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SHORT REPORT

Alcohol use among firefighters in the Central United States

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Background	Although the US National Fire Service is concerned about alcohol use among firefighters, little research has been conducted on the topic.
Aims	To survey alcohol use patterns among career and volunteer firefighters.
Methods	Data were from a population-based cohort study of male firefighters conducted in randomly selected career and volunteer departments. Data were collected from 2008 to 2010.
Results	There were 656 participants from 11 career and volunteer 13 departments included in the study with a response rate of 97%. Career firefighters drank approximately 10 days per month (just about half of their off duty days) and drank relatively heavily on those days. Fifty-eight per cent of career and 40% of volunteer firefighters averaged three or more drinks and similar percentages reported binge drinking on the days they consumed alcohol. In general, firefighters who drank but did not binge drink tended to have the best health outcomes, while those who binge drank typically were at highest risk of negative health outcomes. Nine per cent of career and 10% of volunteer firefighters who drank self-reported driving while intoxicated in the previous 30 days.
Conclusions	Given the high rates of heavy and binge drinking, local and nationally coordinated efforts to increase the surveillance of drinking behaviour among firefighters and the development of targeted prevention interventions are critically needed.
Key words	Drinking; fire service; health.

Introduction

Studies demonstrate a J-shaped relationship between alcohol intake and health, where moderate use is protective, while heavy consumption results in negative outcomes. Heavy alcohol use is associated with injuries [1], neurological impairment [2], social problems [3], liver disease [4] and cancer [5]. Given their critical role in public safety, the National Fire Service (NFS) is concerned about alcohol use by firefighters [6]. This study provides the first population-based examination of patterns of alcohol use in the NFS.

Methods

The data are from a large cohort study examining risk factors for injury among firefighters in the International Association of Fire Chief's Missouri Valley Region (Colorado, Iowa, Kansas, Missouri, North Dakota, Nebraska, South Dakota and Wyoming). Data were collected in 2008–10. Sampling methodology are presented in detail in a previous report [7].

The protocol was approved by the National Development and Research Institutes Review Board. Eleven career and 13 volunteer departments were randomly selected and contributed data to this study. The research team met with crews to overview the project, and of firefighters solicited, 97% agreed to participate. The survey was confidential and no individual results were provided to the department. Given the very small number of females, only data from male firefighters are presented.

Measurement items were modelled after previous occupational surveys. Items included the following: alcohol use—During the *past 30 days*, have you had at least one drink of any alcoholic beverage such as beer, wine, a malt beverage, or liquor?'; amount drank—'During the *past 30 days*, on the days when you drank, about how many drinks did you drink on the average?';

binge drinking—'Considering all types of alcoholic beverages, how many times during the past 30 days did you have 5 drinks or more on an occasion?'; peak use—'During the past 30 days, what is the largest number of drinks you had on any occasion?'; driving intoxicated—'During the past 30 days, did you drive a car or other vehicle on any occasion when you perhaps had too much to drink?'; potential problem drinking—a score of 2 or greater on the CAGE questionnaire was used to identify potential problem drinking [8]. Detailed descriptions of other items are in a previously published paper [7].

Although policies vary by department, career firefighters are not allowed to be intoxicated or drink while on duty. Thus, our analytic strategy reflects the occupational culture of firefighters (no drinking possible on work days). Descriptive statistics included average intake among all participants (abstinence or use on days when alcohol was consumed) and patterns of use among those who drink (i.e. binge drinking, peak use, days drank and driving while intoxicated). Standard measures of firefighter health and safety stratified by level of alcohol use also were examined. Models were adjusted for participant age. Use categories were (i) abstinent; (ii) drank but did not binge; (iii) drank and binged. The abstinent group served as the referent group for post-hoc tests.

Results

Of all firefighters solicited, 97% agreed to participate and consented. A total of 656 male career (97% of all males who consented; mean age = 38.2; SD = 9.9) and volunteer (mean age = 40.2; SD = 12.0) firefighters completed the baseline alcohol evaluation. Ranks of career/volunteer firefighters were: Firefighter (32%/60%), Firefighter/Paramedic (17%/5%), Driver/Operator (19%/9%), Officer, (23%/11%), Chief (7%/10%) and Other (2%/5%). Alcohol use patterns are presented in Table 1.

A relatively heavy pattern of alcohol use was found among career firefighters. For instance, 56% reported binge drinking in the past month. Nine per cent of participants who reported drinking within the last 30 days also reported driving while intoxicated in the previous month. Chiefs had a lower prevalence of binge drinking (OR = 0.282; $P < 0.01$) compared with firefighters. No other ranks were significantly different on binge drinking. Highest intake in the past month also differed by rank (F (4, 378) = 3.69; $P < 0.01$), with firefighter/paramedics reporting the largest intake.

Consistent with career firefighters, volunteers reported a high rate of alcohol use, with 45% reporting binge drinking. Of volunteers who drank, 10% reported driving while intoxicated. No significant differences in drinking patterns were found among ranks for volunteers.

Table 2 presents associations between levels of alcohol use and health outcomes. Among career firefighters, alcohol use status was associated with body mass index ($P < 0.01$), waist circumference ($P < 0.001$), torso strength ($P < 0.05$), flexibility ($P < 0.05$), smokeless tobacco use (tobacco that is not smoked but used in another form, such as chew, dip, or

Table 1. Patterns of alcohol use among firefighters (past 30 days)

	Average use on days when drank			Binge drinking		Among participants who drank in past 30 days		
	Abstinent *n* (%)	1–2 *n* (%)	3+ *n* (%)	*n* (%)	Mean number (SD)[a]	Days drank mean (SD)	Highest intake mean (SD)[b]	Drove intoxicated *n* (%)
All career (*n* = 459)	70 (15)	148 (32)	241 (53)	256 (56)	4.7 (4.4)	9.7 (6.2)	6.8 (5.3)	36 (9)
Career by rank								
Firefighter	22 (15)	42 (28)	84 (57)	90 (61)	4.7 (4.0)	9.1 (6.2)	6.8 (5.3)	10 (8)
Firefighter/Paramedic	9 (11)	24 (30)	47 (59)	54 (68)	5.4 (4.7)	10.2 (6.8)	8.5 (4.7)	10 (14)
Driver operator	16 (18)	32 (36)	41 (46)	42 (47)	5.1 (5.4)	10.2 (6.4)	6.9 (6.2)	7 (10)
Officer	16 (15)	32 (31)	56 (54)	58 (56)	4.3 (4.1)	9.9 (5.9)	6.4 (5.3)	5 (6)
Chief	7 (23)	14 (45)	10 (32)	9 (29)	2.7 (1.7)	8.7 (6.3)	4.0 (2.4)	4 (17)
All volunteer (*n* = 197)	58 (29)	61 (31)	78 (39)	89 (45)	6.1 (6.7)	11.7 (8.9)	7.4 (5.6)	12 (10)
Volunteer by rank								
Firefighter	28 (24)	40 (34)	50 (42)	58 (49)	6.1 (6.7)	12.3 (9.2)	8.0 (6.4)	12 (13)
Firefighter/Paramedic	3 (33)	1 (11)	5 (56)	4 (44)	4.3 (4.0)	10.5 (8.4)	7.4 (2.4)	1 (17)
Driver operator	3 (17)	8 (44)	7 (39)	9 (50)	6.6 (9.2)	11.1 (10.4)	5.4 (2.9)	0 (0)
Officer	7 (33)	5 (24)	9 (43)	8 (38)	3.6 (3.6)	8.6 (6.3)	6.8 (4.4)	0 (0)
Chief	11 (55)	4 (20)	5 (25)	7 (35)	3.9 (3.2)	13.7 (8.3)	6.2 (3.8)	1 (11)

Percentages may not add to 100 due to rounding.
[a]Mean number of binge episodes among firefighters who had at least one binge.
[b]Highest daily intake in the past 30 days.

Table 2. Firefighter health and safety stratified by alcohol use

	Career firefighters			Volunteer firefighters		
	Abstinent	Drink/No binge	Binge	Abstinent	Drink/No binge	Binge
Firefighters, *n* (%)	70 (15)	130 (28)	259 (56)	59 (30)	48 (25)	90 (46)
Body mass index	29.6 (5.8)	27.9[b] (3.5)	28.8 (4.5)	28.7 (6.0)	30.4 (5.0)	29.6 (5.1)
Per cent body fat	26.4 (8.0)	24.8 (5.8)	25.3 (6.6)	25.0 (9.2)	28.0 (7.0)	26.3 (7.0)
Waist circumference (inches)	39.0 (6.1)	37.5[b] (4.0)	38.4 (4.6)	39.4 (5.5)	41.2 (5.0)	40.3 (5.2)
Systolic blood pressure (mmHg)	123.8 (15.2)	123.9 (12.5)	124.0 (11.6)	130.9 (13.9)	131.7 (15.0)	130.0 (13.2)
Diastolic blood pressure (mmHg)	78.4 (11.9)	78.7 (9.8)	78.3 (9.8)	79.9 (11.1)	81.1 (11.1)	82.2 (11.3)
Estimated VO_{2max}	37.4 (9.6)	38.3 (6.7)	39.7 (6.5)	35.1 (11.2)	34.7 (6.5)	36.7 (6.5)
Jackson torso strength (max lbs)[a]	301.7 (55.0)	325.6[b] (47.5)	323.3[b] (58.2)	310.0 (52.6)	321.4 (53.9)	334.3 (59.7)
Sit and reach flexibility test (inches)[a]	12.3 (2.9)	13.6[b] (2.9)	13.4[b] (3.0)	12.9 (3.0)	13.3 (2.9)	13.7 (3.1)
Perceived stress scale, *n* (%)	10.5 (6.6)	9.7 (5.4)	10.6 (5.5)	11.8 (6.8)	12.6 (5.3)	12.2 (5.1)
Depression (CESD10 > 4), *n* (%)	10 (15)	18 (14)	35 (14)	8 (14)	9 (20)	17 (18)
Alcohol dependence (CAGE > 2), *n* (%)	–	3 (2)	50 (19)	–	4 (9)	14 (16)
Current smoker, *n* (%)	7 (10)	8 (6)	48 (19)	7 (12)	8 (17)	19 (21)
Current smokeless tobacco, *n* (%)	7 (10)	11 (9)	67 (26)[b]	2 (4)	6 (13)	25 (27)[b]
Work-related injury past 12 months, *n* (%)	17 (25)	35 (27)	60 (23)	3 (5)	6 (13)	4 (5)
Inconsistent SCBA use during fire, *n* (%)	16 (23)	21 (16)	65 (25)	39 (66)	31 (64)	65 (72)
Inconsistent SCBA use during overhaul, *n* (%)[a]	41 (59)	81 (62)	192 (74)[b]	44 (75)	37 (76)	76 (85)

SCBA, self-contained breathing apparatus.
Results are the subgroup mean and (SD) except where indicated. Results given as *n* (%) are based on 656 total firefighters. The abstinent group served as referent category for post-hoc tests.
[a]Statistically significant main effect.
[b]Statistically significant different from the abstinent group for post-hoc test.

snuff; $P < 0.001$) and inconsistent breathing apparatus use during overhaul ($P < 0.01$). Those who binged were more likely to score in the problem drinking range of the CAGE than those who drank but did not binge ($P < 0.001$). The general pattern of results suggests that those who drank alcohol but did not binge had the most positive health and safety outcomes. Alcohol use was related to smokeless tobacco use in volunteer firefighters ($P < 0.01$), with binge drinkers having high use. Although no other relationships between alcohol use status and health outcomes were statistically significant for volunteers (likely due to smaller sample size), the overall pattern of results were similar to career firefighters.

Discussion

This study found that heavy and binge drinking was prevalent among firefighters and a significant percentage of fire service personnel was at risk for alcohol-related problems. The findings are consistent with previous studies using small, convenience samples of firefighters [9,10]. The strengths of this study include a large, randomly selected sample and high participation rates. However, this research was conducted in only one fire service region and causes of heavy alcohol use among firefighters were not addressed. It is critical that both local and nationally coordinated efforts be developed to increase the surveillance of drinking behaviour among firefighters and target prevention interventions. Also, future studies should explore potential causes of heavy alcohol use in this occupation and expand surveillance to other fire service regions.

Key points

- Alcohol use and binge drinking occurred at high rates among firefighters in this study.
- Those who drank alcohol but did not binge had the most positive health and safety attributes.
- Our findings suggest that interventions to increase awareness of responsible drinking would be useful for the United States National Fire Service.

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Conflicts of interest

None declared.

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