Firefighters play a crucial role in providing emergency medical, rescue, and fire suppression services and they provide the primary public health safety net for most communities in the United States. There are more than 1.1 million firefighters in the United States who work in an estimated 29,727 fire departments (Haynes & Stein, 2017). Because they are the first to respond to emergencies of all types, serving as a firefighter is a mentally and physically demanding profession. For example, personnel are exposed to a wide range of occupational hazards including heat stress, dehydration, smoke-borne toxins, medical hazards, dangerous environments, and strenuous physical challenges. As a result, firefighters have a high prevalence of occupationally related medical and mental health disorders compared with the general public (Haddock et al., 2012; Haddock, Jitnarin, Poston, Tuley, & Jahnke, 2011; Jahnke, Poston, Haddock, & Jitnarin, 2013a; Jahnke, Poston, Haddock, et al., 2012; Jahnke, Poston, Jitnarin, & Haddock, 2012; Jitnarin, Haddock, Poston, & Jahnke, 2013; Poston, Haddock, et al., 2011; Poston, Jitnarin, Haddock, Jahnke, & Tuley, 2011; Soteriades et al., 2005; Soteriades, Smith, Tsismenakis, Baur, & Kales, 2011).

Women make up a very low proportion of the U.S. Fire Service, with estimates ranging from 3.5% to 5.1% (Fox, Hornick, & Hardin, 2006; Hulett, Bendick, Thomas, & Moccio, 2008). These rates are lower than in similar male-dominated occupations, such as law enforcement (approximately 15%; Langton, 2010) and even the U.S. Marine Corps, where all active duty personnel are trained in combat skills (U.S. Marine Corps, 2016). There are no national databases listing individual firefighters and their characteristics, and individual departments are reluctant to release information on employees to researchers without their consent. Thus, participant sampling for occupational epidemiology research in the fire service typically involves first recruiting departments, and then firefighters within departments. Given the low numbers of women firefighters, published reports from these studies usually exclude women owing to small sample sizes. For example, two previous
fire service occupational epidemiology studies collected data in a combined 44 departments nationally and only 69 women firefighters were enrolled in the cohorts (Haddock et al., 2012; Haddock, Day, Poston, Jahnke, & Jittinar, 2015). As a result, the occupational epidemiology literature on the fire service is almost entirely based on male firefighters and many key health concerns of women firefighters have yet to be studied. Fortunately, occupational scientists recently have begun to address the dearth of data on women firefighters. For example, the National Institute on Occupational Safety and Health included women in their cohort study of cancer among firefighters (Daniels et al., 2014).

One of the most pressing health concerns identified in the literature on male firefighters is the disturbingly high prevalence of heavy alcohol consumption and binge drinking (Carey, Al-Zaiti, Dean, Sessanna, & Finnell, 2011; Haddock et al., 2012; Haddock et al., 2015; Jahnke, Poston, & Haddock, 2014; Piazza-Gardner et al., 2014). Alcohol use screenings were conducted as part of two large surveillance studies in the U.S. fire service (Haddock et al., 2012). The first survey was conducted with 656 firefighters from 24 fire departments randomly selected from the International Association of Fire Chief’s Missouri Valley region. Results indicated that more than 50% of male career firefighters reported recent heavy (≥3 drinks) or binge drinking (≥5 drinks on an occasion for males), and 9% of firefighters who drank self-reported driving while intoxicated in the past 30 days.

The second surveillance study was a cohort study including 20 fire departments nationally (Poston, Haddock, Jahnke, Jittinar, & Day, 2013). The departments were purposively sampled (Shadish, Cook, & Campbell, 2001) based on whether or not they had well-developed wellness programs (career firefighters, N = 1,002). The prevalence of past 30-day heavy (44.7%) and binge drinking (50.2%) among male firefighters was similar to the previous study conducted in the Missouri Valley region. This compares with a binge drinking prevalence of 23.2% of adult men nationally (Kanny, Liu, & Brewer, 2012). Among male firefighters who reported a binge drinking episode in the past 30 days, 72.5% reported multiple episodes. The epidemic of alcohol abuse in the fire service is reflected in a recent (August 9, 2013) alert on the firefighter listserv “The Secret List,” warning that alcohol misuse is “a huge issue and one we continue to struggle with at every fire department.”

Unfortunately, aside from one descriptive study based on 31 women firefighters (Jahnke, Poston, Haddock, et al., 2012), there are no published data to determine whether the high rates of heavy and problem drinking found among males generalize to women firefighters. It is critical to determine whether women firefighters also are at risk for unhealthy levels of alcohol consumption owing to its deleterious social and health effects (Bates, Bowden, & Barry, 2002; Booth & Feng, 2002; Bouchery, Harwood, Sacks, Simon, & Brewer, 2011; Breslow, Guenther, Juan, & Graubard, 2010; Caetano, 1987; Caetano & Cunradi, 2002; Caetano, Schafer, Fals-Stewart, O’Farrell, & Miller, 2003; Centers for Disease Control and Prevention, 2015; Chartier & Caetano, 2012; Cunradi, Caetano, Clark, & Schafer, 1999; Ehlers, Gilder, Criado, & Caetano, 2010; Galvan & Caetano, 2003; Greenfield, 1998; Jahnke et al., 2014; Kaplan et al., 2014; Klimgersmann, 2001) and association with occupationally related risk factors, such as exposure to trauma (Jahnke, Poston, Haddock, & Murphy, 2016). This study fills the gap in the literature on women firefighters and alcohol consumption by presenting data from the first national study of the health of women in the fire service. In addition, we examine associations between problem drinking among women firefighters and key occupational risks, such as depression and trauma, injury, and job satisfaction.

Methods

Sampling Methods

Most fire departments across the country operate under the auspices of their own local governing body (e.g., local city, district, or county government) so no central registry of firefighters currently exists. Female firefighters can be arguably described as a “hidden population.” There are no national lists of female firefighters and departments typically refuse to provide personal data to researchers on their firefighters unless a strong bond has been established and appropriate administrative clearance has been obtained. Thus, “cold contacting” all United States fire departments and asking them to pass on study information to female firefighters would require considerable resources and likely result in low rates of cooperation. Given the small number of women in most departments, and the fact that many have no women, contacting a random selection of departments likely would not provide a sufficient sample unless a very large number of departments agree to participate.

Given the lack of a central repository from which to recruit women firefighters and the lack of feasibility of alternative methods, this study used snowball sampling techniques to solicit participation (Shadish et al., 2001). These techniques are widely accepted for recruitment among underserved, hidden populations (Sadler, Lee, Lim, & Fullerton, 2010). The primary outlets used for recruitment included 1) contacting participants from previous studies (Jahnke, Poston, Haddock, et al., 2012), 2) through iWomen membership, the only national organization representing women in the fire service, 3) email distribution through the International Association of Fire Fighters, the national labor union for firefighters, 4) through the Center for Fire, Rescue & EMS Health Research’s email distribution list to previously collaborating fire service personnel, and 5) a posting on the “Secret List,” a popular email listserv in the fire service that is distributed to thousands of firefighters worldwide. Secondary recruitment included requesting any women completing the survey to share the solicitation with their women colleagues. All women interested in participation were directed to a web-based survey.

Study protocols and consent procedures were approved by the Institutional Review Board of the National Development and Research Institutes, Inc. The initial page of the survey served as the informed consent document, which described the scope and purpose of the study, provided contact information for the research team and the Institutional Review Board, and explained the survey’s confidentiality. Next, participants were asked whether they currently serve in the career or volunteer fire service. Those indicating volunteer status were thanked for their interest and asked to share their contact information for future research, given the focus of the current study was career firefighters. We focused on career firefighters because they are exposed to the greatest risk, respond to the most calls, and spend the most time in the firehouse culture. Furthermore, most volunteer firefighters consider their participation as a form of community service, not their primary occupation.

Those indicating career status were provided an opportunity to share their contact information if they wanted to receive a thank you gift (a portable phone charger) via the U.S. Postal Service. All participants were then directed to the online survey.
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