

Construction workers' alcohol use, knowledge, perceptions of risk and workplace norms

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Abstract

Introduction and Aims. Globally, there is growing concern regarding workers' alcohol use and its implications for health, wellbeing and workplace safety. Male-dominated industries are more susceptible to risky alcohol consumption and its associated harms. This paper investigated the patterns, prevalence and predictors of risky drinking among construction workers. **Design and Methods.** Male construction workers (n = 511) completed a survey measuring alcohol-related measures including Alcohol Use Disorders Identification Test - Concise (AUDIT-C), which was compared with population data. Hierarchical multiple regression examined alcohol-related knowledge, perception of risk to workplace safety, psychological distress, job stress, general health, quality of life and workplace alcohol culture variables as predictors of risky drinking. **Results.** Prevalence of risky drinking was higher than the national average, particularly for younger (<25 years) and mid-aged (45–54 years) workers. One in six construction workers reported workmates being visibly affected by alcohol in the workplace. Key predictors of risky drinking were perception of alcohol-related risks to workplace safety, general health, alcohol knowledge and descriptive norms regarding workmates' alcohol use. **Discussion and Conclusions.** These findings provide useful insights into the patterns and predictors of risky drinking in construction and can inform future preventive programs and interventions in high-risk workplaces. In addition to tailoring programs to both young and mid-aged workers, this work highlights the importance of implementing strategies to increase awareness of risks to workplace safety; and the adoption of norms that inhibit the social acceptability of risky drinking behaviour in the wider workplace. [Roche AM, Chapman J, Duraisingam V, Phillips B, Finnane J, Pidd K. Construction workers' alcohol use, knowledge, perceptions of risk and workplace norms. *Drug Alcohol Rev* 2020]

Key words: alcohol use, workplace, construction, health and safety, male-dominated industry.

Introduction

Globally, alcohol causes more than 3 million deaths per year, one every 6 min [1], with heavy episodic consumption trends increasing [2]. Alcohol is recognised as the psychoactive drug most likely to cause harm, especially harm to others [3].

There is increasing concern about workers' alcohol use and its implications for health, wellbeing and workplace safety [4,5]. As a depressant, alcohol slows the body's motor and sensory systems and impairs balance, co-ordination, perception and decision-making, and can contribute to decrements in human performance with negative implications for workplace safety. Problematic alcohol use by workers can impair

productivity [6,7], and increase absenteeism and associated costs [8–11].

Risky alcohol consumption is not evenly distributed across communities [12]. Particular workforce groups and male-dominated industries have high levels of alcohol use [13]. Construction is one industry with high levels of risky drinking and associated harms [13–17].

The Australian construction industry employs large numbers of young males [18]. Risky drinking is generally more common among males [19]. Furthermore, male-dominated industries often possess working conditions and social and cultural factors conducive to risky drinking [20,21].

Previous Australian studies found that nearly 60% of construction workers were risky or hazardous drinkers

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[22]. Similarly, Pidd *et al.* [23] found more than 40% of building and construction trade apprentices reported hazardous drinking behaviour and one in five reported drinking alcohol during work hours. Banwell *et al.* [24] reported that 19% of construction workers had alcohol-related problems. Concern about high levels of alcohol in the construction industry promoted VicHealth to commission an investigation into the drinking culture of this industry, guided by its Alcohol Cultures Framework [25].

While risky drinking in the construction industry is prevalent, specific drivers of risky alcohol consumption are less evident. Construction work is generally demanding, dangerous and hectic [18,23,26], with taxing workplace events such as industrial disputes and downsizing commonplace [27]. Such stressful working conditions may facilitate alcohol and/or drug use as forms of stress relief [28,29]. In addition, construction workers appear to have a propensity to underestimate risks associated with heavy drinking and smoking, or not heeding safety precautions to wear sunscreen or protective equipment on site, and thus engage in behaviours that might be risky to their health and workplace [17].

The culture of a workplace may also influence workers' alcohol consumption patterns and related behaviours [30–32]. Workers' perceptions of alcohol availability, awareness of colleagues' alcohol consumption at work (descriptive norms) and peer approval of alcohol consumption (injunctive norms) could encourage risky drinking behaviours [30]. The construction industry, with traditional masculine group norms and mateship culture, may foster a workplace climate where alcohol is easily accessible and acceptable. Research has suggested an association between a permissive alcohol and drug use workplace climate and lower workplace safety and morale among workers [11,30]. To date, little research has examined the relationship between a workplace drinking culture and alcohol consumption patterns among construction workers. Similarly, studies examining the link between risky drinking and perceptions of risks to workplace safety and health in the construction industry are lacking.

Examination of key drivers of risky drinking behaviours in this high-risk, under-researched group, is required to inform appropriate prevention and harm minimisation responses. The current study therefore investigated the patterns, prevalence and correlates of alcohol use and key predictors of risky drinking among male construction workers.

Methods

Survey sample

A convenience sample of New South Wales (NSW) construction workers was obtained through collaboration

with the NSW Building Trades Group. Subjects were recruited as part of a NSW Building Trades Group professional development session. Workers were recruited by researchers onsite prior to undertaking a workplace drug and alcohol impairment training session and invited to complete an anonymous questionnaire. The researchers involved in data collection were independent of the workplaces and had no supervisory or management role with the workers. Workers were assured that participation in the study was voluntary, their decision to participate would not affect their work in any way and that their employer would not be privy to the workers' participation or their responses. No workplace managers or supervisors were present at the time that the questionnaire was administered. The pen-and-paper-based questionnaire was developed and administered by the National Centre for Education and Training on Addiction and took 15 minutes to complete. Confidentiality and anonymity were assured, with workers free to withdraw from participation at any time. Data were analysed using SPSS version 25. Ethics approval was obtained from Flinders University Social and Behavioural Research Committee: ethics approval #7932.

Measures

The three-item Alcohol Use Disorders Identification Test - Concise (AUDIT-C) questionnaire [33] assessed frequency of consumption, number of standard drinks consumed on a typical day and frequency of drinking six or more drinks on a single occasion. Question three was modified to five or more drinks on a single occasion, to align with Australian alcohol guidelines [34]. Total scores ranged from 0 to 12, with continuous scores ≥ 4 indicating at-risk drinking. Four AUDIT-C risk groups were calculated [35]: (i) low risk = 0–3; (ii) mild risk = 4–5; (iii) moderate risk = 6–7; and (iv) severe risk = 8–12.

Perceptions of alcohol-related risks to health (e.g. liver disease) were assessed by four single items adapted from the European Alcohol Workplace Questionnaire [36], measured on a five-point scale (1 = strongly disagree to 5 = strongly agree). Perceptions of alcohol-related risks to workplace safety (1 = no risk – 4 = high risk) were measured by three purpose-designed items in relation to: (i) drinking alcohol during work hours; (ii) coming to work with a hangover; and (iii) drinking more than four standard drinks the night before work. Alcohol-related knowledge was assessed by five purpose-designed items (e.g. 'You can reduce the amount of alcohol in your system by eating'), scored True = 1/False = 0, with totals summed (score range of 0–5).

Nine items, adapted from Frone [31], assessed workplace alcohol culture: *Availability* of alcohol in the workplace (e.g. 'How easy or difficult would it be to use alcohol

during work hours', 1 = very difficult – 4 = very easy); *Descriptive norms* regarding alcohol use (e.g. 'How often were you aware of someone at work who used alcohol during work hours', 1 = never – 5 = nearly every day); and *Injunctive norms* (e.g. 'To what extent would your closest workmates approve of using alcohol during work hours', 1 = strongly disapprove – 5 = strongly approve). Cronbach's alphas for the three items included in each subscale demonstrated good reliability ($\alpha > 0.80$) and were summed and averaged to create a total score for availability, descriptive norms and injunctive norms.

Psychological distress was measured by the 10-item Kessler Psychological Distress Scale (K10) [37]. Each item is scored 1 (none of the time) to 5 (all of the time) and scores were summed to provide a total score ranging from 10 to 50, with higher scores indicating higher psychological distress. The scale showed good reliability ($\alpha = 0.93$).

Job stress was assessed using the five-item Job Stress Scale [38,39], measured on a 5-point scale (1 = strongly disagree – 5 = strongly agree) (e.g. 'A lot of the time my job makes me very frustrated or angry'). Items were summed and averaged, with higher scores indicating higher job stress ($\alpha = 0.78$).

Single items assessed perceived general health (1 = poor – 5 = excellent) and overall quality of life (1 = poor – 5 = very good). Basic demographic questions such as age, gender and years of construction industry experience were also included.

Comparison data

Data from the 2016 National Drug Strategy Household Survey (NDSHS) were subjected to secondary analysis. Full sampling and weighting procedure details are available elsewhere [19]. The NDSHS contained a sample of 23 772 complete and useable surveys, which represents a co-operation rate of 51.1% (using the total number of dwellings where contact was made as the denominator), or a response rate of 34.7% (where eligible reporting units include cases of non-contact). The 2016 NDSHS included industry of employment data with $n = 496$ responses from employed construction workers nationally and $n = 113$ from NSW. Proportion estimates and analyses were calculated with probability weighted data to be representative of the Australian population, but unweighted ns are presented to indicate survey sample size.

Analyses

Data were analysed using SPSS version 25. Descriptive statistics and correlational analyses were performed to ascertain frequencies, mean values and associations

between key variables. t -Tests were conducted to compare differences on mean AUDIT-C scores between this sample and the NDSHS sample of male construction workers in total, by state, and all employed men aged 15+ years nationally. A hierarchical multiple regression was performed to examine significantly correlated predictors of risky drinking in the current sample, as measured by AUDIT-C scores.

Results

Sample characteristics

A total of 531 completed surveys were obtained. As respondents were predominantly male (96.4%) female participants were excluded from current analyses, leaving $n = 511$ for analysis. Average age was 35.1 years ($SD = 11.8$, range 15–68 years)—18.5% ($n = 94$) of the sample were aged ≤ 24 years; 39.1% ($n = 198$) were aged 25–34 years; 19.7% ($n = 100$) were aged 35–44 years; 15.0% ($n = 76$) were aged 45–54 years; and 7.7% ($n = 39$) were aged ≥ 55 years. Most of the sample (47%, $n = 239$) had worked in construction for 10 years or more.

Approximately two-thirds (62%) described their general health as very good or excellent (mean = 3.97, $SD = 0.86$, range 1–5). Most (91.5%) indicated that their quality of life was good or very good (mean = 4.23, $SD = 0.68$, range 1–5). Age was not significantly correlated with quality of life ($r = -0.03$, not significant) and weakly correlated with general health ($r = -0.09$, $P = 0.05$).

Drinking patterns and prevalence

Table 1 shows the total quantity and frequency of alcohol use and split by age group (≤ 24 , 25–34, 35–44, 45–54, ≥ 55 years). Approximately 10% were abstainers. Compared with NDSHS data, this was slightly more than male construction workers nationally (8.3%) but lower than the national male workforce (12.9%) and the Australian population overall (23%) (comparison data shown in Table S1) [40]. Approximately 14% drank alcohol more than four times a week, increasing to 28.4% among those aged 45–54 years. A quarter drank alcohol two to three times a week.

On a typical drinking day, 28% drank 1–2 standard drinks, while approximately 36% drank >5 drinks, of whom 10% consumed 10+ drinks in a session. Approximately one-quarter (23%) of respondents aged ≤ 24 years reported drinking 10+ standard drinks on a typical drinking day, more than double the 25–34 year olds and substantially more than older age groups.

Drinking five or more alcoholic drinks on one occasion, weekly or daily, was reported by 28.4%, and most prevalent among those aged 45–54 years (36.5%). Those aged 55+ years were least likely to report drinking this amount monthly or more often.

AUDIT-C scores

Overall, 69% of the sample scored positive (4+) on AUDIT-C. Highest AUDIT-C prevalence was among those aged ≤24 and 45–54 years. Three-quarters (76%) of respondents aged ≤24 years and nearly 80% of those aged 45–54 years were at-risk drinkers (Table 1). Time in industry was not significantly associated with risky drinking (AUDIT-C scores) and was therefore excluded in further analyses.

Risky alcohol consumption: comparison with male workers nationally

The sample's mean AUDIT-C score (mean = 5.02, SD = 2.97) was significantly higher than employed males

nationally (4.62) and significantly lower than NSW male construction workers (5.70). Male construction workers nationally, and in Queensland, Victoria, Western Australia and Northern Territory, had significantly higher AUDIT-C scores than the current sample (comparison data shown in Table S1).

Fewer drinkers in the current sample versus the total NDSHS national sample of male construction workers scored positive (scores ≥4) on AUDIT-C (69% vs. 73%, respectively) (Table S1). The proportion of male workers in Australia overall with positive AUDIT-C scores was lower at 61%.

Proportions of workers categorised as drinkers at 'severe risk' (Table S1) were similar to proportions in the total national population of male workers (23% vs. 22%) but substantially lower than the proportions among construction industry workers nationally (36%) (Table S1).

Perceptions of alcohol-related risks and knowledge

When asked to determine the degree of risk to health from drinking more than two standard drinks per day, one-third

Table 1. Workers' alcohol use (quantity and frequency), total and by age group

	Age range, years					Total % (n)
	≤24 % (n)	25–34 % (n)	35–44 % (n)	45–54 % (n)	≥55 % (n)	
<i>Frequency of having an alcoholic drink</i>						
Never (abstainer)	9.8 (9)	10.8 (21)	10.3 (10)	6.8 (5)	10.8 (4)	9.9 (49)
Monthly or less	31.5 (29)	23.2 (45)	24.7 (24)	9.5 (7)	18.9 (7)	22.7 (112)
2–4 times per month	28.3 (26)	31.4 (61)	22.7 (22)	23.0 (17)	35.1 (13)	28.1 (139)
2–3 times per week	21.7 (20)	22.7 (44)	27.8 (27)	32.4 (24)	21.6 (8)	24.9 (123)
≥4 times a week	8.7 (8)	11.9 (23)	14.4 (14)	28.4 (21)	13.5 (5)	14.4 (71)
<i>Number of standard drinks on a typical drinking day</i>						
Abstainer	9.9 (9)	11.1 (21)	10.3 (10)	6.9 (5)	11.1 (4)	10.1 (49)
1 or 2	15.4 (14)	25.8 (49)	35.1 (34)	27.8 (20)	52.8 (19)	28.0 (136)
3 or 4	18.7 (17)	24.7 (47)	24.7 (24)	37.5 (27)	27.8 (10)	25.7 (125)
5 or 6	22.0 (20)	18.4 (35)	20.6 (20)	19.4 (14)	5.6 (2)	18.7 (91)
7 to 9	11.0 (10)	8.4 (16)	7.2 (7)	4.2 (3)	2.8 (1)	7.6 (37)
10+	23.1 (21)	11.6 (22)	2.1 (2)	4.2 (3)	0 (0)	9.9 (48)
<i>Frequency of ≥5 drinks on one occasion</i>						
Abstainer	9.8 (9)	11.0 (21)	10.3 (10)	6.8 (5)	11.1 (4)	10.0 (49)
Never	7.6 (7)	8.4 (16)	15.5 (15)	13.5 (10)	30.6 (11)	12.0 (59)
<Monthly	25.0 (23)	26.2 (50)	32.0 (31)	23.0 (17)	33.3 (12)	27.1 (133)
Monthly	28.3 (26)	25.7 (49)	15.5 (15)	20.3 (15)	13.9 (5)	22.4 (110)
Weekly/daily	29.4 (27)	28.8 (55)	26.8 (26)	36.5 (27)	11.1 (4)	28.4 (139)
AUDIT-C score ≥4	75.8 (69)	69.7 (131)	60.8 (59)	79.2 (57)	42.9 (15)	68.5 (331) ^a
<i>AUDIT-C risk category</i>						
Low (0–3)	24.2 (22)	30.3 (57)	39.2 (38)	20.8 (15)	57.1 (20)	31.2 (152)
Mild (4–5)	18.7 (17)	24.5 (46)	21.6 (21)	23.6 (17)	22.9 (8)	22.8 (111)
Moderate (6–7)	30.8 (28)	20.7 (39)	16.5 (16)	33.3 (24)	14.3 (5)	23.2 (113)
Severe (8–12)	26.4 (24)	24.5 (46)	22.7 (22)	22.2 (16)	5.7 (2)	22.8 (111)

^aNote that this % differs slightly from Table S1 as four respondents did not provide their age. AUDIT-C, Alcohol Use Disorders Identification Test - Concise.

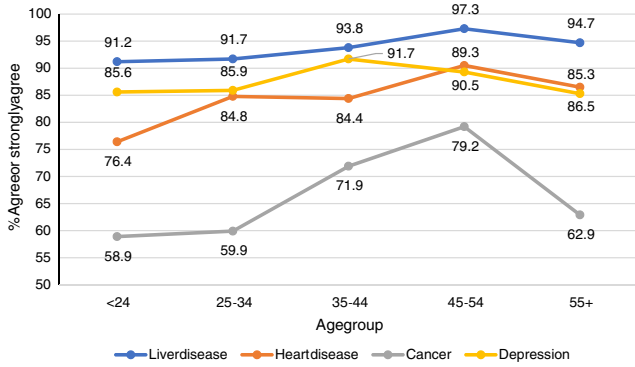


Figure 1. Perception of alcohol-related risk to health conditions by age.

(33.9%) indicated that this represented no/low risk; more than half (51.5%) of those aged 55+ selected this option (≤ 24 years = 36.7%; 25–34 years = 35.6%; 35–44 years = 28.4%; 45–54 years = 25.3%) (data not shown).

When asked about alcohol-related risks to health, participants agreed or strongly agreed that regular alcohol use increased risk of liver disease (93.1%), depression (87.4%), heart disease (82.4%) and cancer (65.2%), respectively. Younger workers were generally most likely to perceive lower risk to health than older colleagues (Figure 1).

In relation to perceptions of risk to workplace safety, 62.3% of respondents perceived that coming to work with a hangover carried a high risk to workplace safety. Perception of risk from hangover was lowest in young workers aged ≤ 24 years (46%) (Figure 2). Most respondents (89.8%) considered drinking alcohol during work hours to constitute a high risk to workplace safety. Perceptions of risk to workplace safety from drinking more than four standard drinks the night before work was lower at 36.7%, with younger workers (≤ 24 years and 25–34 years) less likely to believe that drinking more than 4 standard drinks the night before a workday carried a high risk to workplace safety (28% and 31%, respectively).

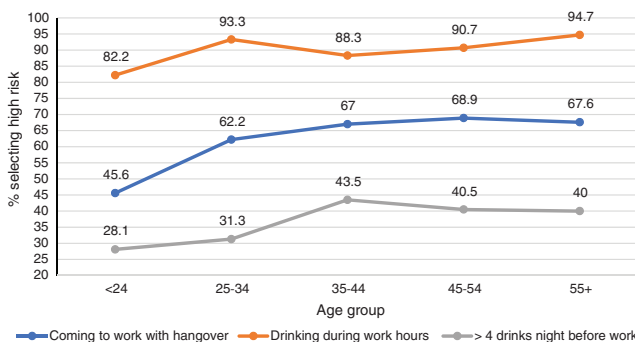


Figure 2. Perception of alcohol-related risk to workplace safety by age.

Alcohol-related knowledge by age. Alcohol-related knowledge was generally high [% correct for each item ranged from 72% (“you can reduce the amount of alcohol in your system by eating”) to 89% (“you can reduce the amount of alcohol in your system by having a cold shower”)] and tended to increase with age, albeit with decrements in knowledge among the oldest group (55+ years) (Table S2).

Workplace culture: alcohol availability and descriptive and injunctive norms

For availability of alcohol in the workplace, 52.5% of workers reported that it would be easy/very easy to bring alcohol into the worksite, and 43.5% indicated that it would be easy/very easy to use alcohol during work hours. A smaller proportion (23%) indicated that it would be easy/very easy to buy or get alcohol from someone at work.

In relation to injunctive norms indicating the level of co-worker approval for alcohol use, most workers reported that their closest workmates would disapprove or strongly disapprove of using alcohol at work or coming to work under the influence of alcohol (80.6% and 85.4%, respectively) (Figure 3). Fewer respondents (65.9%) reported that their closest workmates would disapprove or strongly disapprove of coming to work with a hangover.

For descriptive norms, indicating perceptions of co-worker alcohol use, a substantial proportion reported that coming to work with a hangover was a relatively common phenomenon; 30% indicated it occurred more than monthly and 28% indicated it occurred less than monthly (see Figure 3). Awareness of someone at work being affected by alcohol, or using at work, more than monthly was reported by approximately 16% and 17% of respondents, respectively.

Predictors of risky drinking

Hierarchical multiple regression analyses were conducted to determine predictors of AUDIT-C scores. Preliminary analyses were conducted to ensure no violation of assumptions of normality, linearity and homoscedasticity [41]. Data were examined for multivariate outliers using Mahalanobis distance. Seven cases with extreme scores were removed before conducting regressions. Correlations among predictor variables were assessed for potential threats of multicollinearity. All correlations were weak to moderate in association (Table S3).

Regression results. Age was entered first into the model as a covariate but was not significant. In the second step,

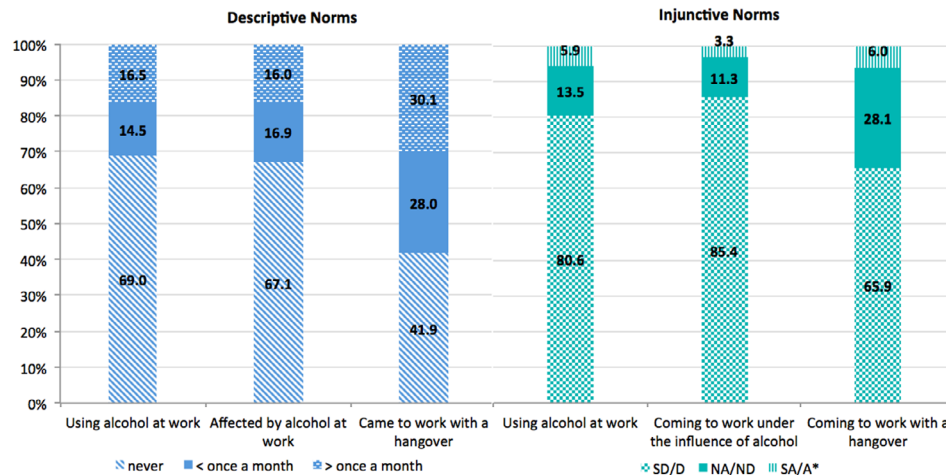


Figure 3. Frequency of workplace descriptive and injunctive norms around alcohol use at work. Note: *NA/ND, neither approve nor disapprove; SA/A, strongly approve/approve; SD/D, strongly disapprove/disapprove.

general health, alcohol knowledge, perception of alcohol-related risk to workplace safety and age explained 18% of the variance in AUDIT-C scores. General health, alcohol knowledge and risk to workplace safety made significant unique contributions to the model. In the final step, descriptive norms, injunctive norms and alcohol availability were added into the model, contributing a further 2% to the variance in AUDIT-C scores. Total variance explained by the model as a whole was 21% [$R^2 = 0.21$; $F(7,402) = 15.26$; $P < 0.001$]. In the final adjusted model, lower perception of alcohol-related risk to workplace safety ($\beta = -0.28$, $P < 0.001$) was the strongest predictor of AUDIT-C scores, followed by poorer general health

($\beta = -0.15$, $P = 0.001$), higher alcohol knowledge scores ($\beta = 0.14$, $P < 0.01$) and higher alcohol-related workplace descriptive norms ($\beta = 0.14$, $P < 0.01$) (Table 2).

Discussion

This NSW survey is one of few quantitative studies to examine drinking patterns and correlates of male construction workers in Australia. It adds valuable information to our understanding of both prevalence and patterns of use, potential contributory factors and possible strategies to ameliorate risky use. The findings

Table 2. Hierarchical regression model of risky drinking (Alcohol Use Disorders Identification Test – Concise)

	R	R ²	R ² change	B	SE	β
Step 1	0.08	0.01				
(Constant)				5.76	0.45	
Age				-0.02	0.01	-0.08
Step 2	0.44	0.19***	0.18***			
(Constant)				13.15	1.17	
Age				-0.02	0.01	-0.06
General health				-0.58	0.16	-0.17***
Alcohol knowledge				0.35	0.10	0.15***
Risk to workplace safety				-1.92	0.28	-0.32***
Step 3	0.46	0.21*	0.02*			
(Constant)				11.51	1.38	
Age				-0.02	0.01	-0.06
General health				-0.52	0.16	-0.15***
Alcohol knowledge				0.32	0.10	0.14**
Risk to workplace safety				-1.73	0.30	-0.28***
Descriptive norms				0.39	0.15	0.14**
Injunctive norms				0.05	0.21	0.01
Availability of alcohol				0.04	0.15	0.01

* $P \leq 0.05$; ** $P \leq 0.01$; *** $P \leq 0.001$.

provide useful insights into both descriptive patterns and predictors of risky drinking, and can inform future preventive programs and interventions.

Patterns and prevalence

The study sample reported high levels of risky drinking as normative behaviour, with few abstainers as countervailing influences. Risky drinking was higher than the national average among male workers but lower than male construction workers in most other Australian states. Awareness of co-workers affected by alcohol use at work and having hangovers was also common, raising serious concerns about safety and the potential for alcohol-related injuries and other harms.

Risky drinking and positive AUDIT-C scores were concentrated among young (aged <25 years) and mid-aged workers (45–54 years). The former contrasts with national and international downward trends in drinking among young people [42] and warrants attention. Very high levels of use among mid-aged workers is similarly concerning and requires tailored interventions to address personal health and occupational safety issues.

The bi-modal distribution of risky drinking suggests different drivers may be at play among younger versus middle-aged workers and has important implications from a prevention and intervention perspective. Risky consumption among middle-aged males may reflect midlife pressures, demanding work roles and high levels of stress, or emergent mental health problems [43,44] and is implicated in many health conditions which manifest in middle age, including diabetes, weight gain, high blood pressure, cancer and depression [45,46]. In addition, mid-life is the peak age for alcohol-related deaths and the time when work-related performance/pressure is often greatest [47–49]. Hence, the heavy drinkers aged 45–55 years are at increased risk of premature death or disability. Such outcomes incur personal tolls as well as creating a substantial loss for business.

Predictors of risky drinking

The strongest (negative) association with risky drinking was perceived risks to workplace safety; that is, lower perceived risks to workplace safety predicted higher levels of risky drinking. This finding supports the results of previous studies that reported discordance between risky behaviours and perceived risks to safety [17,50]. It also highlights the importance of focusing on safety and strengthening the culture of workplace safety. In contrast, awareness of the health effects of alcohol were not significant predictors of alcohol use. This result could indicate

that construction workers tend to ignore or underestimate the health impacts of risky behaviours or that the workplace climate places less emphasis on health. The implications for workplace education programs are evident and indicate that raising awareness of safety repercussions, rather than individual health effects, is critical. Rather than focusing solely on impairment from alcohol, education programs should address risks to safety from hangovers and poor health. Knowledge of how such risks extend to the safety of co-workers and the wider workplace are likely to have a greater impact than a narrow focus on the individual drinker.

A further key finding was that positive descriptive norms in relation to alcohol (i.e. co-workers affected by alcohol at work or coming to work with a hangover) were a significant predictor of risky drinking. This supports previous work showing that normative support in the form of co-worker behaviour and expectations about the use of alcohol can impact employees' consumption patterns [30], and that alcohol-related workplace cultural norms influence workers' drinking behaviours and styles [32]. This issue is considered of such salience that VicHealth, for example, recently applied their Alcohol Cultures Framework to an investigation of drinking among construction workers to inform potential alcohol interventions [25]. Clearly, co-worker influence is an important focus for workplace programs. In contrast, workplace injunctive norms, or the perception of co-worker approval for alcohol use, were not a significant predictor of risky drinking in the final regression model. This suggests that cultural norms in regard to impairment and workplace safety may outweigh approval of personal use of alcohol at work, or at least use in a manner that affects work performance and safety.

Findings relating to other predictor variables are noteworthy. Although job stress was positively correlated with AUDIT-C scores, it was not found to be a significant predictor of drinking in this study, indicating that stress was not a primary driver of alcohol in the current sample. In addition, an association between workers' alcohol-related knowledge and risky drinking was found whereby higher knowledge scores predicted higher AUDIT-C scores. This finding is counterintuitive to the assumption that information provision will motivate change and reflects research that suggests change is unlikely to be achieved by targeting individual alcohol knowledge alone. This lack of concordance therefore underscores the limitations of education approaches in isolation and, again, highlights the need for interventions that address the wider workplace, alcohol-related safety risks and cultural norms concerning alcohol [32]. Encouragingly, there are growing examples of effective interventions that can be feasibly executed in blue collar workplaces that have been demonstrated to achieve positive results in terms of reducing risky alcohol consumption and associated reinforcers

[10,51,52]. Further in-depth research is required that examines the key drivers of industry and organisational culture in relation to risky alcohol use to inform effective intervention strategies, programs and policies in this high-risk industry.

Limitations

The sample for this study was a convenience sample, albeit a relatively large one, rather than a deliberately sourced representative sample. Nonetheless, comparison with a nationally representative data (i.e. NDSHS) demonstrated comparability. For instance, the AUDIT-C mean score of the study sample was not significantly different to the AUDIT-C scores for a representative sample of male construction workers in NSW, suggesting that the findings can be generalised to at least male construction workers in NSW, if not more broadly. Moderate demographic information available for this study curtailed a more detailed examination of predictors of risky drinking.

Conclusions

This study flags the imperative for appropriate workplace policy and programs to address risky alcohol use, confirming high levels of use among male construction workers across a range of age groups. The study identifies workplace factors that may be conducive to risky drinking patterns and provides a valuable basis to inform future intervention and support programs in high-risk workplaces at both an individual and organisational level. In particular, it directs attention to the need to tailor programs not only to young workers, the traditional focus of concern, but also to the often-overlooked needs of mid-aged workers. It also indicates the need to implement strategies to increase awareness of alcohol-related risks to workplace safety and change cultural norms regarding the social acceptability of risky drinking behaviour within and outside the workplace.

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Supporting information

Additional Supporting Information may be found in the online version of this article at the publisher's web-site:

Table S1. Proportion of positive AUDIT-C scores (≥ 4) and risk categories for sample in comparison to all male construction workers (nationally and by state) and all male workers nationally (aged 15+ years)

Table S2. Workers' alcohol-related knowledge

Table S3. Means, standard deviations and correlations of all variables