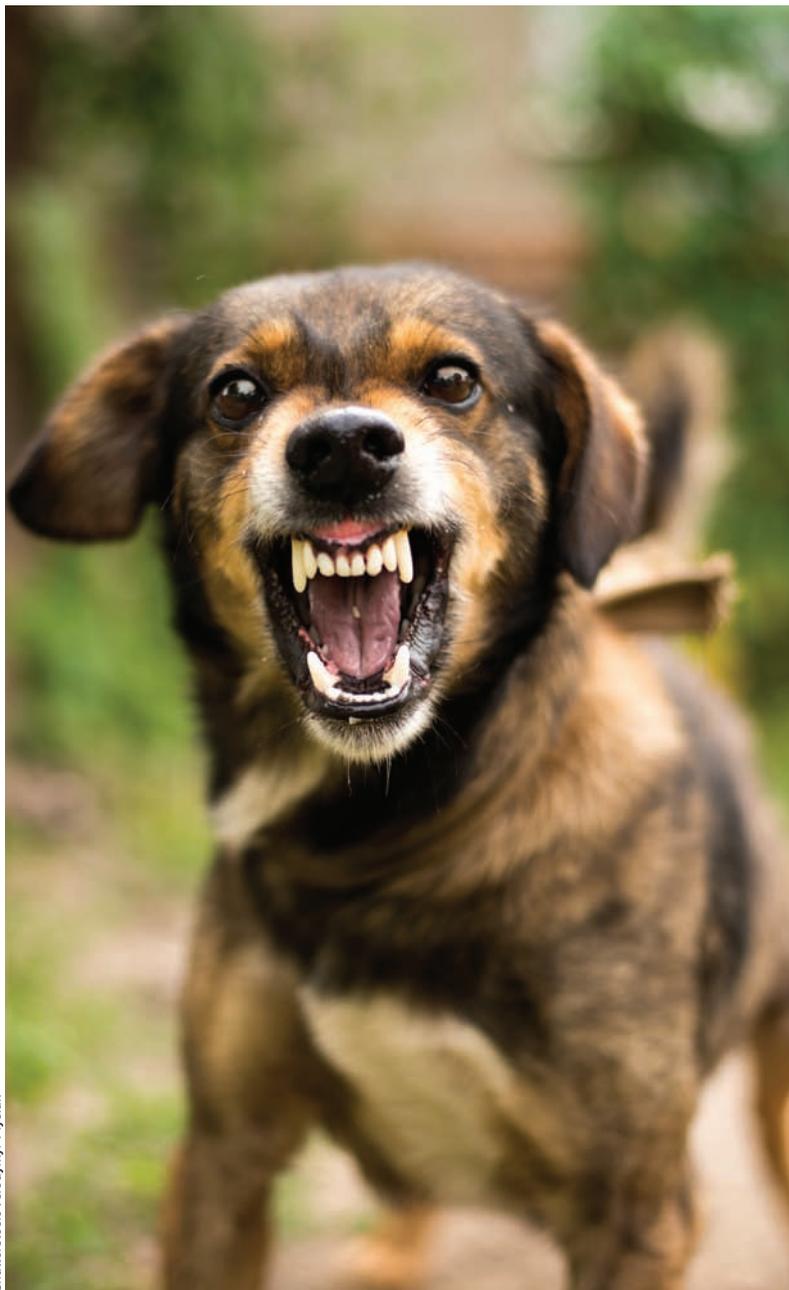


Home Healthcare Workers' Occupational Exposures



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Home healthcare workers (HHCWs) belong to one of the fastest growing industries and have an unpredictable work environment, potentiating their risk of exposures to occupational hazards. More patients seeking care for chronic health conditions, and improvements in technology and medical advancements are allowing more complex patient care to be provided at home. A comprehensive integrative review was completed, identifying nine articles that provide an overview of the occupational hazards HHCWs face. Analysis of the articles indicates occupational hazards are similar across studies. Occupational exposures reported by HHCWs align within all the studies and include exposures to blood, saliva, dangerous conditions walking to and within the home, secondhand smoke, aggressive pets, violence, and ergonomic concerns. These studies have been methodologically limited to self-reports, including surveys, interviews, and focus groups but include quantitative and qualitative data. Future research can further describe and identify specific occupational exposures and health hazards, subsequently leading to modifications to protect the health and safety of HHCWs, personal care workers, and the informal caregivers who provide care in the home.

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The unpredictable occupational environment of home healthcare places workers at increased risks for occupational exposures, injuries, and illnesses. As the number of home healthcare jobs increases, the safety of workers within the industry needs to be prioritized. The U.S. Bureau of Labor Statistics (BLS, 2014) reported the home healthcare service industry employed 1,238,000 workers in 2013, accounting for 8% of healthcare jobs. Home healthcare is one of the fastest growing healthcare industries, with projected employment expected to increase by 60% between 2012 and 2022, adding an estimated 716,000 new jobs (BLS, 2014). The estimated number of registered nurses working in home healthcare in May of 2018 was 181,180 (BLS, 2019b). The number of personal care aides, those providing assistance with activities of daily living such as cooking, cleaning, dressing, or bathing within the patient home, is expected to increase 39% by 2026 to over 2.7 million jobs (BLS, 2018). The hazards home healthcare workers (HHCWs) and personal care aides experience are similar due to the commonality of the home care environment in which they work; however, the hazards differ based on the care provided and the uniqueness of each home, patient, and neighborhood the HHCWs enter.

Home Healthcare Workers

There are two types of care provided within the home; home healthcare and personal care, also referred to as home care. As defined by the Institute for Healthcare Improvement (IHI), “home care workers” are persons who provide help in the home with cleaning or activities of daily living (apart from the family caregiver) and “home healthcare workers” are skilled workers providing medical or nursing care such as nurses, therapists, home health aides (HHAs), or medication aides (IHI, 2018).

Occupational Hazards and Health Outcomes

Workers’ occupational exposures are dependent on the environment in which they work and HHCWs are no exception. The General Duty Clause created by the United States Department of Labor, Occupational Safety and Health Act of 1970 states that employers “shall furnish to each of his employees’ employment and a place of employment which are free from recognized hazards that are causing or are likely to cause death or

serious physical harm to his employees” (OSHA, n.d.-a). Within this statement, there are no details that the place of work restricts the employee from being protected by the regulations put forth by the Occupational Safety and Health Administration (OSHA); however, there are exclusions to who is protected by OSHA based on the type of employer (e.g., self-employed; OSHA, 2016). OSHA has dedicated safety and health topics aiming to educate HHCWs of the hazards they may encounter. In addition to identifying the potential hazards, recommendations and interventions for employees and employers have been made regarding mitigation of the hazards including ergonomic training and equipment, personal protective equipment, use of needles with safety devices and sharps disposal containers, guidelines indicating when to seek medical treatment, and reporting hazards and injuries to the employer (National Institute for Occupational Safety and Health [NIOSH], 2010a).

Privacy and the unpredictable environment of healthcare in patients’ homes make identifying occupational hazards specific to HHCWs challenging. The occupational environment of each home is neither regulated nor predetermined to be safe for the worker. NIOSH (2010a) reports occupational hazards for HHCWs include musculoskeletal disorders, latex exposure, needlesticks, bloodborne pathogen exposures, occupational stress, violence, infectious diseases, hostile animals, temperature extremes, falls, severe weather, chemicals, pests, and motor vehicle travel. There is a unique occupational environment within each patient home, where known and unknown hazards have the potential to increase rates of injuries and illnesses.

According to the United States BLS (2019a), the incidence of nonfatal occupational injuries and illnesses was 2.7 per 100 full-time HHCWs, which is lower than the national average incidence rate of all industries combined at 3.1 per 100 full-time workers based on 2018 data. The incidence rate for hospital workers is 5.6 per 100 full-time workers. Knowing the type of injuries and illnesses HHCWs report is important in order to understand how the workplace is impacting the health and safety of these workers. The rate of injuries and illnesses within the entire healthcare population is likely attributed to the occupational tasks they perform and the exposures they encounter; however, it is surprising that HHCWs, who often work alone, have lower injury and illness incidence

rates. Could it be that HHCWs are underreporting their injuries?

Within several studies specifically focusing on needlestick injuries, Gershon et al. (2009) found that home healthcare registered nurses underreported needlesticks at a rate of 35%. Quinn et al. (2009) estimate underreporting to be closer to 50% and may be due to fear of job loss, lack of reporting systems in place, and lack of time to report due to job constraints. The Centers for Disease Control and Prevention (CDC) notes the importance of reporting and seeking treatment for bloodborne pathogen and needlestick exposures including care to the exposed site, evaluating the exposure, providing postexposure prophylaxis, and following up with testing and counseling as needed (CDC, 2019b). Without reporting and follow-up testing being conducted, it is difficult to determine if these workers are acquiring infections.

Another occupational illness of interest in HHCWs is the rate of asthma in this worker population. When not well controlled for or mitigated, occupational hazards lead to occupational illness. The population of HHCWs has a higher prevalence of asthma at 13.2%, compared with the prevalence of 7.2% for all U.S. workers combined (NIOSH, 2010b). Of the nonsmoking HHCWs, 18.2% report occupational exposure to secondhand smoke compared with 10% of all U.S. workers combined (NIOSH, 2010c).

With the increasing population of HHCWs, it is imperative to inquire about the occupational hazards these workers face, subsequently identifying ways to decrease HHCWs occupational risks, injuries, and illnesses. The purpose of this inquiry is to evaluate the quality of the current literature and gain a clear understanding of what is known and unknown about the breadth of occupational exposures HHCWs encounter in order to prioritize future research design.

Methods

This integrative review was conducted using the keywords home health care worker and occupational exposure, and their related search terms, to identify primary research articles focusing on a broad overview of HHCWs health and safety exposures. The term “home health care” includes those who provide skilled, medical, clinical care in the home such as HHAs, occupational or physical therapy, skilled nursing care, speech, and social workers (IHI, 2018). For this review, home care

There is a unique occupational environment within each patient home, where known and unknown hazards have the potential to increase rates of injuries and illnesses.

workers and HHCWs are included and referenced under the same term HHCWs as both groups of workers have similar occupational exposures. The integrative review was completed with the assistance of a health science librarian who developed database-specific search strategies including a combination of subject headings (MeSH or Emtree) and keywords.

A database search of CINAHL, Embase, and PubMed was completed for the period of January 2008 through December 2018. The search produced 343 articles and conference abstracts; titles and abstracts were screened for inclusion for final review (Figure 1). Inclusion criteria were qualitative and quantitative, primary research, with participants being HHCWs, managers and/or union representatives, identifying the breadth of occupational hazards in the home care environment. Excluded articles were those conducted outside the United States, not specific to home healthcare, intervention studies, or focused on one specific hazard such as sharps or musculoskeletal injuries, instead of the range of exposures encountered by this worker population.

Quality Assessment

The quality of the articles was determined using The Johns Hopkins Nursing Evidence-Based Practice rating scale to measure the level and quality of evidence within each study (Newhouse et al., 2005). The tool guides the reviewer through rating the strength of the evidence, indicated by Roman numerals, and the quality of the evidence, indicated by a letter. The strength of evidence for studies that are randomized control studies is level I, quasi-experimental level II, nonexperimental or qualitative studies level III, expert opinion level IV, and individual opinion based on expert review or literature review is level V. Quality of evidence scores ranges from A to C and is determined by thoroughness of the literature review, sufficient sample size, reproducibility, identification of strengths and limitations, and recommendations based on the evidence

(Newhouse et al.). Reviewing available research, including identification of strengths and limitations, will guide the development of future studies.

Results

Level and Quality of Evidence

Due to the search limitations previously described, the studies included in this review were level III as they were nonexperimental. This level of evidence was expected as each study described the overall occupational environment of the worker. Experimental (level I) and quasi-experimental (level II) designs would only be expected in occupational health research when a hazard mitigation or type of safety training is being trialed. The score given for level and quality of evidence can be found in Supplemental Digital Content 1 (available at <http://links.lww.com/HHN/A137>).

The quality of evidence for each article was assigned a B. Each report had reasonably consistent

results with definitive conclusions, reference to scientific evidence, evaluation of strength and limitations, with reasonable recommendations for further studies. All of the studies used a cross-sectional method with convenience sampling of home healthcare nurses, aides, therapists, management, and union representatives. The study methods included one-on-one interviews, self-administered surveys, and focus groups. All of the studies had a limitation related to small sample sizes, samples limited to a specific geographical location within the United States, limited by the type of worker represented, or not demographically representative of the worker population.

Study instruments were carefully designed after observation in the home, interviewing stakeholders and field experts, and review of results of previous studies. Polivka et al. (2015) used an instrument that had been previously validated for face and content validity. Multiple studies used

tools that had been developed using gained knowledge from previous studies, and tools that were validated and piloted (Gershon, Canton, et al., 2008; Gershon, Porzelska, et al., 2008; Markkanen et al., 2014; Quinn et al., 2016). Each study within the integrative review identified exposures to hazardous environments that HHCWs often encounter when they enter a patient's home.

Synthesizing the Findings

The findings of the studies indicate there are many potential occupational exposures that occur within the unpredictable environment of patients' homes. Occupational exposures reported by HHCWs align between the studies and include exposures to blood, saliva, dangerous conditions walking to and within the home, secondhand smoke, aggressive pets, violence, and ergonomic concerns. Exposure to violence within the home is not limited to violence from the patient or family members but includes aggressive pets, and violence or threats from within the neighborhood

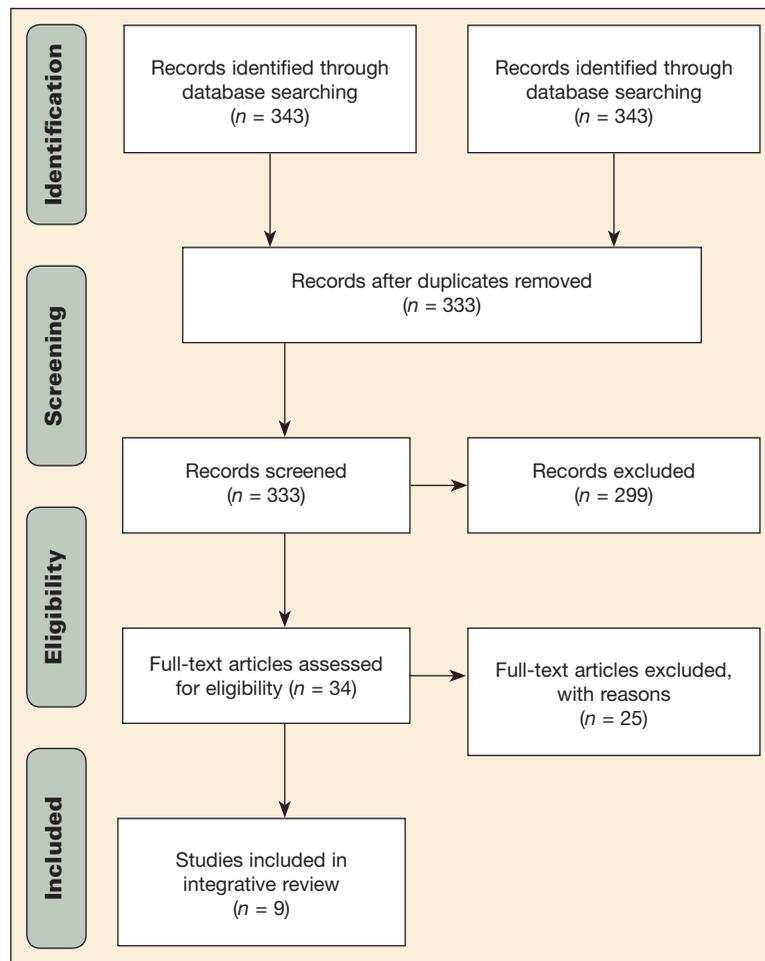


Figure 1. PRISMA diagram.

(Gershon, Canton, et al., 2008; Gershon, Porgorzelska, et al., 2008; Hittle et al., 2016; Markkanen et al., 2014; Markkanen et al., 2017). In addition, researchers have shown that HHCWs have unique risks due to the unpredictable and unplanned environment of a patient's residence that are both similar and different than other healthcare environments. For example, risks related to bloodborne pathogens is a known hazard within the healthcare environment; however, the complications leading to bloodborne pathogen exposures is not the same in the home as it is in the tightly regulated hospital or long-term care environment. Obstructed access, poor access due to furniture in the way, lack of working area, lack of engineered sharps safety equipment, lack of proper disposal for sharps, and unexpected interruptions from family or pets were identified as unique to the home care environment (Hittle et al.; Markkanen et al., 2014; Markkanen et al., 2017).

Each study indicated multiple musculoskeletal hazards due to lifting patients and furniture within the home care environment; however, the severity of exposure is not clear. As rates of obesity increase, so does the number of obese patients who need care within the home. In the hospital and long-term care setting, there is an increased focus on decreasing musculoskeletal injuries through the use of safe patient handling programs (OSHA, n.d.-b). Study participants reported musculoskeletal injuries were precipitated by tight working spaces, awkward positions, lifting of furniture, and a lack of patient lifting equipment in the home (Agbonifo et al., 2017; Gershon, Canton, et al., 2008; Polivka et al., 2015).

Multiple exposures were noted with the potential to impact respiratory health. In one study, 30% of HHCWs reported using bleach/ammonia/chemical (Quinn et al., 2016). In another study, 31% of HHCWs reported exposures to chemicals and 87% reported poor indoor air quality and a lack of ventilation in many homes (Polivka et al., 2015). Tobacco smoke exposure was noted in each article and was listed as primary exposure, secondhand smoke exposure, and/or exposure to persons smoking with supplied oxygen. Respiratory occupational exposures reported by HHCWs align between multiple studies and include exposures to pests, pet hair, chemicals, tobacco smoke exposure, and poor air quality (Agbonifo et al., 2017; Gershon, Canton, et al., 2008; Gershon, Porgorzelska, et al., 2008; Hittle et al., 2016; Markkanen et al., 2017; Polivka et al.; Quinn et al.). Several articles

reported exposure to biological hazards such as human, vermin, and pet waste (Gershon, Canton, et al., 2008; Polivka et al.; Quinn et al.).

In a mixed methods study by Polivka et al. (2015), the qualitative narrative provided a comprehensive view of the daily work practices that place HHCWs at risk for exposures, including a glimpse into the culture of this work group. Exemplars include a patient refusing to be moved with a Hoyer lift placing increased ergonomic stress on the worker. Another example included reports of patients who refuse to stop smoking when the HHCW enters the home (Polivka et al., 2015). Hittle et al. (2016) reported that one unexpected hazard was related to HHA providing medications that is outside their typical set of duties. Markkanen et al. (2014) reiterated that going above and beyond the plan of care is common. Going beyond what the HHCW is trained to do could potentiate an exposure, such as an HHA giving a medication with bare hands when gloves are required to decrease the risk of the medication penetrating the skin.

Limitations of the studies are related to convenience sampling methods, conceptual definitions of hazards, and multiple operational uses of measurement. With the exception of Quinn et al. (2016) that gathered data from agency- and patient-hired HHAs, it is noted that the samples have limited diversity compared with the diversity of the HHCW populations that is made up of 59% racial/ethnic minorities and 42% non-Hispanic/Latino White (PHI, 2017).

These studies are limited to self-reported data that can bring into question validity and accuracy, potentially skewing the reality of the actual exposure. Hittle et al. (2016) indicated the results were based on the perception of hazards encountered by the worker, which could be an error based on information bias. Potential for recall bias exists in those studies that ask HHCWs to report their frequency of exposure as they remember it within the past week or past year (Agbonifo et al., 2017; Hittle et al., 2016; Quinn et al., 2016; Suarez et al., 2017). The CDC (2019c) indicates there is a benefit to having workers report site hazards, but these reports do not take the place of formal worksite environmental assessment. This is important to consider when planning future research in the occupational setting of the home care environment.

Discussion

The purpose of this inquiry was to gain an understanding of what is known, unknown, and the qual-

ity of previous studies related to the broad range of HHCWs' occupational exposures. The review and analysis demonstrated that the studies were well designed through strategic development of evaluation tools using expert insight, face validity, content validation, and pilot testing. The body of knowledge of these self-report studies would be strengthened by objective quantitative studies, such as observations of the work environment and the worker within the environment, biomonitoring to assess the occupational exposures, and human factors assessments.

Several exposures identified were unique to the home care environment. Exposures to pest, animal dander, and pet waste are not typical exposures encountered in the acute care or long-term care settings. Although human waste is a documented and expected occupational hazard in healthcare, pet waste is not, and it harbors additional risks related to zoonotic diseases (CDC, 2019a). In addition, ventilation in other healthcare environments is closely monitored for temperature, humidity, and air movement. Ventilation, temperature, and air quality are not monitored in homes and could pose risks to HHCWs.

The use of industrial hygiene monitoring techniques could be used to demonstrate the level of exposure these workers are encountering, depicting a more complete picture of the occupational hazards in the home care environment and the potential health impact they may have on workers. For example, biomarkers cotinine and NNAL and environmental monitoring have been used to measure occupational tobacco smoke exposure in casino workers (Achutan et al., 2009). Stating a clear conceptual definition of primary and secondhand smoke exposure would offer more transparency of tobacco smoke exposure. Another hazard related to the use of tobacco smoke is thirdhand tobacco smoke, which is the chemical compound that persists in the environment even when no one is smoking and is an unrecognized hazard HHCWs are likely encountering but was not reported in any of the studies. Indoor air monitoring and surface sampling wipes would be able to identify and measure the level of carcinogens and respiratory irritants HHCWs encounter during home visits that may contribute to the rate of occupational asthma in this population.

Combining the previously gathered self-reported data with objective quantitative data would provide a deeper representation of the oc-

cupational hazards HHCWs experience. A scientifically thorough description of the environmental exposures and knowledge of the costly health effects to these workers could potentially encourage stakeholders to make changes to work practices and regulations requiring employers to protect workers from known hazards in the patient home care setting. One use of technology that could be explored is telehealth visits to decrease workers' exposure to an unsafe work environment.

Limitations

This integrative review was limited to those articles found within the searched databases. In addition, the review only included articles that looked at the broad overview of hazards. The authors recognized the knowledge to be gained from the excluded intervention research or research that focused on a single type of hazard such as sharps injuries, respiratory exposures, violence, ergonomics, musculoskeletal injuries, and psychological stress; however, this was outside the scope of this review.

Implications for Future Studies

Future studies with quota sampling would provide a diverse sample, more representative of the HHCW population. In addition, the differences noted by Quinn et al. (2016) indicate demographics of HHCWs and occupational environments are impacted by type of hire; therefore, patient-hired workers should be included in future studies. To gather accurate data related to tobacco smoke exposure, a stated conceptual definition should be established and used for studies relying on self-reporting or future studies could focus on gathering objective biomarker data. Using biomarkers, observations, and environmental monitoring would provide objective data about the occupational exposures of HHCWs.

Conclusion

Following a formal integrative review process and using a tool designed to assess the quality of research studies have provided a comprehensive review of the current state of the science related to the overview of HHCWs' occupational exposures. There are a multitude of occupational hazards documented through self-reports of HHCWs. Opportunities for occupational health and safety researchers to identify and confirm what has been self-reported related to occupational exposures in home care is necessary to gain a precise analysis of known and unknown risks, to further develop research with a goal to pro-

tect HHCWs and home care clients. Further research followed by practice and policy changes are necessary to protect the health and safety of these workers who care for patients in their homes. ■

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