Work Injuries Among Therapists In Physical Rehabilitation

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Background: Physical therapists in rehabilitation settings often perform heavy lifting, repetitive forceful tasks and endure long periods of static or awkward postures. These work conditions put therapists at increased risk of work-related injuries (WRIs). ***Methods:*** A cross-sectional survey was conducted among physical therapists (PTs) and physical therapist assistants (PTAs) at 14 randomly selected rehabilitation facilities to determine the prevalence and severity of work-related injuries in physical rehabilitation. ***Results:*** A majority of respondents reported their most severe pain or discomfort within the last year affected their back, lasted 24 hours to 1 week, occurred once every 2-6 months, and was rated as moderate on the 0 to 10 pain scale. The 1-year prevalence of WRIs among PTs and PTAs working in physical rehabilitation was 32%**.** Sixty percent (60%) of those reporting pain/discomfort had mechanical patient lifts available within their work area. Less than half reported using mechanical patient lifts before or during/after their work-related pain. ***Conclusion:*** More than 65% of rehabilitation PTs and PTAs experienced work-related pain due to therapeutic activities including patient handling and movement. It is critical to understand therapists' technology usage barriers, redesign technology to meet end-user needs, and develop technology-based best practices that promote both worker safety and patient outcomes.

INTRODUCTION

Work-related injuries (WRIs) occur when the work environment and performance contribute significantly to the condition, and/or the condition is made worse or persists longer due to work conditions (CDC, 2013). Work conditions that may lead to injuries include routine lifting of heavy objects, overhead work, work with the neck in a chronic flexed position, and performing repetitive forceful tasks (CDC, 2013). Particularly within rehabilitation settings (i.e., free-standing rehabilitation hospitals, rehabilitation units in general hospitals and skilled nursing facilities) therapists provide substantial hands-on support, direction and guidance to their patients during therapeutic activities (e.g., transfers, repositioning, gait training). These therapeutic activities may predispose therapists to work-related injuries because of the awkward postures, high force levels and repetition with which activities are performed.

Safe patient handling guidelines and equipment can reduce or eliminate manual patient handling, resulting in decreased prevalence of WRIs among health care providers (Collins et al., 2004; Garg et al., 2012; Kim et al., 2012; Nelson & Baptiste, 2004; Siddharthan et al., 2005; Spiegel et al., 2002). Therapists complete intensive ergonomic training and even work as occupational health providers, yet are hesitant to use safe patient handling technology (Darragh et al., 2013; Nelson et al., 2008). Some therapists believe that their knowledge and skills will prevent an injury from occurring (Cromie et al., 2002). Accordingly, the purpose of this study was to determine the prevalence and severity of work injuries among therapists in physical rehabilitation. It was hypothesized that therapists in rehabilitation settings would have a high prevalence of WRIs due to the repetitive forceful exertions performed during daily work activities.

MATERIALS AND METHODS

Study Design and Population

A cross-sectional survey was conducted from November 2013 to May 2014 among PTs and PTAs at 14 rehabilitation facilities in Nebraska. The survey was reviewed and pilot tested by a total of 18 subject matter experts (i.e., physical therapists, occupational therapists, nurses and statisticians). Five experts were external to Madonna Rehabilitation Hospital (MRH). The study was approved by MRH's Institutional Review Board (IRB). Survey inclusion criteria included adults (aged 19 years and older) that were working as a PT or PTA at hospital-based rehabilitation facilities in Nebraska. Eligible facilities had both inpatient and outpatient physical therapy programs, and were randomly selected for study inclusion.

Data Collection

The survey was created using SelectSurvey.NET (ClassApps.com, Overland Park, KS), which includes a multitude of question and response types, invitation features, customizable security levels and data export formats. This flexible survey platform allowed the research team to create a customized survey that anonymously and confidentially gathered user responses. A brief message of

the survey's purpose, procedures, confidentiality and anonymity assurances, investigators' contact information, participation risks and benefits, participation refusal and voluntary withdrawal were included in the IRB approved invitation email as well as the start of the survey. Each rehabilitation or physical therapy director electronically sent the survey invitation to their staff via their facility's email system. Participants individually completed the informed consent and screening process, which consisted of marking a box indicating their willingness to voluntarily participate in the study, selecting their age (i.e., 19 years old and older), occupation (i.e., PT or PTA) and rehabilitation facility.

The survey consisted of four sections: Section I Background and Demographics, Section II Primary Work Setting, Section III Workload, and Section IV Patient Handling. Section I was used to gather routine background and demographic information (e.g., age, height). Section II was used to clarify the amount and type of work performed (e.g., full-time/part-time). In Section III, respondents indicated the body regions, duration, frequency, and severity of musculoskeletal pain or discomfort experienced during the past 12 months that they believed to be related to their work. Additionally, they described the effects of the pain (e.g., took sick leave) and any activities they believe caused or contributed to their pain (e.g., patient transfers). For Section IV, respondents indicated the type, availability and utilization of mechanical lifting devices (i.e., patient lifts) for patient handling.

Statistical Analysis and Outcomes

The survey data were exported from SelectSurvey to MiniTab (Version 14, Minitab Inc., State College, PA) for descriptive and statistical analyses. Data quality and accuracy were reviewed for erroneous and missing data. The data were then coded appropriately to assess the primary and secondary outcomes. The primary outcome was the 1-year prevalence of WRIs among PTs and PTAs working in rehabilitation facilities. Using OSHA's regulations for recordable WRIs, a WRI case was defined as a report of a pain or discomfort within the last 12 months that resulted in days away from work, restricted work activity or job transfer, or medical treatment beyond first aid (CDC, 2013). Prevalence was then calculated by dividing the number of WRI cases by the total number of survey respondents. Secondary outcomes included the severity, duration and frequency of work-related pain/discomfort, and patient handling perceptions.

Associations between WRIs and therapist background, demographics, work setting and patient lift perceptions were assessed at the 0.05 level of significance. Specifically, contingency tables and Chi-square tests were used to examine the associations among categorical variables, and one-way analyses of variance were used to examine the associations among categorical and continuous variables.

RESULTS

Survey Respondents

Of the 14 included rehabilitation facilities, four were located in an urban area (population ≥ 50,000), seven were located in an urban cluster (population >2,500 and < 50,000), and three were located in areas with a population less than 2,500 (U.S. Census Bureau, 2010). There were a total of 198 surveys distributed to 159 PTs and 39 PTAs. Twelve responses were omitted because the individuals did not complete the electronic consent. A total of 109 completed responses were included in this preliminary survey assessment for a response proportion of 55% (109/198). 80% of the respondents were PTs, 69% were female, and had average had 11.5 years of physical therapy experience (Table 1).

Table 1. Survey Respondent Characteristics[1]

	PT n=87	PTA n=22	Overall n=109
Age (yrs)	37 (10.4)	40 (10.2)	37.5 (10.3)
Height (cm)	172 (10.2)	170 (8.7)	171 (9.9)
Weight (kg)	74.4 (16.9)	78.4 (17.7)	75 (17.0)
Experience (yrs)	11.3 (9.4)	12.5 (9.8)	11.5 (9.5)

[1]Mean (Standard Deviation)

Work-related Pain/Discomfort

Sixty-seven percent (67%) reported musculoskeletal pain or discomfort within the past year with 68.5% experiencing back pain, 20.5% experiencing upper extremity pain, and 11% experiencing lower extremity pain (Table 2). A majority of respondents reported their *most severe pain or discomfort* within the last year affected their back (67%), lasted 24 hours to 1 week (43%), occurred once every two to six months (50%), and was rated as moderate (4-6) on the 0 to 10 pain scale (60%). Nearly all respondents (96%) continued to work with a majority (60%) taking pain-relieving medication to manage their pain. Over three-quarters (78%) indicated that patient transfers caused or contributed to their pain. Half reported that patient repositioning (49%) and gait training (47%) also caused or contributed to their pain.

Work-related Injuries/Illnesses (WRIs)

The 1-year prevalence of WRIs among PTs and PTAs working in physical rehabilitation was 32% (35/109). There were no significant differences between WRI cases and non-cases for gender, occupation, setting, employment status, age, height, weight or experience (Table 3). There was a significant association between WRI cases and non-cases for the amount of patient treatment performed per day ($p=0.05$). Post hoc tests indicated that there were significantly more WRI cases that performed >7 hours of patient treatment time compared to those that performed 5-7 hours of care. 37% of these WRI cases performed 7-8 hours and 17% performed 8-10 hours of patient treatment per day.

Table 2. Attributes of Most Severe Work-related Pain or Discomfort (% Respondents)

Experienced pain/discomfort during past 12 months related to their work	67.0%
Location	
Back (Cervical, Thoracic, Lumbar and/or Sacral)	68.5%
Upper Extremity (Shoulder, Elbow, and/or Wrist/Hand)	20.5%
Lower Extremity (Hip/Thigh, Knee, and/or Ankle/Foot)	11.0%
Duration[1]	
24 hours or less	30.6%
24 hours to 1 week	43.0%
>1 week to 1 month	18.1%
>1 month	8.3%
Frequency[1]	
More than once every week	16.7%
Once a week	12.5%
Once a month	20.8%
Once every 2-3 months	23.6%
Once every 6 months or more	26.4%
Severity[1]	
Mild (Rated 1-3)	35.6%
Moderate (Rated 4-6)	60.3%
Severe (Rated 7-10)	4.1%
Effects[2]	
Continued to work with pain/discomfort	95.9%
Performed first aid[3]	71.2%
Changed treatments/practices[4]	37.0%
Sought treatment or consulted a healthcare provider[4]	23.3%
Prevented from completing normal duties[4]	12.3%
Took sick leave[4]	2.7%
Activities that Caused/Contributed[2]	
Patient Transfers	78.1%
Patient Repositioning	49.3%
Gait Training	47.9%
Lifting/Moving Equipment & Supplies	27.4%
Range of Motion	26.0%
Soft Tissue Work	23.3%
Joint Mobilization	21.9%
Manual Facilitation	21.9%
Balance Activities	19.2%
Manual Muscle Testing	11.0%
Applying Modalities	5.5%
Device Fitting	4.1%
Activities of Daily Living Training	1.4%

[1]One response missing
[2]Respondents reported multiple effects and causes of their most severe pain/discomfort
[3]First aid included stretching, pain relieving medication, braces, application of heat/cold, and strengthening exercises
[4]Pain/discomfort effects that were classified as OSHA recordable work-related injuries and illnesses

A majority reported that a safe patient handling program and patient lifts (89%) were available at their facility. More than 65% reported there wasn't a lift team available with 79% of all WRI cases not having a lift team (p=0.04). 71% received initial patient lift training while 40% received ongoing training. Only 35% felt confident operating either ceiling-mounted or floor-based patient lifts. 60% of those reporting pain had patient lifts available within their work area; yet less than 45% used patient lifts before or during/after their work-related pain. Only 6% increased lift usage during/after their work-related pain.

Table 3. WRIs by Respondent Characteristics

	No WRI n=74	WRI n=35	P-value
Female	50	23	0.70
Male	22	12	
Physical Therapist	56	31	0.12
Physical Therapist Assistant	18	4	
Inpatient	32	18	0.73
Outpatient	22	9	
2 or more settings	20	8	
Full Time	63	26	0.13
Part Time or Less	10	9	
Treatment Time <4 hours	14	8	0.05
Treatment Time 5-7 hours	34	8	
Treatment Time >7 hours	25	19	
SPH Program[1]	56	26	0.89
No SPH Program[1]	14	7	
Lift Team	29	7	0.04
No Lift Team	41	26	
Patient Lifts Available	63	30	0.94
Patient Lifts Not Available	8	4	
Initial Lift Training	42	20	0.74
No Initial Lift Training	16	9	
Ongoing Lift Training	21	12	0.68
No Ongoing Lift Training	34	16	
Confident with Ceiling Lifts	17	7	0.79
Not Conf with Ceiling Lifts[3]	38	18	
Confident with Floor Lifts	21	11	0.69
Not Conf with Floor Lifts[3]	37	16	
Used Lifts Before Pain	25	15	0.39
No Lifts Before Pain	48	20	
Used Lifts During/After Pain	27	17	0.25
No Lifts During/After Pain	46	18	
Age (years)[2]	37 (10.8)	38 (9.5)	0.59
Height (cm)[2]	171 (9.5)	172 (10.7)	0.73
Weight (kg)[2]	76 (18.0)	74 (14.9)	0.57
Experience (years)[2]	11 (10.2)	12 (7.9)	0.93

[1]SPH (Safe Patient Handling), [2]Mean (Standard Deviation), [3]Conf (Confident)

DISCUSSION

Based on OSHA's current regulations (U.S. BLS, 2012), 32% (35 cases) of the work-related pain/discomfort reported were considered recordable work-related injuries and illness. Documenting WRI cases and maintaining a WRI facility log enables employers, workers and OSHA to evaluate the safety of a workplace, understand industry hazards, and implement worker protection to reduce/eliminate hazards.

A majority of cases reported back pain as their most severe pain over the last year, which was similar to findings of back pain ranging from 32% to 70% among PTs (Holder et al., 1999; Molumphy et al., 1985; Rugelji, 2003). The high proportion of therapists experiencing pain coupled with the long duration and moderate severity indicate that *changes in the work environment are necessary now.* The occupational demands of therapists in rehabilitation settings fail to fit the worker.

Although lifting devices were available, there was a lack of confidence in their use. The lack of confidence operating ceiling and floor lifts was expected given the complexity and infrequent training of these devices. Yet 49% were not confident using non-mechanical aids (e.g., slide board), which are routinely part of formal physical therapy education and safe patient handling programs. Most facilities had a safe patient handling program but lacked a dedicated patient lift team resulting in a significant association between being a WRI case and having a lift team available.

Therapists reported that patient transfers, patient repositioning, and gait training were the top contributors/causes of their pain, yet 80%, 73% and 89% preferred "hands-on" facilitation of these activities, respectively. With so few therapists (11%-27%) utilizing mechanical lifts or non-mechanical aids during these repetitive and forceful activities, it was not surprising to have a significant association between being WRI case and performing more patient treatment (54% of WRI cases performed 7-10 hours of patient treatment per day).

Lifts can be used for patient handling while providing hands-on facilitation. Creative thinking and teamwork can enable therapists to use a mechanical sit-to-stand transfer lift while also providing the patient individualized hands-on cueing during the movement (Figure 1). However, lifts need to be designed to fit the needs of a range of healthcare professionals such as nurses, aides, and therapists. Lifts also need to be customizable based on the patient's ability to engage in the activity (e.g., completely passive, actively engaged). Accordingly, new patient handling technologies must enable healthcare professionals to promote patient outcomes according to their treatment plan, be easy and intuitive to use to maximize efficiency, and be safe to protect patients and therapists from injury (Arnold et al., 2011; Burnfield et al., 2013; Campo et al., 2013; Darragh et al., 2013; Nelson & Baptiste, 2004; Nelson et al., 2008). Engineers, designers, manufacturers, and healthcare pro-

fessionals must continue to develop a collaborative partnership to design and implement engineering control technologies that enable safe patient handling and promote optimal rehabilitation outcomes. Overall, more data are needed to understand therapists' technology usage barriers, redesign technology to meet end user needs, and develop technology-based best practices that promote both worker safety and patient outcomes.

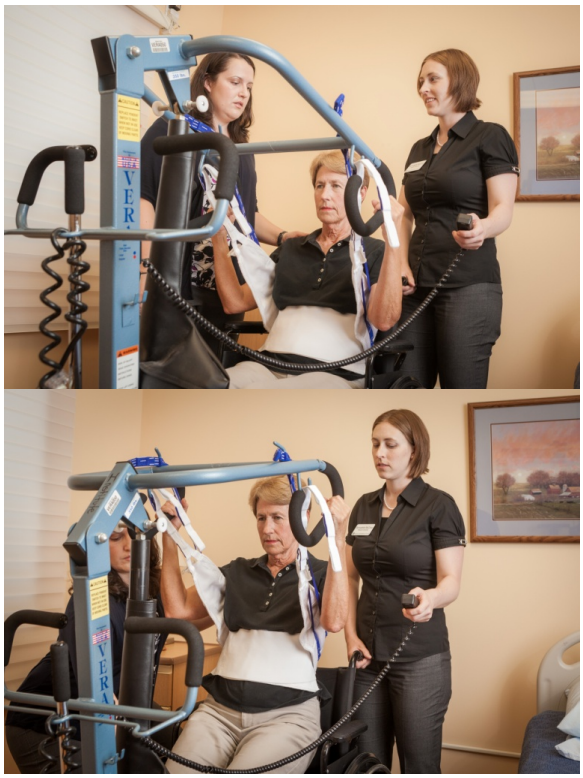

Figure 1. Patient Handling Technology in action—patient instructions (top) and hands-on facilitation of motion without the strain of lifting patient (bottom)

LIMITATIONS

A small monetary award was randomly awarded to participants (i.e., $5 gift card). However, all respondents voluntarily completed the survey, so their perceptions of pain may or may not have been more intense as compared to the therapists not completing the survey. Additionally, a larger more representative sample is needed to generalize these findings across rehabilitation facilities in the Nebraska. As an ongoing survey effort across the heartland states (i.e., Iowa, Kansas, Nebraska and Missouri), the goals of this study are not only to determine the prevalence of WRIs among rehabilitation therapists, but also to identify associations between WRIs and exposure risk factors, such as the frequency of therapeutic activities and use of patient handling technologies.

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