Original Article

Frequency and Risk of Occupational Health and Safety Hazards for Home Healthcare Workers

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Abstract

Given the increased prevalence of chronic disease and health care costs, more individuals are treated in the home, which has augmented the demand for more Home Healthcare Workers (HHCWs) in the field. HHCWs face multiple hazards with injury rates being more than double the national average; however, current studies on HHCWs have provided limited understanding of their occupational safety & health experiences and exposures. The aim of this study was to assess the frequency and risk of exposures through perceptions of HHCWs. The results of this study provide an initial picture of the different risks that HHCWs face daily. These findings show that studies involving HHCWs occupational safety need to be job-specific, and the proposed interventions will also likely need to be tailored by HHCWs type.

Keywords

home healthcare workers, home health nurses, home health aides, hazards, injury, exposure

Introduction

Home health care has become a key component in the delivery of health care in the United States. Rising health care costs stemming from increased prevalence of chronic diseases, lengthy hospitalizations, and hospital readmissions have shifted the paradigm from in-hospital care to caring for clients in the home.[1,2] Cost containment strategies shifting care to the home have highlighted a vital role for home health care in reducing readmission rates and improving outcomes.[3-5] This important shift to care for clients in the home has increased demand for home health services and subsequently has led to an overwhelming need for home health care workers (HHCWs).[6]

Home health care jobs come at a high expense on the safety and health of HHCWs. As per the Bureau of Labor Statistics (BLS) in 2014, the rate of injuries for HHCWs was twice the average for hospital workers and 3 times above the national average.[7] The injuries among HHCWs have been identified as overexertion injuries, workplace violence, and needle stick injuries among others .[8] Despite the high injury rate and increased demand for HHCWs, few studies have characterized the type and frequency of health hazards that these workers face in the home environment.

Many of the tasks HHCWs perform are associated with significant demands of various types including physical (e.g., mobility and repositioning activities), psychological (e.g., dealing with a complex environment while administering lifesaving medical care), and social (e.g., dealing with dying and grieving clients). The population HHCWs face is often frail with multiple diagnoses, and they require skilled, experienced care,[9] thus an encounter with any given client can be associated with multiple risks. Furthermore, HHCWs potentially face many unique risks such as work near unpredictable animals, exposures to pests, neighborhood crime and other violence, and environmental agents such as cigarette smoke, dust, irritating chemicals, and peeling paint.[10,11] Every house represents a new worksite that has its own unique exposures. To better understand the wide variety of exposures in the home health care working environment and the potential risks these exposures pose to workers, this study assessed the frequency and risk of exposures through perceptions of HHCWs.

Background

HHCWs encompasses a variety of professionals with different degrees of training that provide health care services to chronically ill or disabled clients. A review of the demographic profile

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of these workers by Smith and Baughman[12] revealed that the majority of HHCWs are females of Caucasian race but increasingly of racial/ethnic minorities. The home health care workforce is aging[13] (average age above 45 years), has a high turnover rate,[14] and records the fourth occupation with highest age-adjusted prevalence of obesity.[15,16] In addition, HHCWs have been noted to have high prevalence of smoking and low quitting rates compared with general industry workers.[17]

Two professionals within the HHCW field commonly participate in the delivery of home care services: Home Health Nurses (HHNs) and Home Health Aides (HHAs). In general, HHNs provide and coordinate medical care (administering oral, intravenous, or parenteral medications, and sterile wound dressing changes), educate clients and family members about various health conditions, and provide advice and emotional support to clients and their families.[18] On the contrary, HHAs help clients with disabilities, chronic illness, or cognitive impairment with activities of daily living, including bathing, dressing, repositioning, and eating.[19] Although each group has clearly defined roles, the augmented demand for HHCWs and overinvestment in care beyond expected levels in an increasingly cost-focused health care environment has led to the expansion of tasks performed by HHCWs. It is not uncommon for HHAs to provide dressing and simple wound care, catheter irrigation and even providing medications.[20] This shift of duties has posed challenges to HHAs, HHNs, and home care agencies calling for a better understanding of the tasks performed by HHCWs, the frequency and risks associated these activities.

Methods

Study Overview

The study was a cross-sectional design, which involved conducting one-on-one interviews with HHCWs using a risk ranking protocol. Data were collected between January 2015 and August 30, 2015. Participants identified frequencies and perceived risk levels of potential home health care workplace hazards using sorting cards. This study was part of a more comprehensive project assessing potential occupational health risks, injuries, and interventions in HHCWs.

Participants

Study participants were recruited by convenience sampling from home health care and hospice companies within Northern Kentucky and the Southwest and Northwest Ohio regions. Recruitment strategies included distribution of recruitment flyers to management at home health care companies, and direct recruitment of participants done via phone and e-mail by the researchers. The collected responses were documented on paper version of study documents. Each interview was audiotaped. Inclusion criteria in the study required subjects to be at least 18 years of age, to have been employed in home health care for a minimum of 1 year, and to have worked in the above-mentioned demographic areas. Institutional review board (IRB) approval was obtained from the University of Cincinnati Institutional Review Board for Social and Behavioral Sciences (IRB-S). Written informed consent was obtained from each subject at the beginning of the interview and risk ranking protocol.

Risk and Frequency Ranking Interviews

The risk ranking assessment protocol was devised from the work of the National Institute for Occupational Safety and Health (NIOSH) Hazard Review,[10] Parsons et al,[21] Meyer and Muntaner,[22] and through consultation with experts in the field of home health care. Participants were asked to recall and rate the frequency of on-the-job performance of physical tasks (e.g., lifting and bathing patients), clinical tasks (e.g., providing oral medications and dressing changes), biological exposures (e.g., exposure to infectious and noninfectious bodily fluids), chemical exposures (e.g., exposure to medication residue and cleaning chemicals), and environmental exposures (e.g., exposure to pets and household infestations). Subsequently, utilizing sorting cards, participants ranked exposures by perceived level of risk into four different categories (no risk, low risk, medium risk, and high risk) and by frequency into five different categories (never, rarely/once a month, infrequent/weekly, frequent/daily, and all the time/multiple times per day).

The directions provided for the level of risk sorting task were, "please rank how risky you feel each of the exposures is by placing them into the corresponding piles: No risk, low risk, medium risk, and high risk." Then, the frequency ranking task was accomplished by directing the participants to "rank the frequency of each exposure into the most appropriate category from the following: Never, rarely/once a month, infrequent/weekly, frequent/daily, and all the time/multiple times per day."

Each of the sorted level of risk cards were converted into integers from 0 to 3 (where 0 was assigned for a "no risk" card, 3 was assigned for a "high risk" card, and 1 and 2 were assigned for low and medium risk cards, respectively). In a similar manner, the sorted frequency risk cards were each assigned numbers from 0 to 4 with higher frequency level cards being assigned higher numbers.

In addition to ranking, participants were allowed to give their general impressions of each exposure/task/hazard for which they determined the frequency and perceived level of risk. They would often include examples of how the particular potential hazard had impacted their ability to work or caused an injury. After the completion of the interview, the participant was provided a small incentive payment.

Data and Statistical Analyses

For each exposure and for both groups of HHCW, the numerical data that corresponded to the level of risk and frequency

Table 1. Demographics of the Participant Population.

	Nurses (HHNs)	Nurse aides (HHAs)
Gender (female/male) (*n*)	26/4	12/2
BMI (cm/kg^2)	33.3 (8.2)	32.6 (9.5)
Age (years)		
20 to 29	3	2
30 to 39	7	4
40 to 49	8	1
50 to 59	9	6
>59	3	1
Ethnicity (*n*)		
White, non-Hispanic	22	13
Black or African American	6	1
American Indian	1	0
Native Hawaiian or other Pacific Islander	1	0
Length of employment (years)	8.2 (6.7)	13.8 (11.9)
Length of employment with current employer (years)	4.0 (3.0)	8.5 (9.4)
Patient population treated (%)		
Children	4.7 (13.6)	2.4 (8.9)
Nonelderly adults	45.8 (21.8)	49.6 (41.0)
Elderly	49.5 (25.7)	48.0 (40.9)
Current smoker (%)	3.3	21.4

Note. Average and standard deviation when parentheses present. HHNs = home health nurses; HHAs = home health aides; BMI = body mass index.

categories were entered into an Excel database and analyzed. These assigned numbers were later used to calculate a Weighted Risk Index (WRI) for each exposure within each HHCW group by multiplying the frequency category number by the level of perceived risk category number. The frequency rankings for each hazard and exposure were converted from a weekly exposure rate to a yearly estimated exposure. A WRI was computed by multiplying the numeric value assigned for risk by the numeric value assigned for frequency. This WRI takes into consideration both the perceived risk as well as how often it is perceived to be performed. Group differences for the risk and frequency of exposures were compared using an independent samples *t* test calculated using SAS 9.4, Cary NC statistical package. Alpha was set at .05.

Results

Demographics

The researchers interviewed 30 HHNs and 14 HHAs (Table 1). Eighty-six percent of participants were females and 14% were males. Sixty-six percent of nurses and 57% of HHAs were aged 40 years and older. Most subjects were Caucasian (80%). The average length of employment in home health care and with the current employer for HHNs was 8.2 years and 4.0 years, respectively. For HHAs, those figures were 13.8 years of total employment in home health care and 8.5 years with the current employer. Both participant groups generally provided care for nonelderly adult and elderly populations with minimal pediatric care. In addition to the demographic information, body mass index (BMI) and smoking histories were collected for each participant. The average BMI was elevated, approximately 33 kg/m^2 for both HHNs and HHAs. The frequency of exposure to secondhand tobacco smoke averaged 236 times/year for both groups. However, there was a difference in the percentage workers who were current smokers with 21.4% and 3.3% smoking in HHAs and HHNs, respectively.

Frequency Ratings

The self-reported frequencies with which the HHNs and HHAs performed potentially risky tasks or encountered various exposures are found in Table 2. The most frequent task/exposure for both HHAs and HHNs was walking to/from the patient home and completing paperwork which were in the frequent to all the time range (around 3.5). HHNs reported doing these two tasks slightly more frequently than HHAs.

For HHNs, the next highest performed task/exposure frequency was exposure to blood, which was rated in the frequent category (3.1). Other clinical tasks were rated by HHNs as infrequent including exposure to saliva, sweat, and urine as well as noninfectious respiratory infections (all at the 2.0 to 2.4 level). HHNs also rated frequency slightly above the infrequent level for exposures to cleaning chemicals and pest infestations (2.2-2.3). Another infrequent task rated by the HHNs was lifting and carrying of medical equipment (2.3). Many tasks were rated as being rarely performed (less than 1.1) in the 10 least performed tasks for HHNs:

Table 2. Means and Standard Deviations of Frequency and Risk Ratings for Nurses and Nursing Aides.

	Frequency ratings		Risk ratings	
	Nurses (HHNs) *M* (*SD*)	Nurse aides (HHAs) *M* (*SD*)	Nurses (HHNs) *M* (*SD*)	Nurse aides (HHAs) *M* (*SD*)
Physical exposures				
Walking to/from patient's house	+3.77 (0.43)	+3.57 (0.65)	+2.37 (0.89)	−1.43 (0.93)
Completing paperwork	+3.83 (0.38)	+3.43 (0.85)	+1.87 (1.31)	−0.79 (1.05)
Move client in/out of bed	1.20 (1.10)	2.57 (1.22)	1.23 (0.82)	+1.93 (0.82)
Moving clients on/off chair, toilet, or wheelchair	1.37 (0.93)	2.71 (1.27)	1.20 (0.61)	+1.93 (1.07)
Moving client in/out of vehicle	−0.80 (1.16)	−1.36 (1.15)	−0.47 (0.68)	−1.36 (1.08)
Moving client on/off stretcher	−0.07 (0.25)	−0.71 (1.33)	−0.30 (0.65)	−1.14 (1.29)
Walking client	+2.07 (0.91)	+3.00 (1.24)	+1.70 (0.75)	+2.07 (0.73)
Bathing client in bed or chair	−0.37 (0.67)	2.57 (1.65)	−0.57 (0.68)	1.57 (0.94)
Bathing client in bathtub	−0.20 (0.48)	2.14 (1.56)	−0.47 (0.73)	+1.86 (1.03)
Reposition client in bed	1.83 (0.91)	+3.00 (1.24)	1.27 (0.83)	1.64 (0.74)
Dress client	−0.90 (0.96)	2.57 (1.40)	−0.60 (0.72)	1.57 (1.02)
Assist client with exercise	−1.03 (1.10)	2.14 (1.56)	−1.07 (0.69)	1.57 (1.09)
Change bedding	−0.80 (0.76)	2.50 (1.22)	−0.50 (0.57)	−1.07 (1.27)
Lift or carry medical equipment/furniture	+2.33 (1.67)	−1.86 (1.66)	+1.93 (1.01)	−1.07 (1.00)
Mop/clean client's floor	−0.23 (0.50)	+2.64 (1.28)	−0.53 (0.82)	−1.21 (1.05)
Biological exposures				
Exposed to saliva	+2.40 (1.43)	2.50 (1.29)	+1.87 (1.01)	+2.00 (0.88)
Exposed to respiratory mucus	2.00 (1.05)	2.21 (1.25)	+1.93 (0.69)	+1.93 (1.00)
Exposed to sweat	+2.40 (1.19)	+2.93 (1.00)	+1.73 (0.91)	1.71 (0.99)
Exposed to vomit	1.23 (1.04)	−1.71 (1.07)	1.50 (0.78)	1.64 (1.01)
Exposed to urine	+2.30 (0.88)	+2.71 (1.27)	+1.70 (0.75)	+1.93 (1.07)
Exposed to fecal matter	1.60 (1.10)	+2.71 (0.99)	1.50 (0.90)	+2.14 (0.77)
Exposed to blood	+3.10 (0.96)	−1.79 (1.31)	+2.47 (0.73)	+2.14 (1.10)
Exposed to vaginal discharges or semen	−0.77 (0.82)	−1.64 (1.45)	−0.93 (0.91)	−1.29 (1.38)
Exposed to contagious resp. infections	1.80 (1.06)	1.93 (1.14)	+1.70 (0.84)	+1.93 (1.14)
Exposed to noncontagious respiratory infections	+2.07 (1.11)	−1.86 (1.23)	1.67 (0.84)	−1.43 (0.94)
Exposed to drug resistant infections	1.70 (0.92)	−1.43 (1.34)	1.67 (0.88)	1.64 (1.08)
Exposed to nonrespiratory transmitted infections	1.90 (1.06)	2.00 (1.41)	+1.90 (0.84)	1.64 (1.08)
Chemical and environmental exposures				
Breath in/skin contact of cleaning chemicals	+2.30 (1.53)	+2.71 (120).	1.47 (1.11)	1.71 (0.91)
Breath in/skin contact of pesticides	−1.07 (0.91)	−1.86 (1.66)	−1.13 (1.11)	1.71 (1.07)
Breath in/skin contact of drug residue	1.30 (1.29)	−0.86 (0.86)	1.67 (1.06)	−1.43 (1.22)
Breath in/skin contact of household infestations	+2.20 (1.30)	2.14 (1.70)	+1.93 (0.98)	1.57 (1.16)

Note. "+" indicates top 10, "−" indicates bottom 10 for each column, including ties. Frequency: 0-never, 1-rarely, 2-infrequent, 3-frequent, 4-all the time; risk: 0-none, 1-low, 2-medium, and 3-high. HHNs = home health nurses; HHAs = home health aides.

Contact with pesticides, assist client with exercise, dress client, move client in/out of vehicle, change bedding, exposed to vaginal discharges/semen, bathe client in chair or bed, bathe client in bathtub, and mop/clean floor. The least performed task reported by HHNs was moving clients to/from stretcher (0.07). Overall, the HHNs reported they are most commonly exposed to hazards associated with clinical procedures.

In contrast, HHAs reported their most frequent risks occurred working with clients including walking the client (3.0) and repositioning the client in bed (3.0) followed by exposures to bodily fluids, sweat (2.9), urine (2.7), and fecal matter (2.7), followed by performing housekeeping tasks such as mopping floors (2.6) and handling/contacting cleaning chemicals (2.7). Overall, HHAs reported that their most frequent risks occurred when they interacted with clients and performed housekeeping tasks.

Risk Ratings

The perceptions of the level of risk associated with their various occupational tasks/exposures differed between HHNs and HHAs (Table 2).

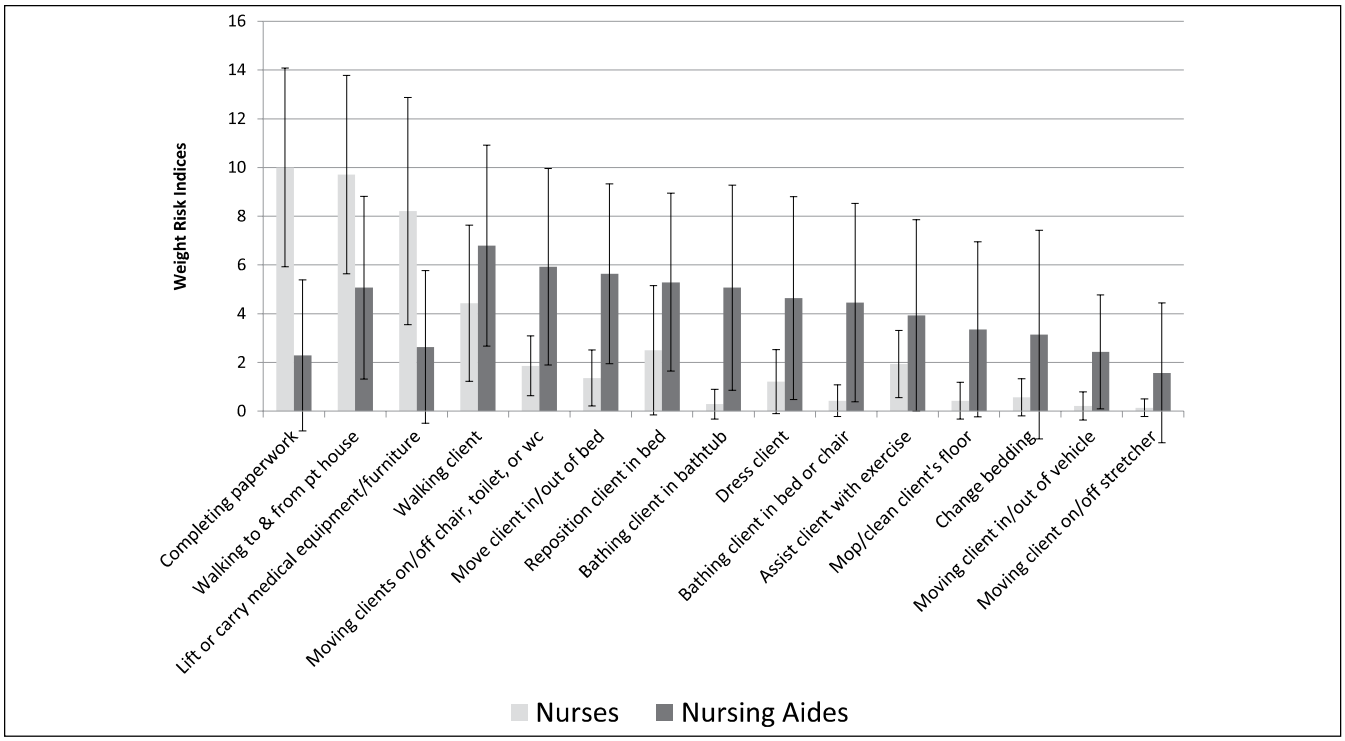

Figure 1. Weighted risk indices for nurses and nursing aides (weighted risk = risk rating multiplied by frequency rating) as a function of physical exposures.

The activities HHNs perceived as carrying the highest risks included exposures to blood, saliva, and respiratory mucus and more process oriented tasks (e.g., paperwork and home egress/ingress). The exposures perceived by HHNs as least risky were moving clients on/off chairs, moving clients in/out of a vehicle, assist with exercise, and bathing clients in bed and bath (all below low risk of 1.0). Exposures to pesticides as well as vaginal discharges/semen were also perceived low risk (between 0.9 and 1.1). Overall, the perception of risk for HHNs focused on exposure to infectious fluids, completing paperwork, and walking to/from homes.

Overall, the top 10 exposures perceived by HHAs as being of highest risk included exposures to blood and excreted body fluids and ergonomic concerns from handling clients. Exposure to excreted body fluids was rated for fecal matter (2.7) and urine (1.9). For client handling, the highest perceived tasks were the following: Walking clients (2.1), moving clients in/out of bed (1.9), moving clients on/off toilet (1.9), exposure to respiratory mucus (1.9), exposure to urine (1.9), exposure to contagious respiratory infections (1.9), and bathing clients in bathtub (1.8). All of these tasks were perceived to be "medium" risk. The exposures that were perceived to be least risky were exposures to drug residue, noncontagious respiratory infection, vaginal discharges/semen, move client in/out of vehicle, mop/clean floor, and walking to/from homes which were rated between low and medium (1.5 rating) and completing paperwork, moving client to/from stretcher, change bedding, and lift/carry medical equipment which were rated low risk (about 1.0).

WRIs

The WRI combined the perceived risk and frequency ratings to determine an overall risk index. Figures 1 through 3 provide a summary of the WRIs for each task/exposure for HHNs and HHAs, grouped into Physical, Biologic, and Chemical/Environmental task/exposures. Overall, the top weighted indices for HHAs were exposures related to physical activity which correlates with the significant physical demands HHAs face routinely. The only exception within the physical exposure category was that HHNs had higher WRIs for completion of paperwork, walking to/from patient home and lifting, and carrying medical equipment which relates to the higher number of client visits nurses must fulfill each work day (compared with HHAs). Of these three activities, WRI for completion of paperwork was statistically different comparing HHNs with HHAs. For HHNs, the highest WRIs were those related to biological exposures, which highlights the invasive nature of their clinical interventions. The biological WRIs ranked highest by the HHAs were exposures to excretion fluids which relates to their routine involvement in client hygiene activities. HHAs had higher indices than HHNs for the chemical and environmental exposures, except for contact with household infestations which was similar.

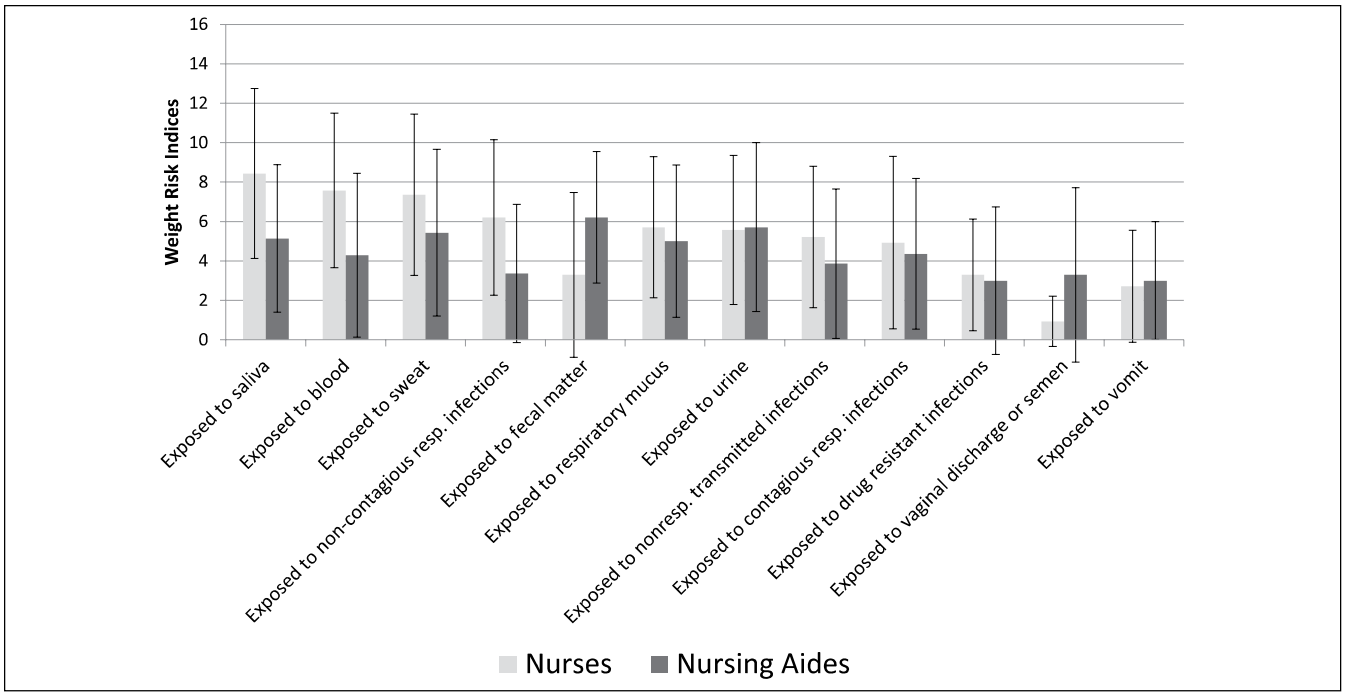

Figure 2. Weighted risk indices for nurses and nursing aides (weighted risk = risk rating multiplied by frequency rating) as a function of biological exposures.

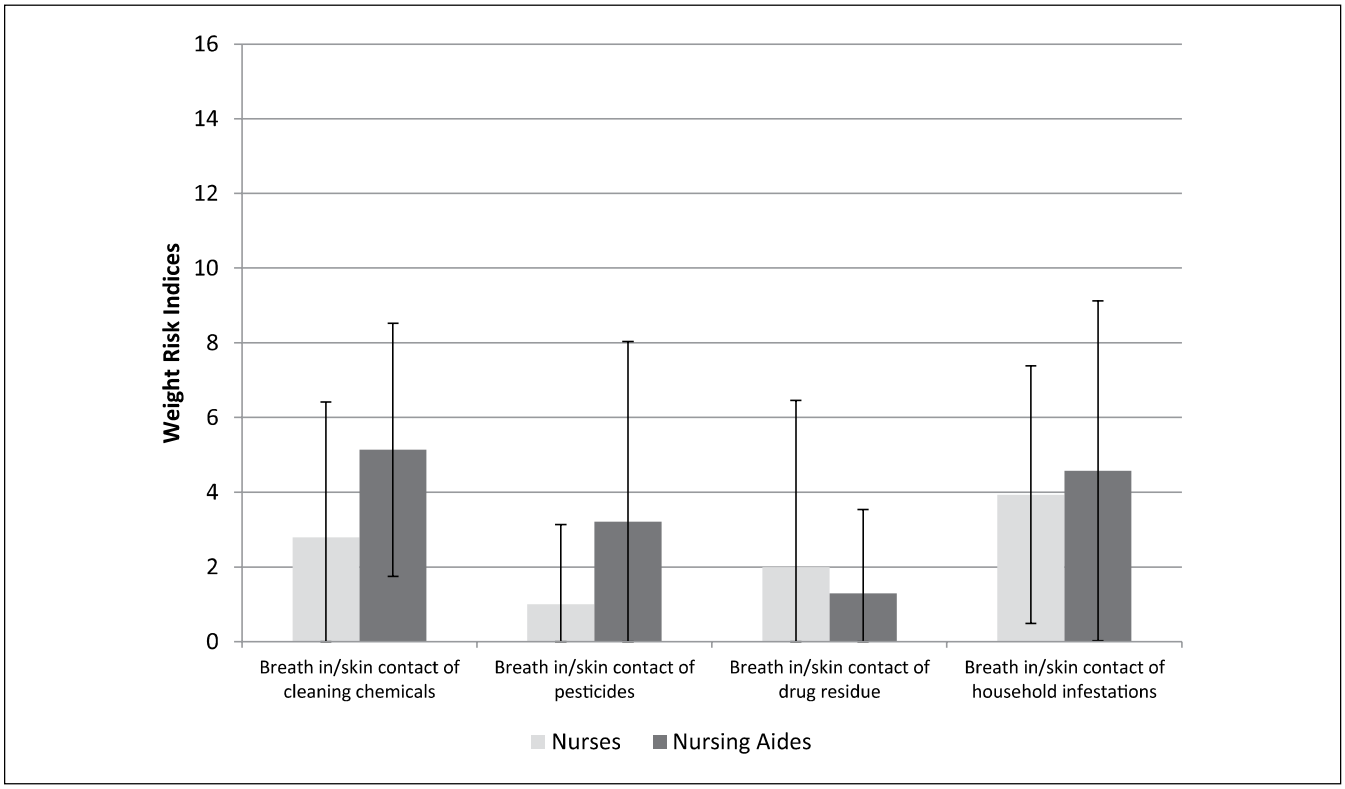

Figure 3. Weighted risk indices for nurses and nursing aides (weighted risk = risk rating multiplied by frequency rating) as a function of chemical and environmental exposures.

Discussion

The identification of occupational hazards faced by HHCWs on a daily basis is challenging. Furthermore, unpredictable working environments, overinvestment in care beyond roles, and delegation of duties have led to differences on the tasks performed by HHCWs and their associated risk. Our study has identified what are the most frequently performed activities by HHCWs and perceived riskiness of job-related tasks and exposures.

The demographic profile of our study population identified that the majority of HHCWs were overweight and of advancing age with more than 50% of participants being above 40 years old. These factors could further increase their risk for ergonomic injuries. Given growing shift in health care favoring the treatment of chronic and complex conditions in the home, engaging younger workforce and highlighting personal worker health is important for improving and maintaining the health and safety of this expanding workforce.

Physical Exposures

The ergonomic issues in HHCWs that have been more frequently reported in other studies are back, neck, and shoulder injuries.[7,21-23] Overexertion while performing daily tasks has been a common cause of these injuries.[22] Our study identified that walking, repositioning clients, and lifting medical equipment/furniture were not only some of the most frequently performed tasks but also perceived to be one of the riskiest activities. This was particularly higher for HHAs as compared with the HHNs. Potentially contributing to this problem is the issue of performing tasks outside the job description, as identified in other studies.[20,24] These important findings highlight the need for more research and occupational health policies in the following areas: (1) Addressing safe client handling and utilization of lifting equipment in the home setting, (2) Better job description, and (3) Expansion of the training of HHCWs to raise awareness on the multiple ergonomic hazards at their work sites.

Another frequently reported problem that adds to the burden of the daily activities and which is more frequently performed by HHNs was the completion of paperwork. Home health care nurses spend more time completing paperwork than nurses in other settings and more time dealing with reimbursement issues. Regulations driving these issues have been identified as directly contributing to increased stress, job dissatisfaction and decrease in job retention rates.[25] This calls for the implementation of more user friendly administrative processess that may help HHCWs focus on client care and the provision of services.

Biological Exposures

HHCWs are often required to take care of clients with multiple infectious and noninfectious conditions, and they are therefore prone to exposures to contaminated blood or body fluids via percutaneous injuries from sharps, or mucous membrane and nonintact skin exposures.[26] Exposure to blood and other biological exposures was more frequently reported and perceived to carry higher risk for HHNs. The most concerning exposure for both groups was exposure to blood, which was likely to be driven by sharp injuries. Trinkoff et al[27] reported needle stick rates as high as 8.5% of 164 nurses in home health care, hospice, or assisted living. Another study identified that per diem, HHCWs tend to have more sharp injuries than full-time and part-time employees.[28] This has been hypothesized to be due to a lack of training of these health care workers. Occupational health laws have helped by making mandatory that any health care worker expected to become in contact with blood receives adequate training; however, there are concerns of the consistency of training across agencies.[29] Further public health guidance is needed in regard to handling excreted body fluids and other biological exposures.

Chemical and Environmental Exposures

Skin and respiratory exposures to cleaning chemicals in the home setting were characterized by HHCWs in our study as both frequent and of risk, particularly by HHAs, who often provide cleaning services in the home. Despite the need for safer and more effective cleaning and disinfecting chemicals, there is also increasing evidence that exposures to cleaning solutions can be a cause for acute or exacerbation of chronic respiratory and dermal conditions.[30,31] Studies on the specific chemical exposures and mixtures in the home health care setting are lacking. From our study, this was the most common WRI exposure cited. More research is needed to establish the impact of cleaning chemicals used out of the institutionalized setting.

Study Limitations

This study was limited by a few factors. First, the sample was a small sample of convenience, although it was mostly representative of the HHCW population.[32,33] Most study respondents worked with an adult/elderly patient population. Few respondents were from hospice or pediatric home health care companies, which both would present different risks and exposures unique to their patient population. Some respondents also had issues with recall of some of their experiences and their overall perception of risks. Risk perception is also highly subjective and the variability among participants was not individually accounted for in this study.

Conclusions

HHCWs complete a variety of tasks when providing care for clients in the home with different types of HHCWs having different exposures and risks. HHNs reported more biologic

exposures (blood, saliva, sweat, potentially contagious infections) and more processed oriented tasks (e.g., paperwork and egress/ingress homes) as their greatest perceived risks, while HHAs reported physical exposures and exposure to urine and feces as the riskiest activities. The results of this study contribute to current research on the different risks that HHCWs face on a daily basis. These findings suggest that there are differences between HHNs and HHAs, thus future studies of HHCWs and their workplace hazards should consider the effects of potentially unique characteristics of these workers. Furthermore, as efforts are made to increase value of care in a cost-conscious environment, interventions addressing: gaps in training, safer medical equipment, and worker health are needed to improve the safety of this increasingly important workforce.

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Ethical Approval

University of Cincinnati's Institutional Review Board (#2014-6944, approved October 19, 2015).

Declaration of Conflicting Interests

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