Work-Related Musculoskeletal Disorders and Prevention Among Home Healthcare Workers

Arun Garg[a], *Matthew S. Thiese*[b], *Jay Kapellusch*[a] *and Kurt T. Hegmann*[b]

[a]*Center for Ergonomics*
University of Wisconsin-Milwaukee
Milwaukee, WI 53211, USA

[b]*Rocky Mountain Center for Occupational and Environmental Health*
University of Utah
Salt Lake City, UT 84108, USA

ABSTRACT

Work-related musculoskeletal disorders are common and costly, particularly among home healthcare workers. These workers are a particularly interesting occupational group because of growth of the home healthcare industry and specific patient transfer exposures. This cross-sectional study of 883 home healthcare workers from 17 agencies evaluated self-reported personal and occupational factors related to 1-year period prevalence of neck pain. One-year prevalence odds ratios (PORs) were calculated by separately comparing WMSDs in aides and nurses to office workers/therapists. Multiple logistic regression models were constructed for WMSDs. For neck pain the potential confounders included in the logistic regression models were: age, gender, smoking history (calculated in pack years), body mass index (BMI), time spent performing aerobic exercises, personal psychosocial factors, work related psychosocial factors, miles traveled in an automobile during an average day, and the degree to which the HHCW felt rushed or hurried traveling from patient to patient. Many occupational and non-occupational factors were statistically significantly related to 1-year period prevalence of neck pain with prevalence odds ratios for home healthcare aides at 1.99 after adjustment for above factors. Nurses had higher statistically significant risk estimates at 2.17. Both home healthcare aides and nurses are at increased risk for neck pain.

Keywords: Home Healthcare Workers, Musculoskeletal Disorders, Prevention

BACKGROUND

A work-related musculoskeletal disorder (WMSD) is an injury of the muscles, tendons, ligaments or joints caused by hard work tasks such as lifting, pushing, and pulling (Orr, 1997). WMSDs are common injuries among workers in the United States. In 2010, WMSDs occupied 29 percent of all workplace injuries requiring time away from work and the incidence rate for WMSD cases increased 4 percent to 34 cases per 10,000 full-time workers. Nursing aides, orderlies, and attendants are the occupations with the highest incidence rate of WMSDs with 249 cases per 10,000 full-time workers (BLS, 2011). Healthcare workers are not immune to musculoskeletal disorders because they are exposed to occupational risks factors, including hospital, nursing homes, emergency room and home healthcare environments (Waters, Collins, Galinsky, & Caruso, 2006).

Home healthcare (HHC) is the most rapidly growing industry in the United States. The Bureau of Labor Statistics (BLS) projects that home healthcare will add more than 870,000 jobs by 2020 with an average annual growth rate of

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6.1 percent (BLS, 2012). Home healthcare workers (HHCW) aid sick, elderly and disabled people who live in their own homes instead of in a healthcare establishment (DHHS(NIOSH), 2010). Home healthcare workers most often are realizing heavy tasks such as, lifting and moving their patients without assistance (Myers, Jensen, Nestor, & Rattiner, 1993), and these have been demonstrated to be associated with the high rates of MSDs in HHCW (Galinsky, Waters, & Malit, 2001). According with many studies, HHCW take more days away from work than other workers as a result of WMSD (Brulin, Goine, Edlund, & Knutsson, 1998; Moens, Dohogne, & Jacques, 1994; Ono, Lagerstrom, Hagberg, Linden, & Malker, 1995) and with the growth of HHC services, it is expected that WMSDs increase as well among HHCWs.

The purpose of this article is to report the results of neck pain of a large cross sectional study of home healthcare workers in 17 agencies.

METHODS

This study was approved by the Institutional Review Boards at the University of Utah (IRB # 8197), University of Wisconsin-Milwaukee (Protocol # 01-01-047), Intermountain Health Care (IRB # 1292), and Aurora Health Care (Protocol # S-01-123E).

Home healthcare workers (n=883) were enrolled from 17 agencies in Iowa (n= 35), Wisconsin (n= 237), Utah (n= 337) and Saskatchewan, Canada (n= 274). The participation rate of those attending enrollment sessions averaged 98.5 percent and overall participation rate was approximately 85 percent. All participating workers consented and completed a self-administered survey instrument, mostly in small group settings. Data collected included (i) demographics (ii) job tasks performed, (iii) Borg CR-10 ratings (Borg 1982) for stressful tasks performed, (iv) psychosocial stressors, (v) non-MSD hazards (e.g. dog bites, traffic accidents, seat belt use, sharps injuries, etc.), (vi) MSD symptoms, and (vii) use of patient transfer assistive devices.

First we analyzed our data using ANOVA to determine if there were significant differences in WMSD complaints in the back, neck and shoulder among the Physical Therapists, Occupational Therapists, Social Workers, Managers, and other office workers. Since there were no significant differences among these groups for MSD symptoms ($p \geq 0.80$) these job categories were collapsed into one category (Office Workers/Therapists) that served as the control group for this study (see Table 1).

For the purposes of this paper, a WMSD case was defined as an episode of self-reported neck pain in the prior 12 months that the worker reported as “related to work.” One-year prevalence odds ratios (PORs) were calculated by separately comparing WMSDs in aides and nurses to office workers/therapists. Multiple logistic regression models were constructed that included both recognized and biologically plausible risk factors for WMSDs. For neck pain the potential confounders included in the logistic regression models were: age, gender, smoking history (calculated in pack years), body mass index (BMI), time spent performing aerobic exercises, personal psychosocial factors, work related psychosocial factors, miles traveled in an automobile during an average day, and the degree to which the HHCW felt rushed or hurried traveling from patient to patient.

RESULTS

Workers were largely female 815 (93.2%). The mean age was 43.4 ± 11.3 years. HHCWs were identified as 413 (48.7%) aides, 306 (34.7 %) nurses, 67 (7.6%) Physical Therapists 18 (2.0%) Occupational Therapists 8 (0.9%) Respiratory Therapists, 22 (2.5 %) Office Workers, 21 (2.4 %) Managers and 10 (1.1 %) Social Workers (see Table 1).

Table 1. Demographic characteristics of the 883 participants in the Home Health Care Study.

		Aides N=431		Nurses N=306		Office workers / Therapists† N=146		Total N=883		p value
Sex										
Female	n (%)	400	(92.8)	291	(95.1)	124	(84.9)	815	(92.3)	<0.001*
Smoking Status										
non-smoker	n (%)	211	(49.0)	203	(66.3)	106	(72.6)	520	(58.9)	<0.001*
ex-smoker		115	(26.7)	70	(22.9)	35	(24.0)	220	(24.9)	
current smoker		99	(23.0)	29	(9.5)	4	(2.7)	132	(14.9)	
		mean	(sd)							
Age		43.8	(12.7)	43.4	(9.7)	42.5	(9.9)	43.4	(11.3)	0.52**
Body Mass Index (BMI)‡		27.8	(6.3)	27.0	(6.7)	26.1	(5.7)	27.2	(6.4)	0.015**
Median and Range		26.6	(36.32)	25.0	(35.68)	25.0	(29.48)	25.7	(36.32)	

†Control group includes speech pathologists, social workers, managers, office personnel and physical, occupational, and respiratory therapists.
‡The values immediately below the mean and standard deviation are the median and range, respectively. Median and range included due to positively skewed data.
*P values based on the chi-square test of statistical independence.
**P values based on one-way ANOVA.

The second most common musculoskeletal disorder was neck pain, since 84.81% of the subjects say that sometime in their life they have experienced neck pain. However, neck was less common than low back pain and was called as having afflicted approximately one third (31.86%) of the participants during a 12 month period. Neck pain prevalence was found to be most common among nurses (87.24%), and less common in the office/therapist category. More aides (32.95%) and nurses (34.75%) had neck pain than did office/therapists (22.60%). Only 39.19% of the participants were more likely to visit the doctor or chiropractor, 14.49% missed work, and 6.93% received light duty due to neck pain. The 53.90% of the participants rated the intensity of their pain as moderate for neck pain .

Non-occupational factors (Table 2) associated with work-related neck pain in aides included current smoking (POR=2.48, 95% CI 1.46, 4.20), a history of back problems (POR=4.19, 95% CI 2.65, 6.66), sciatica (POR=2.07, 95% CI 1.25, 3.41), osteoarthritis (POR=2.41, 95% CI 1.23, 4.69), and degenerative spine disease (POR=3.62, 95% CI 1.27, 11.07).

Of ten psychosocial factors were associated with work-related neck pain, including feeling depressed (POR=1.52, 95% CI 1.09, 2.14), supervisor does not listen to personal problems (POR=1.39, 95% CI 1.08, 1.78), feeling mentally exhausted after work (POR=1.71, 95% CI 1.26, 2.32) and feeling physically exhausted after work (POR=1.95, 95% CI 1.42, 2.67). Similar findings were present in the nurses, though there were additional statistically positive associations for psychosocial factors, quality of sleep at night (POR=1.36 95% CI 1.05, 1.78),

self-described general health as compared to others the same age (POR=1.43 95% CI 1.09, 1.88), feeling rushed/hurried (POR=1.45, 95% CI 1.16, 1.81), and home care job satisfaction (POR=1.35 95% CI 1.03, 1.76).

Occupational factors that were statistically associated with work-related neck pain included miles traveled in an average day (POR=1.06, 95% CI 1.01, 1.12), lack of access to the bed (POR=1.75, 95% CI 1.12, 2.74), problems with height of the bed (POR=1.73, 95% CI 1.11, 2.69), more than 10 weekly distinct Home Healthcare patients (POR=1.47, 95% CI 0.95, 2.26) and greater than 20 Home Healthcare visits per week (POR=1.59, 95% CI 1.01, 2.51). Age and female gender were statistically insignificant.
Adjusted PORs were calculated using multivariable logistic regression (see Table 3). This data suggest nurses had more work-related neck pain than the aides.

Table 2. Univariate Prevalence Odds Ratios (POR) for selected occupational and non-occupational factors for work-related neck pain

	Aides POR (95% CI)	Nurses POR (95% CI)	Office/Therapists POR (95% CI)
Sex			
Female	1.22 (0.52, 3.09)	1.07 (0.32, 4.10)	2.02 (0.54, 11.35)
Smoking Status[a]			
Ex-smoker	1.11 (0.65, 1.88)	1.05 (0.56, 1.93)	1.32 (0.47, 3.45)
Current	2.48 (1.46, 4.20)*	1.88 (0.79, 4.44)	1.27 (0.02, 16.72)
Age (5 year increments)	1.03 (0.95, 1.11)	1.02 (0.90, 1.16)	1.16 (0.95, 1.43)
Body Mass Index[b]	0.84 (0.50, 1.38)	1.07 (0.59, 1.92)	0.68 (0.16, 2.31)
Tenure w/ HHC[c]	1.23 (1.01, 1.50)*	1.29 (1.02, 1.64)*	1.53 (1.02, 2.29)*
Back Problems	4.19 (2.65, 6.66)*	1.68 (1.01, 2.79)*	1.57 (0.65, 3.73)
HHC Visits[d]	1.59 (1.01, 2.51)*	1.49 (0.89, 2.47)	1.52 (0.56, 4.07)
HHC Patients[e]	1.47 (0.95, 2.26)	1.43 (0.85, 2.42)	0.89 (0.34, 2.32)
Walking Obstacles[f]	1.27 (0.81, 1.97)	2.66 (1.57, 4.53)*	1.46 (0.46, 5.55)
Cooperative pts as a % of total	0.54 (0.19, 1.50)	1.02 (0.36, 2.88)	0.52 (0.02, 12.47)
Time spent per day in vehicle (hours)	0.99 (0.97, 1.01)	1.03 (0.97, 1.01)	1.00 (0.97, 1.02)

[a] The referent group is non-smoker
[b] Obese vs. non-obese
[c] Incremental intervals (years): [0-1.9], [2-4.9], [5-9.9], [10+)
[d] Dichotomized at 20 weekly visits
[e] Dichotomized at 10 weekly patients
[f] none vs. any

* Indicates significance at an alpha level of 0.05.

Table 3. Crude and Adjusted Prevalence Odds Ratio for Aides, Nurses, and Office/Therapists.

Risk Factor	Prevalence Odds Ratio (95% CI)		
	Aides	Nurses	Office workers/Therapists
HHC Related Neck Pain (Crude)	1.68 (1.09, 2.60)*	1.82 (1.16, 2.87)*	1.00
HHC Related Neck Pain (Adjusted)	1.99 (1.16, 3.44)*	2.17 (1.25, 3.77)*	1.00

* Denotes Significance at alpha level of 0.05

DISCUSSION

Work-related musculoskeletal disorders in HHCW are attributed primarily to the forceful exertions and awkward postures inflicted by patient lifts and transfers (Burdorf & Sorock, 1997; Galinsky et al., 2001; K. S. Parsons, Galinsky, & Waters, 2006; Waters et al., 2006). Home healthcare workers have these issues because there are limited hoists in the homes and insufficient time to implement adequate methods for lifting (Brulin, Winkvist, & Langendoen, 2000). Other studies suggests that healthcare workers who spend the most time transferring, bathing, and dressing patients have the highest rates of WMSDs (Kim, Geiger-Brown, Trinkoff, & Muntaner, 2010; Moens et al., 1994; Nelson, Gross, & Lloyd, 1997; Zelenka, Floren, & Jordan, 1996).

NIOSH study intended to find the potential associations between patient handling and workers' reports of musculoskeletal symptoms, a survey was administered to a group of HHCW (N= 744). Data were collected during 2002-2004 with 64% rate of responses. Workers were categorized as a "patient handlers" if they performed tasks, such as, transfer in/out of bed, transfer on/off toilet, adult diaper changing, bathing, and dressing. The results showed that patient handling was significantly associated with workers' reports of musculoskeletal pain in back, shoulder/neck, and leg/feet (Galinsky, Parsons, & Krieg, 2004; K. Parsons, Galinsky, Waters, & Feng, 2006).

Our study has shown that neck pain is one of the most prevalent WMSDs among HHCW. This is the first article that has evaluated neck pain factors among HHCW, since all literature that we have knowledge, has studied neck pain in conjunction with other WMSDs, such as, shoulder and back pain.

Several studies indicate that the risk and consequences of shoulder/neck problems may even comparable of back problems in HHCW (Gerdle, Brulin, Elert, & Granlund, 1994; Knibbe & Friele, 1996). Neck pain is mainly due to poor postures and forceful exertions during patient transferring and cleaning tasks (Brulin, Gerdle, et al., 1998; Elert, Brulin, Gerdle, & Johansson, 1992; Johansson, 1995; Knibbe & Friele, 1996; Meyer & Muntaner, 1999; Torgen, Nygard, & Kilbom, 1995). Additionally, we found that the psychosocial factors: feeling depressed including, supervisor does not listen to personal problems, feeling mentally exhausted after work and feeling physically exhausted after work, were strongly related with work-related neck pain. Other studies suggested that a combination of ergonomic factors and a poor psychological environment, whether is related or not to work; reinforces the risk of neck pain (Fredriksson et al., 1999; Johansson, 1995; Josephson, 1998; Linton SJ., 1990; Thorbjornsson et al., 1998).

In cross-sectional study, a questionnaire was administered to a group of HHCW (N= 400) and a total of 361(90%) responded (Brulin, Gerdle, et al., 1998). The study intended to find physical and psychosocial work-related risk factors associated with shoulder/neck and low back pain. Also, it was found that neck pain had a prevalence of 44% (95% CI: 39-49) and shoulder pain had a prevalence of 47% (95% CI: 42-52). The factors with strongest associations to shoulder/neck pain were: "standing in forward-bent" and "twisted postures" with adjust OR of 2.0 (90% CI: 1.2-3.1). The analyses of synergy showed that shoulder/neck pain area was more sensitive to the interaction of "possibility of influencing the planning of work" and "standing in forward-bent and twisted postures" (OR: 1.7, 90% CI: 0.2-3.2) (Brulin, Gerdle, et al., 1998).

Strengths of this study include the large sample size which was collected from 17 home healthcare agencies in the US and Canada. These data include both occupational and non-occupational factors, which were controlled for in a final model relating job with 1-year prevalence of neck pain. Weaknesses include the cross-sectional nature of this study which does not allow for demonstration of temporality. Additionally, there is a possibility of recall bias and the healthy worker effect in these data.

CONCLUSION

Both home healthcare aides and nurses are at increased risk for 1-year period prevalence of neck pain in this large, multi-center study. These relationships persist after adjustment for both occupational and non-occupational factors.

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