Claim Costs, Musculoskeletal Health, and Work Exposure in Physical Therapists, Occupational Therapists, Physical Therapist Assistants, and Occupational Therapist Assistants: A Comparison Among Long-Term Care Jobs

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Background. Patient/resident-handling tasks are physically demanding and associated with musculoskeletal disorders (MSDs) among nursing personnel. The routine performance of such tasks by physical therapists and occupational therapists during treatment can cause similar problems.

Objective. This study characterized the magnitude of MSDs and the risk factors for MSDs in physical therapists, occupational therapists, physical therapist assistants, and occupational therapist assistants (collectively called "therapy personnel" for this study) and compared them with those of other nursing home workers, especially nursing staff.

Design. This was a cross-sectional study.

Methods. Workers' compensation claim (WCC) data from 1 year of experience in a long-term care company were used to compute claim rates by body region, nature, and cause of injury, and the costs per case and per full-time–equivalent employee. Data regarding musculoskeletal symptoms, use of patient/resident-lifting equipment, and perceived physical and psychological job demands were obtained from a concurrent cross-sectional survey of workers from 24 long-term care facilities.

Results. About 80% of the WCCs were related to musculoskeletal incidents in nursing aides and therapy personnel. WCC costs paid per case for therapy personnel were more than twice those for nursing staff for both ergonomic and resident-handling incidents. Prevalence of low back pain in therapy personnel was the same as in nursing aides (48%) but involved more chronic, milder pain. About half of therapy personnel reported "never" or "rarely" using patient/resident-lifting equipment. Therapy personnel, nursing aides, and housekeeping/dietary/maintenance personnel reported the highest physical job demands.

Limitations. Causal inference cannot be determined due to the cross-sectional nature of the survey data. Study findings are relevant only to therapy work in long-term care settings because exposures vary in other health care settings (hospitals, outpatient, and others).

Conclusions. MSD prevalence and claim costs in therapy personnel are high enough to deserve more attention. The low use of patient/resident-lifting equipment in therapy could increase the risk for MSDs. Future studies with comprehensive ergonomic analysis of therapist tasks and recommendations to reduce injuries are warranted.

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Work-related musculoskeletal disorders (MSDs) and injuries among direct care nursing personnel are well documented.[1–4] In the United States, MSDs accounted for 31% of all workplace injuries and illnesses requiring time away from work in 2015.[5] Nursing assistants were among the 7 occupations that had the highest MSDs, with an incidence rate of 171 per 10,000 full-time workers.[5]

High physical job demands are implicated in these MSDs among nursing staff (registered nurses, licensed practice nurses, nursing aides/assistants).[1,2] In both acute and long-term care (LTC) settings, direct nursing care work involves lifting and transferring of patients/residents, causing awkward postures and high forces.[6] Lifting and transferring of patients/residents has a strong association with lower back pain and injury.[1,7–11] Exposure to reaching, pulling, and pushing in patient/resident-handling tasks is also strongly associated with neck and shoulder pain among nurses.[9]

Physical therapists, occupational therapists, physical therapist assistants, and occupational therapists (collectively called "therapy personnel" for this study) work manually to improve the physical functional status of patients/residents with all levels of dependency. Patient mobilization techniques are based on the assessed needs of individual residents, leading to a wide variety of therapeutic handling tasks and activities. Although these differ significantly from the usual lifting and transfers that nursing staff perform, not infrequently they expose therapy personnel to awkward postures and heavy loads (eg, when supporting and lifting body limbs while seeking to restore mobility and function). A few studies of therapists (physical therapists and occupational therapists) have demonstrated work-related MSDs affecting the lower back, neck, upper back, wrist, and shoulders. Internationally, the annual prevalence of lower back pain in therapists ranges widely between 22% and 74%.[12–19] This wide prevalence rate could be attributed to the different case definitions used, differences in workload (eg, patient/staff ratio), practice technique, and other factors. Although MSD risks vary with the practice specialty, transferring and lifting patients/residents were identified in several studies as the main tasks associated with low back pain.[20–23] Thus, therapists perform similar resident-handling tasks as nursing aides, although varying in task type and frequency. A higher prevalence of low back pain in physical therapists than in nurses has been demonstrated: manual transfers, walking assistance, and bending were performed more frequently by physical therapists than nurses.[24] More specific reported risk factors for MSDs in therapists include workload, static postures, and repetitive tasks (some occurring during handling tasks).[14,16,17,21–23]

Literature reviewing occupational injuries in therapists has primarily used surveys to identify injuries by recall.[25–27] Reports from a few studies demonstrate similar high incidence rates of back injuries and patient-handling injuries for both nurses and therapists.[28,29] There is still little knowledge about the extent of formally reported MSDs and related incident costs among therapy personnel.

Lifting and handling devices for patients/residents have proven effective in reducing musculoskeletal injuries among nursing personnel,[28–32] specifically including reduction in compensation claims related to resident-handling incidents among nursing staff in LTC.[32] However, it is unclear how often such programs are applied to physical and occupational therapists. In recent years, the American Physical Therapy Association has emphasized safe patient handling and mobility (SPHM) to reduce patient-handling injuries among therapy personnel.[33,34] Legislation in a few US states (eg, California, Washington) mandates SPHM programs in acute-care state hospitals, including inpatient rehabilitation care.[34]

Despite these guidelines, there is minimal evidence on the impact of SPHM in reducing resident-handling exposures and MSDs among therapy personnel.[35–38] Therapists might avoid using patient/resident lifting equipment, as they believe it could hinder patients' progress toward functional independence.[39] Therapists are taught to rely on good body mechanics to avoid injury, and rehabilitation services are often excluded from SPHM programs and policies for injury prevention.[19,40] However, biomechanical evidence confirms that safe lifting techniques and good body mechanics alone cannot prevent injuries. As described by Marras et al,[6] even a transfer task with a light patient who is very cooperative results in a spinal loading that exceeds tissue thresholds.[19,39] Therapy personnel's failure to use lifting equipment, whether voluntary or involuntary, might expose them to a higher risk of MSDs. A review of MSDs in nurses also speculated that physical therapists might have an increased risk for MSDs as a result of patient/resident handling for early mobility.[4] Importantly for therapists' goal-setting for functional independence of a patient/resident, evidence demonstrates that use of lifting equipment does not alter patient outcomes.[41]

The purpose of this study was to describe the magnitude of musculoskeletal conditions, both by risk of claim filing and by symptom prevalence, in addition to compensated claim costs, in therapy personnel compared with other nursing home workers, specifically nursing staff. The secondary goal of this study was to characterize the differences among LTC jobs in workers' perceived physical and psychological work demands, and use of resident-lifting equipment.

Methods

This study included 3 data sets: worker rosters, workers' compensation claim (WCC) data, and employees' survey data (supplementary figure available online at

https://academic.oup.com/ptj), all obtained from 1 long-term health care company that included both skilled nursing facilities (SNFs, n = 202) and assisted living facilities (n = 20).

The company provided its worker roster for the year 2012 (202 SNFs and 20 assisted living facilities), which listed regular hours worked per week for each employee except those in the rehabilitation department. The number of hours was divided by 40 to convert it to full-time equivalent (FTE) for each employee. The roster for rehabilitation workers only specified full-time, part-time, or casual work status for each employee. For this study, rehabilitation employees marked as full time in the roster were considered as having a 40-hour work week (ie, 1.0 FTE), and part time as 20 hours (ie, 0.5 FTE). To estimate hours per week for casual rehabilitation employees, 3 rehabilitation managers were consulted regarding typical work hours for 2012 within the company. They reported that "casual" represented about 1–4 h/wk for therapy personnel and less hours for all of the other rehabilitation jobs. Casual work was therefore estimated on the basis of this input as 0.1 FTE (4 h/wk) for all therapy personnel and 0.025 FTE (1 h/wk) for rehabilitation technicians, speech and language pathologists, respiratory therapists, rehabilitation managers, and rehabilitation coordinators.

Job titles on the worker rosters with qualitatively similar physical tasks were grouped together (Tab. 1) for comparison of the WCC and survey data. Job categorization was based on whether the job titles were clinical or nonclinical, the types of tasks performed, and the nature of the physical work. Job groups with direct patient care were considered as clinical jobs in this study: therapy personnel, nursing staff, and social/speech/respiratory services. Rehabilitation, recreation, and medical technician jobs with some resident-handling tasks, such as transporting patients on wheelchairs, were grouped together.

All WCCs filed by employees for the year 2012 were extracted for information on cause of the incident, nature of injury, body part, costs of indemnity, and medical treatment.

The variable "cause of incident" was categorized into 4 groups: (1) ergonomic (ie, repetition, manual or patient/resident handling, or bodily reaction); (2) workplace violence (ie, assaults by coworkers, patients, or visitors); (3) acute incident (ie, falls, struck by objects, slips, or trips); and (4) other.

The variable "nature of injury" was also categorized into 4 groups:(1) acute musculoskeletal incident (MSI)—fractures, dislocations, bruise/contusions, muscle tears, and similar; (2) subacute MSI—sprains, spasms, muscle contusions, carpal tunnel, tendonitis, disc hernias, and similar injuries; (3) nonspecific MSI—pain, tingling, numbness, soreness, and swelling; and (4) non-MSI—cuts, needle pricks, fluid splashes, and others. "Body region affected" was categorized as: back/lower back, upper extremity, lower extremity, multisite or unknown, and others.

The sum of FTEs for each job group served as the denominator for estimating WCC rates and costs. Rates for all MSIs, those with ergonomic causes, and body regions injured were compared among job groups.

Total paid costs were calculated as the sum of paid medical and indemnity costs. Costs per case were examined for all cases with total costs greater than zero, ie, those with above-zero costs for at least 1 of paid indemnity or paid medical but not for the sum of the total costs. Paid costs per workforce FTE and costs per above-zero case (medical, indemnity, and total) were compared across jobs. As this study mainly focused on musculoskeletal injuries, nonzero costs for cases were calculated specifically for subacute MSIs and ergonomic injuries for each job group. Claim rates and costs were also specifically examined for the patient/resident-handling incident subgroup within the ergonomic causes for subacute MSIs.

Surveys measured musculoskeletal health and work exposures from all clinical and nonclinical employees in 24 SNFs. Surveys were conducted in 2012 (13 SNFs) and 2013 (11 SNFs). Surveys were distributed in person, and employees aged at least 18 years from all departments and shifts were invited to participate.[42,43] Participation was informed and voluntary. Employees were reassured of confidentiality, and all employees returning completed questionnaires received compensation of $20. Ineligible employees (those aged below 18, or temporary agency staff) were not enumerated, but very few presented themselves because eligibility criteria had been widely communicated in advance throughout each center.

The questionnaire elicited information on employees' demographic, occupational, and health characteristics using previously validated items whenever possible.[42–44]

The questions evaluating musculoskeletal health included presence of pain symptoms within the past 3 months for each body region, and separate items for pain severity, duration, and interference with work and social activities.[44] The response for pain duration was categorized by defining "subacute pain" as having started within the past 3 months, and "chronic pain" as having lasted 3 months or more.[45,46] The questionnaire items for work exposures have been previously described.[42–44,47] For the job exposures, perceived physical demands at work (5 items) and psychological job demands (2 items) were evaluated.[47] The psychosocial characteristics of the work environment were evaluated with social support (coworker support and supervisor support: 4 items), and decision authority (3 items).[47–49] Sums of item responses

Table 1.
Descriptions of Job Categories and Grouping Criteria

Job Group (Total Workforce)	Grouping Criteria and Comparable Tasks
Therapy personnel (n = 11,448)	Physical therapist, occupational therapist, physical therapist assistant, occupational therapist assistant (train individuals for functional independence; many resident-handling tasks during treatment)
Nursing aide (n = 12,003)	Certified nursing aide, geriatric nursing aide, licensed nursing aide, personal care aide, certified medical aide, restorative nursing aide (perform resident daily care; frequent resident handling)
Licensed practical nurse (n = 3452)	Licensed practical nurse (manage resident medications and treatment; occasional resident-handling tasks)
Registered nurse (n = 4265)	Registered nurse, unit manager (supervise medical treatment; occasional resident-handling tasks)
Social/speech/respiratory service (n = 3234)	Social service staff, speech therapist, respiratory therapist (perform specialized resident care; rare or no resident-handling tasks)
Technician (n = 1379)	Rehabilitation technician, recreation assistant, medical technician (transport residents, arrange treatment area)
Housekeeping/dietary/maintenance (n = 6261)	Housekeeping, laundry, dietary/kitchen aide, facilities/maintenance assistant (clean resident area and other areas, wash and cook for residents, maintain equipment and premises; many material-handling tasks)
Office/administrative service (n = 6847)	Administrative staff, including managers and office workers from all departments (including rehabilitation department), rehabilitation program manager, rehabilitation office coordinator (perform desk work and supervisory tasks; no resident handling)

were calculated for each set, and the average score for each variable was compared across the job groups.

The frequency of using a resident-lifting device was assessed with a 5-point scale (never, rarely, sometimes, often, or always). Reasons for not using equipment were also obtained.[40]

Statistical software package SAS version 9.4 (SAS Institute Inc., Cary, NC, USA) was used to analyze the WCC rates and costs. SPSS version 22.0 (IBM SPSS, Chicago, IL, USA) was used to analyze the survey data, specifically to compare the prevalence of MSDs and exposures among job groups, with χ^2 statistics (or exact tests when warranted), parametric statistics (analysis of variance), and nonparametric statistics**.** The post hoc test and the F statistic from the robust Welch test (for homogeneity of variance) were used for analysis with 1-way analysis of variance to compare differences in work factors across jobs.

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Results

WCC Rates and Costs

The company had a total of 48,889 employees on the worker roster in all LTC facilities in 2012, of whom 11,448 were therapy personnel. The total number of WCCs in 2012 was 3389 . The majority of all claims were MSI claims (68%). Of the MSI claims with ergonomic causes, 89% were subacute claims.

Among all WCCs, the body regions most commonly injured were upper extremity (37%), lower back/back and trunk (20%), and lower extremity (17%). By job group, claim rates for subacute MSI were highest among nursing aides (100 claims per 1000 FTEs). Non-MSIs were highest among housekeeping/dietary/maintenance personnel, and registered nurses (RNs) (both job categories had 100 claims per 1000 FTEs). The rate of acute MSI was highest among nursing aides and housekeeping/dietary/maintenance personnel. The claim rate by therapy personnel for acute MSI (2 claims per 1000 FTEs) was the lowest among all jobs.

When the claims were restricted to incidents with ergonomic causes, the back and upper extremity regions were the most affected (Fig. 1). The claim rates for ergonomic incidents were substantially higher for nursing aides than for other job groups, with the back being their most affected region (36/1000 FTE). Therapy personnel had the second highest claim rate for back injuries among clinical jobs, comparable to those of licensed practical nurses (LPNs) and RNs.

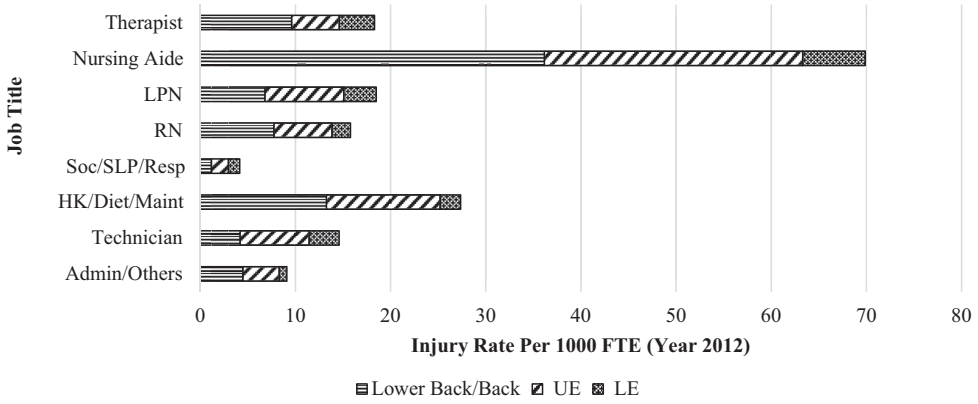

Figure 1.
Claim rates for 1297 ergonomic incidents in 1 year among long-term care workers by body region and job group. Admin = administrative service; Diet = dietary; FTE = full-time equivalent; HK = housekeeping; LE = lower extremity; LPN = licensed practical nurse; Maint = maintenance; Resp = respiratory; RN = registered nurse; SLP = speech and language pathologist; Soc = social service; UE = upper extremity. See Table 1 for job groups.

Correspondingly, the total paid claim costs were highest for nursing aides ($3.9 million), followed by housekeeping/dietary/maintenance ($1.4 million) and therapists ($1.1 million). Paid costs per FTE employee for all ergonomic injuries (total, indemnity, and medical) were also highest among nursing aides (total = $237, indemnity = $70, medical = $167), followed by therapy personnel (total = $132, indemnity = $63, medical = $69), and housekeeping/dietary/maintenance (total = $116, indemnity = $46, medical = $70).

Subacute MSI cases with ergonomic causes were several times more frequent for nursing aides than for any other job (Tab. 2). For this specific category of claims, aides also had the highest paid costs per FTE; however, therapy personnel had the highest paid costs per case. This resulted from their much higher indemnity costs per case. However, the total costs per case for therapy personnel also had higher medical costs than indemnity costs.

About 43% of the claims for subacute MSIs were related to resident-handling incidents. Claim rates and costs per FTE for resident handling within subacute MSIs were much higher for nursing aides and second highest for therapy personnel within the clinical jobs (Tab. 3). Medical costs were higher than indemnity costs for all ergonomic and resident-handling incidents among both nursing aides and therapy personnel.

Survey Results

A survey response rate of 57.7% of the total workforce (n = 4581; including workers absent on disability or for other reasons) yielded a total of 2642 survey participants from the 24 SNFs. Specific to the rehabilitation workforce from the 24 SNFs (n = 426), 156 therapy personnel completed the survey. Individual survey items had missing values ranging from 0.8% to 12.6% of all respondents. The average age of the 2642 survey participants was 41.6 (± 13) years. Women were a majority (> 80%) of all respondents, as well as in each job group.

Musculoskeletal symptoms. Among all job groups, the highest prevalence of pain was for lower back followed by shoulder region (Tab. 4). Therapy personnel and nursing aides reported the highest pain prevalence in the lower back. Shoulder pain similarly was high among nursing staff and therapy personnel. Neck pain prevalence was highest among therapy personnel. Knee pain was reported more frequently by all nursing personnel (aides, RNs, and LPNs) than others. Ankle and foot pain prevalence was highest among technicians and nursing aides.

Therapy personnel were most likely to report low back pain of mild severity (37%) on the 5-point scale, whereas the nursing aides reported more moderate and severe/extreme pain (34%) (χ^2 for frequency among all job groups, $P < .001$, $df = 28$). No significant differences were found for severity in other body regions.

Among individuals reporting low back pain, LPNs (82%) and therapy personnel (81%) reported the highest rates of "chronic" pain. A higher proportion of nursing aides (29%) and social/speech/respiratory personnel (25%) reported subacute pain (χ^2, $P < .001$, $df = 14$). Although no significant differences were found across jobs, nursing aides most frequently reported low back or knee pain limiting their social activities (37%) and work or daily activities (29%).

Use of patient/resident-lifting equipment. Among all clinical jobs, never or rarely using resident-lifting equipment was common among therapy personnel (53%) and social/speech/respiratory services (71%). About 74% of nursing aides reported using a resident-lifting device

Table 2.
Claim Rates and Costs for Subacute Musculoskeletal Incidents With Ergonomic Causes[a]

Job Title	Total No. of Cases (n = 983)	Total FTEs	Claim Rate/ 1000 FTEs	Total Paid Costs ($)	Cost ($)/ Case	Cost ($)/ FTE
Nursing aide	598	9129.6	66	1,955,196	3270	214
Therapy personnel	110	6772.9	16	884,545	8041	131
Housekeeping/dietary/ maintenance	112	4678.3	24	468,648	4184	100
Technician	14	959.7	15	61,292	4378	64
LPN	42	2650.2	16	118,348	2818	45
RN	46	3104.3	15	121,389	2639	39
Social/speech/respiratory service	7	1688.6	4	21,021	3003	12
Administrative service/others	54	6269.5	9	64,541	1195	10

[a]FTE = full-time equivalent; LPN = licensed practical nurse; RN = registered nurse.

Table 3.
Claim Rates and Costs for Subacute Musculoskeletal Incidents With Causes of Resident-Handling Incidents (Subset of all Ergonomic Causes)[a]

Job Title	Total No. Cases (n = 717)	Total FTEs	Claim Rate/ 1000 FTEs	Total Paid Costs ($)	Cost ($)/ Case	Cost ($)/ FTE
Nursing aide	526	9129.6	58	1,769,565	3364	194
Therapy personnel	99	6772.9	15	813,273	8215	120
Housekeeping/dietary/ maintenance	1	4678.3	0	1,191	1191	0
Technician	13	959.7	14	59,336	4564	62
LPN	28	2650.2	11	100,748	3598	38
RN	32	3104.3	10	111,152	3473	36
Social/speech/respiratory service	4	1688.6	2	19,145	4786	11
Administrative service/others	14	6269.5	2	12,367	883	2

[a]FTE = full-time equivalent; LPN = licensed practical nurse; RN = registered nurse.

always/often compared with only 6% of therapy personnel (Fig. 2). In response to an open-ended question about reasons for not using lifting equipment, a majority of therapy personnel stated that treatment did not involve lifting because the goal was to make residents independent.

Perceived work demands and work factors. The mean perceived psychological demand score was higher among RNs ($\bar{x} = 5.94$), LPNs ($\bar{x} = 5.88$), and therapy personnel ($\bar{x} = 5.87$ on a scale from 2 to 8, $P < .001$) than others. Therapy personnel had the highest mean perceived physical demand score ($\bar{x} = 14.6$ on a scale from 5 to 20, $P < .001$), followed by nursing aides ($\bar{x} = 12.6$), and housekeeping/dietary/maintenance workers ($\bar{x} = 12.0$). Decision latitude was lowest for housekeeping/dietary/maintenance personnel ($\bar{x} = 4.9$ on a scale from 2 to 8, $P < .001$), and highest among therapy personnel ($\bar{x} = 6.3$). Social support (supervisor support and coworker support) was perceived as high among social/speech/respiratory workers ($\bar{x} = 12.6$), technicians ($\bar{x} = 12.5$), and therapy personnel ($\bar{x} = 12.0$), and lower among nursing aides ($\bar{x} = 10.9$ on a scale from 4 to 16, $P < .001$).

Table 4.
Symptoms Reported Among 2642 Nursing Home Workers by Body Region and Job Group (2012–2013)[a]

Location of Pain Prevalence	Therapy Personnel (n = 156)[b]	RNs (n = 282)[b]	Nursing Aides (n = 952)[b]	LPNs (n = 230)[b]	Office/ Administrative Service (n = 261)[b]	Housekeeping/ dietary/ maintenance (n = 598)[b]	Technicians (n = 103)[b]	Social/Speech/ Respiratory Service (n = 60)[b]	P^c
Lower back	48.1 (75)	44.0 (124)	47.5 (452)	39.6 (91)	39.5 (103)	37.1 (222)	38.8 (40)	33.3 (20)	.001
Shoulder	34.6 (54)	27.7 (78)	29.6 (282)	25.2 (58)	24.5 (64)	21.6 (129)	22.3 (23)	20.0 (12)	.004
Wrist/forearm	13.5 (21)	11.0 (31)	14.1 (134)	12.2 (28)	15.3 (40)	13.5 (81)	7.8 (8)	10.0 (6)	.501
Knee	17.9 (28)	24.8 (70)	25.0 (238)	22.6 (52)	19.5 (51)	18.6 (111)	20.4 (21)	16.7 (10)	.051
Neck	24.4 (38)	22.0 (62)	16.3 (155)	14.3 (33)	20.3 (53)	11.5 (69)	18.4 (19)	18.3 (11)	<.001
Ankle/feet	15.4 (24)	14.9 (42)	23.0 (219)	19.6 (45)	12.6 (33)	19.2 (115)	24.3 (25)	18.3 (11)	.002

[a] Data other than *P* values are reported as percentages (numbers) of respondents. LPNs = licensed practical nurses; RNs = registered nurses.
[b] The numbers of respondents varied slightly among the rows because of missing values.
[c] Determined from the χ^2 statistic ($df = 7$).

Discussion

In this large study of workers in LTC facilities, MSDs were highly prevalent overall, as expected, but with important variation among jobs in the location of the disorder (body region), as well as the severity and duration of back symptoms. WCCs and costs were particularly high for nursing aides. Therapy personnel had lower claim rates, similar to those of nurses, although their claim costs per case were notably higher than those of nursing staff. WCC costs paid per case for therapy personnel were more than twice those for nursing staff for both ergonomic and patient/resident-handling incidents. Therapy personnel had high indemnity costs, as did nursing aides, whose wages are much lower.

Most WCCs in this study were MSIs, accounting for about 80% of all claims for both nursing aides and therapy personnel. Claim rates and costs of MSIs related to resident handling were highest in nursing aides and therapy personnel among the clinical jobs. These findings are consistent with a study reporting a high incidence of musculoskeletal injury (62% of all injury incident reports) for nursing and therapy jobs in an acute care setting, with back injury being the most common work-related injury.[28] Another study reported high musculoskeletal injury rates related to patient/resident handling among therapists, rehabilitation aides, and nursing aides.[29] Our study identified MSI injury patterns in therapy personnel, but further understanding of the type of patient/resident-handling tasks performed is essential to plan preventive strategies.

Our study demonstrates the differences in the relationship between claim rates and symptom prevalence among jobs. Although therapy personnel had the same prevalence of low back pain as aides, their WCC rate was only about one-fourth that of the aides, and similar to LPNs and RNs. One possible reason for this discrepancy could be that therapy personnel were more likely to report chronic back pain with mild severity.

Mild and chronic pain may be less obviously identified by individuals as work-related. People with mild pain probably also have less incentive to file a WCC, as it might not incur lost work time or medical costs. Workers' compensation systems were developed for acute "accidents" and could discourage workers from claiming for mild and chronic pain where the etiology is more ambiguous.[50] Additionally, therapy personnel may self-treat or treat each other informally.[51]

According to Qin et al, lower claim-filing likelihood in another sample of this population was also associated with higher social support, job strain, and education level.[47] Decision latitude and social support (supervisor and coworker) were highest among therapy personnel and lowest among the nursing aides in our study. It is not

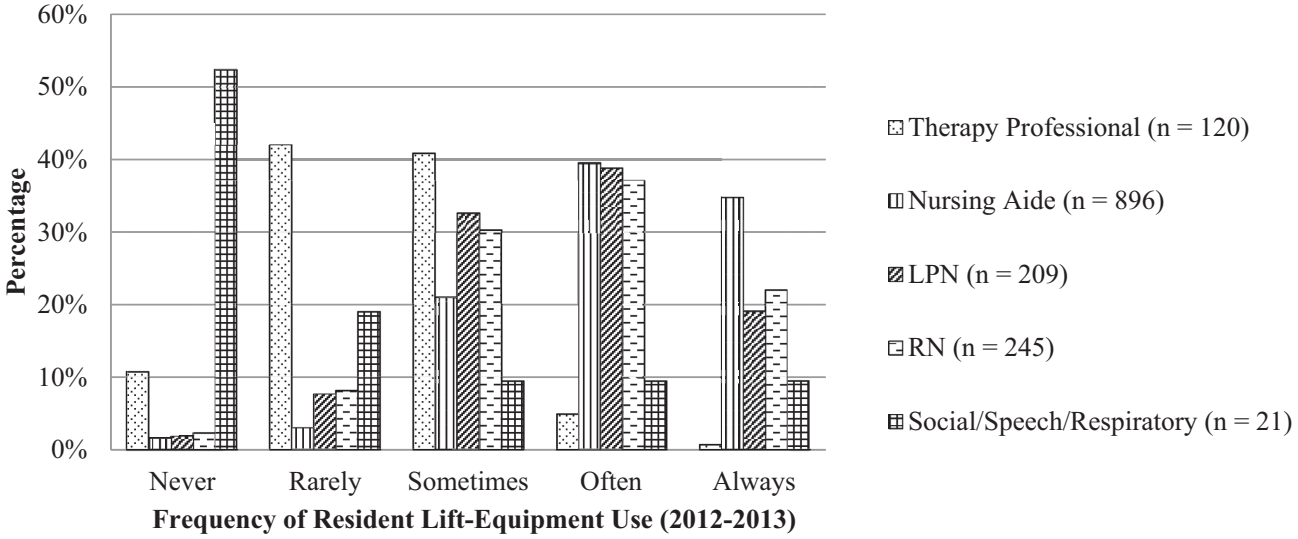

Figure 2.
Frequency ofself-reported use of resident-handling/lifting equipment among 1491 nursing home workers in clinical jobs. $P < .001$ from χ^2 statistic with 16 degrees of freedom. LPN = licensed practical nurse; RN = registered nurse.

known if the claim rates of therapy personnel were lower because of their chronic, low-severity pain; their high decision latitude and perceived social support; their belief that the back pain was not work-related; or other factors that might have affected their reporting behaviors. Further studies are needed to examine the association of musculoskeletal symptoms and work factors among therapy personnel.

A company-wide SPHM program in all SNFs in this study was started in 2007, with a "no-lifting" policy and training on use of resident-lifting equipment for nursing personnel that excluded therapy personnel. The claims and costs for patient/resident handling in nursing reduced over time, but such procedures still accounted for some morbidity in our study despite the established SPHM program in these LTC facilities.[32,40] Thus, it is concerning that MSD symptoms and costs (per case and per FTE) for therapy personnel were higher than for nurses. Our findings on the low use of resident-handling equipment by therapy staff, and the rationale that equipment use interferes with therapy goals, are consistent with prior studies, which showed that therapists use lifting equipment mainly for patients receiving bariatric therapy and those with a totally dependent status.[38,39] It is important for therapy personnel to have ergonomic-device–assisted solutions, as evidence suggests similar patient outcomes with and without the use of patient/resident-lifting equipment and SPHM programs.[14,37,41,52,53]

Although our study focused mainly on clinical jobs, there were also considerable MSD symptoms and injury costs in nonclinical jobs such as housekeeping/dietary/maintenance and technicians. Preventive programs for MSDs in the LTC industry until now have been directed primarily toward nursing staff.[2,10,29,54] The LTC industry should also extend injury prevention programs to nonclinical jobs with high physical load.

Strengths and Limitations

Our study had a large sample size in both the survey and claims data sets, allowing ample statistical power. All WCCs were processed through a single insurance company, which provided relatively good data quality and comparability among jobs. Our findings are relevant only to LTC as exposures vary with patient/resident status and treatment needs in other health care settings (hospitals, outpatient, and others).[55]

The indemnity costs per case for ergonomic incidents specific to resident-handling cases with subacute MSIs were higher in therapy personnel than in nursing staff. Medical costs per case for these incidents were also higher in therapy personnel than others. We cannot determine whether the cause was longer absences with serious injuries or simply higher wages. This is an acknowledged limitation of using indemnity costs as a proxy for severity.

Another limitation was the lack of information on weekly work hours of rehabilitation employees in the worker roster to calculate FTEs for denominators. Underestimation by managers of the hours for casual work would have led

to underestimation of FTEs and therefore overestimation of the WCC rates for rehabilitation employees.

There is possible underreporting of MSDs both to supervisors and to WCC systems in all of the clinical job groups. In general, it is well established that not all individuals with work-related symptoms file claims.[56] Nursing home workers with severe pain are more likely to file claims (as well as differences related to job features, as discussed above).[47,50] Like other health care workers, physical therapists may underreport injuries, and continue working with pain.[14,39,57,58] The difference in the claim rates between therapy personnel and nursing aides in this study, and its apparent discrepancy with symptom prevalence, remains unexplained. It was not possible to examine these relationships here, as WCCs for rehabilitation personnel were deidentified and could not be linked to the surveys. Future research could examine possible reasons for systematic differences in claim filing among health care jobs.

Possible information bias could have occurred within this study, with unknown reporting error in the survey data for MSDs. Potential selection bias in the survey data could have resulted from differential nonresponses. Possible reasons for nonparticipation included lack of interest or confidence in response confidentiality, and absence from work during the week of survey distribution (eg, vacation, disability, casual workers not being scheduled). The overall response rate was adequate but we could not determine, eg, whether workers with back pain were more likely to return questionnaires than those who were pain-free. However, high symptom prevalences among job types were not likely to be affected, because job types are mutually exclusive. Because of the cross-sectional nature of the survey data, cause-effect relationships cannot be determined. One concern is the loss of workers altogether from exposed jobs after the occurrence of pain (the "healthy worker effect"), which would lead to underestimation of exposure-related pain in both WCC and survey data. Back pain has been reported as a reason for nurses leaving the profession, but to our knowledge this possible relationship has not yet been examined among therapy personnel.

Conclusions

This study provides evidence that therapy personnel working in LTC have musculoskeletal claim rates and related claim costs comparable with those of nurses. The high medical costs, costs per case for MSIs, and the high symptom prevalence warrant further investigation of therapy jobs, at least to the level of attention given to other health care workers.

The low use of resident-handling equipment in therapy warrants strategies to reduce tension between therapeutic goals and worker protection in the rehabilitation professions.[37,39] Ergonomic solutions could reduce injuries, and hence it is important to evaluate ergonomic exposures with objective measures among the rehabilitation jobs, to document which specific tasks (if any) produce high biomechanical loads.

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Ethics Approval

The ProCare (Promoting Physical and Mental Health of Caregivers Through Transdisciplinary Intervention) study was approved by the University of Massachusetts Lowell Institutional Review Board (Protocol No. 06-1403) and was part of the Center for the Promotion of Health in the New England Workplace (CPH-NEW) (https://www.uml.edu/Research/centers/CPH-NEW/Research/long-term-care.aspx).

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Disclosure and Presentations

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