aids, rest breaks between treatment sessions, exercises and stretches, postural correction, and modification of work techniques. Participants in our study indicated stretching to be one of the most common strategies followed by active range of motion and protecting joints. Other strategies provided by respondents included activity modification, dynamic stability exercises, handling equipment differently, sleeping with elbows in extension, heat, and using the uninjured shoulder/hand.

Limitations

A limitation of this study includes the method of obtaining participants to complete the survey. The snowball method of recruitment was dependent on access to social media and/or connection and contact with known practitioners. Because the survey was anonymous, researchers were unable to specifically identify what part of the country respondents were practicing in despite the UND Occupational Therapy Fieldwork Database targeting upper Midwest facilities. An additional limitation of this study is that the sample size was small, reducing the power of the survey to detect differences. Researchers additionally recognized that there were missing responses for some of the survey questions during the data analysis. This survey targeted occupational therapists working in upper extremity rehabilitation and hand therapy settings that have experienced work-related injuries. Additionally, there may be differences in other practice settings. The final limitation recognized within this independent study is that there was only one question directly addressing current protective and preventative strategies that respondents use while practicing.

Recommendations

Recommendations include uncovering the specific protective and preventative strategies that occupational therapists utilize to continually provide safe interventions and delivery of services despite these injuries as well as incorporating the modification of hand tools to reduce injury among practicing occupational therapists. It would also be valuable to identify additional perceived causes of injury among practicing occupational therapists we did not identify in the survey. This research may also assist with the development of preventative programs designed to prevent injury within upper extremity

rehabilitation among practicing upper extremity therapists. It may also be beneficial to include pediatric occupational therapists as they perform high amounts of manual therapy as well.

Future Research

Future research endeavors need to address the limitations and recommendations of this study. Continued research may create a better understanding of specifically how injury affects work and work affects injury among practicing occupational therapists. A larger and broader sample across the United States would provide additional data.

Finally, the development of a qualitative study may be beneficial to understand specifically how injury affects work and how work affects injury among practicing upper extremity occupational therapists.

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Appendices

Appendix A

**THE UNIVERSITY OF NORTH DAKOTA
CONSENT TO PARTICIPATE IN RESEARCH**

Project Title: *Upper extremity orthopedic and neurological issues,
an exploratory study focusing on protective and preventative strategies used by practicing occupational therapists.*

Principal Investigator: *Megan Klein, OTS & Shaina Simonson, OTS*

Phone/Email Address: m.klein@und.edu & shaina.simonson@und.edu

Department: *University of North Dakota, School of Medicine
and
Health Sciences, Department of Occupational
Therapy*

Research Advisor: *Dr. Janet Jedlicka, Ph.D., OTR/L, FAOTA*
Phone #: *701-777-2017*
Email Address: *janet.jedlicka@und.edu*

What should I know about this research?

- Taking part in this research is voluntary. Whether you take part is up to you.
- If you don't take part, it won't be held against you.
- If you don't understand, ask questions.
- Ask all the questions you want before you decide.

How long will I be in this research?

We expect that you taking part in this research will last about 10-20 minutes. You will need to simply complete this survey one time. You will be able to participate in this study from a location of your choice.

Why is this research being done?

You are invited to participate in a research study, "Upper extremity orthopedic and neurological issues, an exploratory study focusing on protective and preventative strategies used by practicing occupational therapists."

You are invited to participate in this study because you are a registered occupational therapist that primarily practices in physical dysfunction with upper extremity and hand injuries.

The purpose of this research study is to gain an understanding of the experiences of upper extremity and hand occupational therapists in relationship to work-related injuries and

strategies that they implement to protect themselves. By the use of a survey, researchers will explore the upper extremity orthopedic and neurological issues by focusing on protective and preventative strategies used by current practicing occupational therapists.

What happens to me if I agree to take part in this research?

If you decide to take part in this research study, you will complete an online survey created by the student researchers. There will be several questions for you to answer. Your input is valuable and should take about 10-20 minutes of your time. The survey questions will ask about work-related injuries and preventative strategies that could be implemented. There will be no cost if you choose to participate in this study. Your participation is anonymous and voluntary; and you may discontinue the survey or skip any questions that you would prefer not to answer.

Could being in this research hurt me?

While there are no known foreseeable risks to participating in this survey, it is possible to experience some mild frustration that is common when completing surveys. Some questions may cover an area that is sensitive, and therefore you may become upset as a result. However, if this does occur, you may stop at any time or choose not to answer a question.

Will being in this research benefit me?

While the expected risks are minimal, it is not expected that you will personally benefit from this research. Possible benefits to others include future knowledge gained from the research regarding proper upper extremity body mechanics and preventative strategies in the work setting. The student researchers hope to identify the impacts that orthopedic and neurological issues have on practicing U/E occupational therapists. By identifying the impacts, the researchers hope to share modifications and preventative strategies used by therapists.

How many people will participate in this research?

Approximately 100 participants will take part in this study at the University of North Dakota. Participants will be recruited through University of North Dakota Occupational Therapy fieldwork affiliations and American Occupational Therapy website.

What other choices do I have besides taking part in this research?

There are no alternative procedures for this research except for non-participation.

Will it cost me money to take part in this research?

You will not have any costs for being in this research study.

Will I be paid for taking part in this research?

You will not be paid for being in this research study.

Who is funding this research?

The University of North Dakota and the research team are receiving no payments from other agencies, organizations, or companies to conduct this research study.

What happens to information collected for this research?

Data collected in this research will not be used or distributed for future research studies, even if identifiers are removed. The information you provide will only be accessible to the researchers involved in this study, while your identity remains anonymous. You will not be asked to share any identifying information. We hope to publish the results of this research and submit it for presentations.

What if I agree to be in the research and then change my mind?

Your participation is voluntary and you may choose to not participate or discontinue at any time without penalty. Your decision whether or not to participate will not affect your current or future relations with the University of North Dakota.

Who can answer my questions about this research?

If you have questions, concerns, or complaints please contact the research team at the phone number listed above on the first page.

This research is being overseen by an Institutional Review Board (“IRB”). An IRB is a group of people who perform independent review of research studies. You may talk to them at 701.777.4279 or UND.irb@UND.edu if:

- You have questions, concerns, or complaints that are not being answered by the research team.
- You are not getting answers from the research team.
- You cannot reach the research team.
- You want to talk to someone else about the research.
- You have questions about your rights as a research subject.
- You may also visit the UND IRB website for more information about being a research subject: <http://und.edu/research/resources/human-subjects/research-participants.html>

Electronic Consent

Please select your choice below. You may print a copy of this consent form for your records. Clicking on the “Agree” button indicates that

- You have read the above information
- You voluntarily agree to participate
- You are 18 years of age or older

☐ Agree (1)

☐ Disagree (2)

Page Break

Q2 Gender:

- ☐ Male (1)
- ☐ Female (2)
-

Q3 Age:

- ☐ 18-24 (1)
- ☐ 25-31 (2)
- ☐ 32-38 (3)
- ☐ 39-45 (4)
- ☐ 46-52 (5)
- ☐ 53-59 (6)
- ☐ 60-66 (7)
- ☐ 67+ (8)
-

Q4 What type of setting do you practice in? Check all that apply:

☐

Inpatient (1)

☐

Outpatient Private Clinic (2)

☐

Hospital-based Outpatient (3)

☐

Skilled Nursing Facility (4)

☐

School (5)

☐

Other (6) _____

Q5 How many hours per week do you work?

☐

9 or less (1)

☐

10-20 (2)

☐

21-30 (3)

☐

31-40 (4)

☐

More than 40 (5)

Q6 How long have you been practicing as an occupational therapist?

Q7 Please identify any other certifications that you might have:

☐

Certified Lymphedema Therapist (1)

☐

Certified Hand Therapist (2)

☐

SAEBO Certified Therapist (3)

☐

Physical Agent Modalities (PAMs) Certification (4)

☐

Certified Kinesio Taping Practitioner (5)

☐

Neuro-Developmental Treatment Certification (6)

☐

Instrument Assisted Soft Tissue Mobilization (e.g. Graston Technique) (7)

☐

Other: (8) _____

Q8 On average, how many patients do you see with upper extremity/hand injuries per day?

☐

Less than 3 (1)

☐

4-6 (2)

☐

7-9 (3)

☐

10 or more (4)

Q9 On average, what is the length of treatment sessions for an individual with an upper extremity/hand injury?

- ☐ 15 minutes (1)
- ☐ 30 minutes (2)
- ☐ 45 minutes (3)
- ☐ 60 minutes (4)
- ☐ 90 minutes (5)

Q10 The following set of questions relate to YOU and any upper extremity injury you may have sustained.

Q11 Have you experienced any specific injuries or areas of pain/discomfort in your upper extremities when providing treatment?

- ☐ Yes (1)
- ☐ No (2)

Skip To: End of Block If Q11 = No

Q33 Areas of pain/discomfort (check all that apply):

☐ Shoulder (1)

☐ Elbow (2)

☐ Forearm (3)

☐ Wrist (4)

☐ Hand (5)

☐ Fingers (6)

☐ Thumbs (7)

☐ Please list any specific injuries: (8)

Q34 On a scale of 1-10, with 1 being no pain and 10 being the most pain, please rate the level of pain associated with your injuries:

	1 - no pain (1)	2 (2)	3 (3)	4 (4)	5 (5)	6 (6)	7 (7)	8 (8)	9 (9)	10 - most pain (10)
Pain (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

End of Block: Default Question Block

Start of Block: Block 2

Q14 Do you experience any additional symptoms?

☐ Yes (1)

☐ No (2)

Skip To: Q15 If Q14 = No

Q35 Please check any symptoms you experience related to your injury:

☐

Numbness (1)

☐

Tingling (2)

☐

Weakness (3)

☐

Burning (4)

☐

Sensory loss (5)

☐

Edema (6)

☐

Muscle tension (7)

☐

Other (8) _____

Q15 Severity of symptoms:

	Absent (1)	Mild (2)	Moderate (3)	Severe (4)	Profound (5)
Severity (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q16 Identify what you see as causes of the symptoms and pain (check all that apply):

- ☐ Joint mobilization/Manual therapy (1)
 - ☐ Cutting thermoplastic (2)
 - ☐ Your position when treating patients (3)
 - ☐ Body posture when treating patients (4)
 - ☐ Scar massage (5)
 - ☐ Lymphedema massage (6)
 - ☐ Excessive work-load of clients with U/E injuries (7)
 - ☐ Other: (8) _____
-

Q17 Do you believe your injury was caused by or made worse through participation in work-related activities?

- ☐ Yes (1)
 - ☐ No (2)
-

Q18 In what ways has your injury impacted your work performance? Check all that apply:

- ☐ Has not influenced my work performance (1)
 - ☐ Slower at completing treatment sessions (2)
 - ☐ Request assistance from co-workers (3)
 - ☐ Other, please explain: (4) _____
-

Q19 How do you manage your injury when working with clients?

- ☐ I do not notice it when working with clients (1)
 - ☐ The pain is subtle, I work through it (2)
 - ☐ I have to take breaks when working with clients (3)
 - ☐ Other, please explain: (4) _____
-

Q20 What specific treatment methods or activities aggravate your own injury in the work setting when using your upper extremities? Check all that apply:

- ☐ Scar massage (1)
 - ☐ Joint mobilization (2)
 - ☐ Lymphedema massage (3)
 - ☐ Wrapping/Taping (4)
 - ☐ Making splints (5)
 - ☐ Passive range of motion (6)
 - ☐ Soft tissue massage (7)
 - ☐ Ultrasound (8)
 - ☐ Instrumental Assisted Soft Tissue Mobilization (e.g. Graston technique) (9)
 - ☐ Sitting for long periods of time (10)
 - ☐ Other (11) _____
-

Q21 How many work days have you lost due to work-related upper extremity injury within the last year?

- ☐ None (1)
 - ☐ 1-5 days (2)
 - ☐ 6-10 days (3)
 - ☐ 11-15 days (4)
 - ☐ 16 or more days (5)
-

Q22 Do you use any hand tools when treating upper extremity injuries?

- ☐ Yes (1)
- ☐ No (2)

Skip To: End of Block If Q22 = No

Q23 Are there hand tools in your job that aggravate your condition?

- ☐ Yes (please list) (1) _____
 - ☐ No (2)
-

Q24 Have you modified any hand tools to help prevent pain and other symptoms?

- ☐ Yes (1)
- ☐ No (2)

Skip To: End of Block If Q24 = No

Q25 Please list any hand tools you have modified to alleviate any pain related to your injury.

Q26 How often do you use these tools per week?

- ☐ Once per week (1)
- ☐ 2-5 times per week (2)
- ☐ 6-9 times per week (3)
- ☐ 10 or more times per week (4)

End of Block: Block 2

Start of Block: Block 3

Q27 Are physical agent modalities acceptable at your facility to use on yourself?

- ☐ Yes (1)
- ☐ No (2)

Skip To: End of Block If Q27 = No

Q28 Do you use any physical agent modalities on yourself to alleviate pain due to your injury?

- ☐ Yes (1)
- ☐ No (2)

Skip To: End of Block If Q28 = No

Q29 Please select all physical agent modalities (PAMs) you use to alleviate your pain and symptoms.

- ☐ Thermotherapy (1)
 - ☐ Cryotherapy (2)
 - ☐ Fluidotherapy (3)
 - ☐ Whirlpool (4)
 - ☐ Paraffin (5)
 - ☐ Ultrasound (6)
 - ☐ Phonophoresis (7)
 - ☐ Iontophoresis (8)
 - ☐ Functional electrical stimulation (9)
 - ☐ Transcutaneous electrical nerve stimulation (10)
 - ☐ Neuromuscular electrical stimulation (11)
-

Q30 How often do you use them per week?

- ☐ Once per week (1)
- ☐ 2-5 times per week (2)
- ☐ 6-9 times per week (3)
- ☐ 10 or more times per week (4)

End of Block: Block 3

Start of Block: Block 4

Q31 What kind of preventative and protective strategies do you currently incorporate into your daily routine? Check all that apply:

- ☐ Stretching (1)
- ☐ Icing/Heating (2)
- ☐ Active range of motion (3)
- ☐ Scheduling days differently based on types of injuries of patients (4)
- ☐ Resting between patients (5)
- ☐ Protecting joints (6)
- ☐ Prefabricated splints (7)
- ☐ Custom splint (8)
- ☐ Adaptive equipment (9)
- ☐ Avoid physical interventions (10)
- ☐ Use technician or another therapist (11)
- ☐ Other: (12) _____

End of Block: Block 4

Appendix B

Institutional Review Board
Tech Accelerator, Suite 2050
4201 James Ray Dr Stop 7134
Grand Forks, ND 58202-7134
Phone: 701.777.4279
Fax: 701.777.2193
UND.irm@UND.edu

August 15, 2019

Principal Investigator:	Megan Klein and Shaina Simonson
Project Title:	Upper Extremity Orthopedic and Neurological Issues, an Exploratory Study Focusing on Protective and Preventative Strategies Used by Practicing Occupational Therapists
IRB Project Number:	IRB-201908-032
Project Review Level:	Expedited 7
Date of IRB Approval:	08/14/2019
Expiration Date of This Approval:	08/13/2020

The application form and all included documentation for the above-referenced project have been reviewed and approved via the procedures of the University of North Dakota Institutional Review Board.

The waiver of written consent has been approved under 45 CFR 46.117(c)(2).

Prior to implementation, submit any changes to or departures from the protocol or consent form to the IRB for approval. No changes to approved research may take place without prior IRB approval.

You have approval for this project through the above-listed expiration date. When this research is completed, please submit a termination form to the IRB. If the research will last longer than one year, an annual review and progress report must be submitted to the IRB prior to the submission deadline to ensure adequate time for IRB review.

The forms to assist you in filing your project termination, annual review and progress report, adverse event/unanticipated problem, protocol change, etc. may be accessed on the IRB website:
<http://und.edu/research/resources/human-subjects/>

Sincerely,



Michelle L. Bowles, M.P.A., CIP
IRB Manager

MLB/sy

Cc: Dr. Janet Jedlicka

Appendix C

Research Questions

1. What specific demographics play a role in upper extremity work-related injuries?
2. What are some methods occupational therapists use to alleviate upper extremity problems?
3. What impacts work performance among practicing upper extremity occupational therapists?
4. Do specific practice settings make a difference to work-related injuries?
5. What preventative and protective strategies are beneficial for practicing occupational therapists?
6. What are the relationships between work and injury among practicing upper extremity occupational therapists?
7. Is there an association between how demographics affect pain experienced among practicing occupational therapists?
8. Is there a relationship between how demographics affect pain level?

Appendix D

Email to Participants

Dear Occupational Therapy Practitioner,

You are invited to participate in a research study being completed by third year occupational therapy students Megan Klein and Shaina Simonson through the University of North Dakota. As part of our graduate course work, we are conducting a study through the use of a survey. The purpose of this study is to gain an understanding of the experiences of upper extremity and hand occupational therapists in relationship to work-related injuries and strategies implemented to protect themselves. We are writing to request your participation in our research study regarding upper extremity orthopedic and neurological issues by focusing on protective and preventative strategies used by current practicing occupational therapists.

We are in need of practicing occupational therapists and occupational therapy assistants to complete our online survey. The survey will take approximately 15-20 minutes to complete and your participation is anonymous and voluntary. Survey will close at the end of September.

The link provided below will take you to the statement of informed consent that includes a brief study overview and potential risks of the study. Once you read the informed consent, if you agree to participate, you will simply click on “Agree” and begin the survey.

Qualtrics Link: https://und.qualtrics.com/jfe/form/SV_e9iyW8GF2pSBDBH

If you have any questions, feel free to contact us at Megan Klein m.klein@und.edu or Shaina Simonson shaina.simonson@und.edu. You may also contact our advisor Dr. Janet Jedlicka PhD, OTR/L at janet.jedlicka@und.edu.

We ask that you help us reach out to other occupational therapy practitioners working in upper extremity rehabilitation. Please forward this to others that may be interested in participating. Thank you in advance for your time, consideration, and potential involvement, it is appreciated!

Sincerely,

Megan Klein, MOTS and Shaina Simonson, MOTS

