

## **BACK, NECK, AND SHOULDER PAIN IN HOME HEALTH CARE WORKERS**

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### **ABSTRACT**

Home Health Care workers (HHCW) have elevated injury rates (BLS 1998) and are believed to be at increased risk for Musculoskeletal Disorders (MSDs), in part due to the frequency of manual patient transferring tasks that HHC workers perform. In the U.S. HHC aides typically perform more manual patient transfers than nurses, and are therefore believed to be the highest at-risk employee HHC group for MSDs. A cross sectional study was used to assess relationships between job titles and injury experiences. Questionnaires were completed by home health care workers (n=883) from 24 agencies in Utah and Wisconsin (USA) as well as Saskatchewan (Canada). Statistically associated non-occupational factors for work-related LBP in aides included current smoking (PRR=2.47, 95% CI 1.43, 4.32). Numerous psychosocial factors were positively associated with 1-year period prevalence of LBP. Age and female gender were either statistically negative or protective. Similar findings were present in the nurses, though there were fewer statistically positive associations. Occupational factors that were statistically associated with LBP included miles traveled in an average day (PRR=1.06, 95% CI 1.01, 1.12), feeling rushed/hurried (PRR=1.28, 95% CI 1.04, 1.58), lack of access to the bed (PRR=1.66, 95% CI 1.06, 2.58), problems with height of the bed (PRR=1.82, 95% CI 1.18, 2.81), lack of access to the toilet (PRR=1.66, 95% CI 1.07, 2.59) and  $\geq 10$  weekly distinct HHC patients (PRR=1.77, 95% CI 1.18, 2.67) and  $\geq 20$  HHC visits per week (PRR=2.06, 95% CI 1.34, 3.16). Similar findings were present in the neck and shoulder pain. Logistic regression modelings showed the adjusted PRRs were also done and showed that the aides recalled more work-related LBP in the prior year than the other two groups. Shoulder pain had somewhat similar findings. The nurses had more neck pain than the aides. All findings, except shoulder pain in nurses, were statistically significant. Additional research into HHC tasks is also particularly needed as there is reasonably anticipated major employment growth in this industry over the coming decade from commensurate aging populations.

## BACKGROUND

The number of home healthcare workers (HHCWs) rose 77.3% from 1991 to 1995 (Jarrell 1997) and many studies have documented a high prevalence rate of low back pain (LBP) among nursing personnel (Garg 1999). It has also been reported that HHCWs are also at elevated risk for lost-time injuries (BLS 1998). Thus, with increasing numbers of workers at potential risk, this is an area of increasing concern.

The BLS data indicated that the rate of lost-time work injuries was 4.7 per 100 full-time equivalent employees (FTEs), in contrast with 3.1/100 FTEs for all private health services (a 51.6% increased risk). The most common type of event leading to the lost-time was overexertion (39%) and most of those (56.4%) were attributing to lifting. Workers for home health care (HHC) companies lost a mean of 7 workdays in comparison with 5 days for the private health care industry workers (a 40% increase). In analyzing the two main subcategories of HHC providers, 1) nurses and 2) aides/attendants/orderlies (hereafter “aides”), it has been found that the latter category carries a disproportionate share of the morbidity burden (BLS 1998). The aides constitute approximately one-half of the workforce, yet they account for two-thirds of the lost-time injuries. Meyer and Muntaner (1999) reported that the crude incidence rate was 52/1000, which was above that state’s rate for hospital employees (46/1000). Back injuries constituted the largest grouped body part injured (35.7%), and these were disproportionately more severe as they accounted for 45.5% of the lost-time injuries that were over 3-days lost. Hazards to the worker have been noted to include: limitations in showers/baths, steep stairways, cluttered rooms, cleanliness, allergies (e.g., pets), dog bites, obstacles such as furnishings, vermin and violence. Stonerock noted that by 1997, there were 500,000 home health aides and that an additional 500,000 would be needed by 2005. She also noted that job dissatisfaction was high and job turnover was as high as 75%.

The purpose of this report from this cross sectional study was to describe a large population of home healthcare workers and report on analyses specific for work-related back, neck and shoulder pain while describing and then controlling for numerous potential confounders.

## METHODS

This study is a large, cross sectional study of HHC workers in the US and Canada. HHC workers (n=883) were enrolled in this study from 24 HHC agencies in Iowa (n= 35), Wisconsin (n= 237), Utah (n= 337) and Saskatchewan, Canada (n= 274) during 2001-2002. All workers were consented and completed a lengthy, self-administered survey instrument that concentrated largely on musculoskeletal disorders and numerous non/occupational disease determinants. Prior to administration of the questionnaire an explanation of the study was given to the potential participants which stressed the importance of accurate reporting, particularly because of the intervention phase and potential benefits from the study. The participation rate of those attending enrollment sessions averaged 98.5%.

Workers were largely female 815 (93.2%). The mean age was  $43.4 \pm 11.27$  years. HHCWs’ jobs were identified as 413 (48.7%) aides, 306 (34.7 %) nurses, 93 (10.5 %) PT/OT/SP, 22 (2.5 %) secretarial, 21 (2.4 %) administrative and 10 (1.1 %) other. After analyses failed to find significant differences in work-related musculoskeletal disorder (WMSD) complaints in the

back, neck and shoulder among the non-aides/non-nurses, the other categories were collapsed into one “office/therapists” category.

For the purposes of this report, a case was defined as an episode of self-reported back, neck or shoulder pain in the prior 12 months that was felt to be related to work.

Analyses included descriptive analyses and 1-year Prevalence Rate Ratios (PRRs) for individual variables, with 95% Confidence Intervals (CI). Multiple logistic regression models were constructed that included both documented and pathophysiologically probable risk factors. PRRs were also calculated comparing WMSDs in aides and nurses with all others combined. For low back pain (LBP), shoulder pain, and neck pain, the variables included age, gender, smoking history (calculated in pack years), Body Mass Index, time spent on aerobic exercise, personal psycho-social factors, work related psycho-social factors, miles traveled in an average day, and the degree to which the HHCW felt rushed or hurried traveling from patient to patient.

## RESULTS

**Table 1.** Univariate Analyses of WMSDs in 3 occupational groupings

Low Back Pain

	Aides PRR (95% CI)	Nurses PRR (95% CI)	Office/Therapists PRR (95% CI)
Sex			
Female	0.87 (0.37, 1.94)	3.56 (0.93, 19.98)	1.99 (0.60, 8.58)
Smoking Status <sup>a</sup>			
Ex-smoker	1.25 (0.77, 2.03)	1.44 (0.80, 2.57)	1.45 (0.58, 3.52)
Current	2.47 (1.43, 4.32)*	0.90 (0.37, 2.13)	0.93 (0.02, 12.13)
Age (5 year increments)	0.91 (0.84, 0.99)*	1.06 (0.94, 1.19)	1.04 (0.87, 1.25)
Body Mass Index <sup>b</sup>	0.99 (0.63, 1.54)	1.36 (0.80, 2.31)	1.68 (0.66, 4.24)
Tenure w/ HHC <sup>c</sup>	0.93 (0.77, 1.11)	1.28 (1.02, 1.60)*	1.27 (0.89, 1.81)
Back Problems	3.73 (2.42, 5.77)*	2.79 (1.69, 4.59)*	2.42 (1.08, 5.43)*
HHC Visits <sup>d</sup>	2.06 (1.34, 3.16)*	1.63 (1.00, 2.64)*	1.22 (0.49, 2.98)
HHC Patients <sup>e</sup>	1.77 (1.18, 2.67)*	2.01 (1.22, 3.32)*	1.76 (0.75, 4.17)
Walking Obstacles <sup>f</sup>	1.68 (1.10, 2.59)*	2.17 (1.33, 3.56)*	1.44 (0.51, 4.52)
Cooperative pts as a % of total	0.31 (0.10, 0.98)*	0.40 (0.14, 1.11)	0.49 (0.03, 8.90)
Time spent per day in vehicle (hours)	1.02 (0.99, 1.04)	0.99 (0.97, 1.02)	1.00 (0.98, 1.03)

## Neck Pain

	Aides PRR (95% CI)	Nurses PRR (95% CI)	Office/Therapists PRR (95% CI)
Sex			
Female	1.22 (0.52, 3.09)	1.07 (0.32, 4.10)	2.02 (0.54, 11.35)
Smoking Status <sup>a</sup>			
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 <sup>b</sup>	0.84 (0.50, 1.38)	1.07 (0.59, 1.92)	0.68 (0.16, 2.31)
Tenure w/ HHC <sup>c</sup>	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 <sup>d</sup>	1.59 (1.01, 2.51)*	1.49 (0.89, 2.47)	1.52 (0.56, 4.07)
HHC Patients <sup>e</sup>	1.47 (0.95, 2.26)	1.43 (0.85, 2.42)	0.89 (0.34, 2.32)
Walking Obstacles <sup>f</sup>	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)

## Shoulder Pain

	Aides PRR (95% CI)	Nurses PRR (95% CI)	Office/Therapists PRR (95% CI)
Sex			
Female	0.59 (0.26, 1.33)	3.15 (0.69, 29.23)	2.78 (0.61, 25.91)
Smoking Status <sup>a</sup>			
Ex-smoker	0.90 (0.53, 1.53)	1.53 (0.83, 2.80)	1.27 (0.43, 3.45)
Current	1.83 (1.08, 3.09)*	1.49 (0.60, 3.57)	1.43 (0.03, 18.88)
Age (5 year increments)	1.06 (0.98, 1.15)	1.35 (1.17, 1.55)*	1.21 (0.98, 1.51)
Body Mass Index <sup>b</sup>	1.23 (0.76, 1.99)	1.07 (0.58, 1.94)	0.54 (0.10, 2.03)
Tenure w/ HHC <sup>c</sup>	1.22 (1.01, 1.48)*	1.71 (1.32, 2.22)*	1.36 (0.91, 2.05)
Back Problems	2.53 (1.63, 3.92)*	1.70 (1.01, 2.86)*	1.51 (0.60, 3.76)
HHC Visits <sup>d</sup>	1.71 (1.09, 2.70)*	1.22 (0.72, 2.06)*	1.62 (0.56, 4.55)
HHC Patients <sup>e</sup>	1.79 (1.16, 2.76)*	1.38 (0.81, 2.37)	1.20 (0.44, 3.32)
Walking Obstacles <sup>f</sup>	1.53 (0.98, 2.38)	2.38 (1.38, 4.10)*	1.78 (0.51, 7.90)
Cooperative pts as a % of total	0.46 (0.16, 1.33)	1.01 (0.35, 2.93)	0.07 (0.00, 1.66)
Time spent per day in vehicle (hours)	1.02 (0.99, 1.04)	1.02 (0.97, 1.08)	0.99 (0.97, 1.02)

<sup>a</sup> The referent group is non-smoker

<sup>b</sup> Obese vs. non-obese

<sup>c</sup> Incremental intervals (years): [0-1.9], [2-4.9], [5-9.9], [10+)

<sup>d</sup> Dichotomized at 20 weekly visits

<sup>e</sup> Dichotomized at 10 weekly patients

<sup>f</sup> none vs. any

\* Indicates significance at an alpha level of 0.05.

Statistically associated non-occupational factors for work-related LBP in aides included current smoking (PRR=2.47, 95% CI 1.43, 4.32), a history of back problems (PRR=3.73, 95% CI 2.42, 5.77), and sciatica (PRR=2.56, 95% CI 1.49, 4.59). Numerous psychosocial factors were positively associated (8/10), including poor quality of sleep (PRR=1.30, 95% CI 1.05, 1.61), feeling depressed (PRR=1.58, 95% CI 1.14, 2.18), job dissatisfaction (PRR=1.32, 95% CI 1.01, 1.73), lack of enjoyment of job tasks (PRR=1.50, 95% CI 1.04, 2.18), dissatisfaction of problem sharing with co-workers (PRR=1.41, 95% CI 1.09, 1.84), supervisor does not listen to personal problems (PRR=1.47, 95% CI 1.13, 1.90), feeling mentally exhausted after work (PRR=1.44, 95% CI 1.07, 1.92) and feeling physically exhausted after work (PRR=1.64, 95% CI 1.22, 2.22).

Age and female gender were either statistically negative or protective. Similar findings were present in the nurses, though there were fewer statistically positive associations.

Occupational factors that were statistically associated with LBP included miles traveled in an average day (PRR=1.06, 95% CI 1.01, 1.12), feeling rushed/hurried (PRR=1.28, 95% CI 1.04, 1.58), lack of access to the bed (PRR=1.66, 95% CI 1.06, 2.58), problems with height of the bed (PRR=1.82, 95% CI 1.18, 2.81), lack of access to the toilet (PRR=1.66, 95% CI 1.07, 2.59) and  $\geq 10$  weekly distinct HHC patients (PRR=1.77, 95% CI 1.18, 2.67) and  $\geq 20$  HHC visits per week (PRR=2.06, 95% CI 1.34, 3.16).

Statistically associated non-occupational factors for work-related neck pain in aides included current smoking (PRR=2.48, 95% CI 1.46, 4.20), a history of back problems (PRR=4.19, 95% CI 2.65, 6.66), sciatica (PRR=2.07, 95% CI 1.25, 3.41), osteoarthritis (PRR=2.41, 95% CI 1.23, 4.69), and degenerative spine disease (PRR=3.62, 95% CI 1.27, 11.07). Some psychosocial factors were positively associated (4/10), including feeling depressed (PRR=1.52, 95% CI 1.09, 2.14), supervisor does not listen to personal problems (PRR=1.39, 95% CI 1.08, 1.78), feeling mentally exhausted after work (PRR=1.71, 95% CI 1.26, 2.32) and feeling physically exhausted after work (PRR=1.95, 95% CI 1.42, 2.67). Age and female gender were either statistically negative. Similar findings were present in the nurses, though there were additional statistically positive associations for psychosocial factors.

**Table 2.** Logistic regression adjusted modelings for WMSDs in 3 occupational groupings.

	Aides PRR (95% CI)	Nurses PRR (95% CI)	Office / Therapists PRR (95% CI)
LBP	3.38 (2.10, 5.43)*	1.83 (1.13, 2.96)*	1.00
Neck Pain	1.99 (1.16, 3.44)*	2.17 (1.25, 3.77)*	1.00
Shoulder Pain	1.90 (1.11, 3.24)*	1.62 (0.94, 2.81)	1.00

\* Indicates significance at an alpha level of 0.05

Occupational factors that were statistically associated with work-related neck pain included miles traveled in an average day (PRR=1.06, 95% CI 1.01, 1.12), feeling rushed/hurried (PRR=1.45, 95% CI 1.16, 1.81), lack of access to the bed (PRR=1.75, 95% CI 1.12, 2.74), problems with height of the bed (PRR=1.73, 95% CI 1.11, 2.69),  $\geq 10$  weekly distinct HHC patients (PRR=1.47, 95% CI 0.95, 2.26) and  $\geq 20$  HHC visits per week (PRR=1.59, 95% CI 1.01, 2.51). Logistic regression modelings showed the adjusted PRRs in Table 2.

These models showed that the aides recalled more work-related LBP in the prior year than the other two groups. Shoulder pain had somewhat similar findings. The nurses had more neck pain than the aides. All findings, except shoulder pain in nurses, were statistically significant.

## **DISCUSSION**

This large cross sectional study found significantly elevated 1-year period prevalence rate ratios for LBP, neck and shoulder pain in HHC aides and nurses compared with other occupational groups. The highest PRRs were in the aides and the lower PRRs were in the nurses, with the exception of the neck where nurses showed a higher risk than aides. These results were robust and minimally affected by adjustment for other potential confounders/disease determinants with logistic regression modelings.

The number of psychosocial factors that were statistically associated was a somewhat unexpected finding. While there are numerous studies documenting associations of psychosocial factors with work-related LBP, there appeared to us to be a trend towards more physically demanding jobs to have either smaller magnitude associations or non-statistically significant associations with psychosocial factors in other studies. It is unclear whether this occupational group is a unique population, or whether the inference was inaccurate.

Available data suggest that these elevated PRRs may be due to multiple job physical factors that largely involve manual patient transfers and patient care activities. These activities include access to the toilet, access to the bed, height of the bed, numbers of patients and numbers of visits per week. An additional risk factor driving these injury rates may be time spent in a car.

Prior studies have shown elevated rates for WMSDs. This study has confirmed most prior studies and added additional information regarding several risk factors. Limitations of this study largely involve typical limitations of a cross sectional study: recall bias for exposures and the healthy worker effect. The strengths of this study include the multiple HHC agencies of widely divergent size from 3 states and an additional nation involved, as well as the large sample size.

An additional phase of this research was to quantify the patient care activities, reproduce them in an ergonomics laboratory and then develop alternate manual patient care techniques to be implemented.

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