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*Australia's National Research Centre
on AOD Workforce Development*



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An Evaluation of a Workplace Alcohol and Drug Harm Reduction Program

AOD Early Intervention Innovation Fund Final Evaluation Report

Developed for New South Wales Health

**And the Building Trades Group Drug and Alcohol Program, New South Wales
by**

The National Centre for Education and Training on Addiction,

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About NCETA

NCETA is based at Flinders University in South Australia and is an internationally recognised research and training centre that works as a catalyst for change in the alcohol and other drug (AOD) field. NCETA's areas of expertise include training needs analyses, the provision of training and other workforce development approaches. We have developed training curricula, programs and resources, and provided training programs, to cater for the needs of: specialist AOD workers; frontline health and welfare workers; Indigenous workers; community groups; mental health workers; police officers; and employers and employee groups. The Centre focuses on supporting evidence-based change and specialises in change management processes, setting standards for the development of training curriculum content and delivery modes, building consensus models and making complex and disparate information readily accessible to workers and organisations.

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Statement

This Final Evaluation Report is a deliverable as part of the research collaboration between Flinders University and the Building Trades Group Drug and Alcohol Program (BTGDAP). It is submitted to NSW Health as part of the requirements of the NGO Evaluation Grant Scheme (Round 2) project titled 'An evaluation of a workplace alcohol and drug harm reduction program', Alcohol and other Drugs Early Intervention Innovation Fund. This report presents preliminary findings from the evaluation, pending full publication of data.

Acknowledgements

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Executive Summary

'An Evaluation of a Workplace Alcohol and Drug Harm Reduction Program' was undertaken to evaluate the Building Trade Group Drug and Alcohol Program (BTGDAP) Workplace Impairment Training, delivered to construction industry employees in NSW. NSW Health funded the BTGDAP to undertake the evaluation program in partnership with the National Centre for Education and Training on Addiction (NCETA).

Introduction

The Australian construction industry has high levels of alcohol and other drug (AOD) use and related harms, with social and cultural influences and workplace conditions traditionally conducive to risky drinking and drug use. Tailored training approaches are required to address AOD-related risks to workplace safety and improve worker wellbeing. The BTGDAP delivers 2-hour Workplace Impairment Training sessions to educate workers about the risk of AOD-related harm to themselves and others, offer a support pathway for workers affected by AOD or mental health issues, and improve safety on building sites. The training occurs on-site, with approximately 20 employees per session and is delivered by BTGDAP trainers. The training content covers regulatory requirements, AOD-related workplace impairment factors and how to recognise them, and information on AOD-treatment and counselling options.

Project Aims

The aim of the evaluation was to assess the impact of the training on employee AOD-related knowledge, attitudes, consumption patterns and help-seeking behaviours. Research questions were:

1. Does the BTGDAP training result in positive changes to:
 - a. Risky drinking and drug use?
 - b. Knowledge of AOD-harms and workplace impairment?
 - c. Attitudes to the impact of AOD-risk to health and workplace safety?
 - d. Awareness of treatment and counselling options?
2. What are the training delivery costs and ratio of costs to benefits?
3. From the perspective of key stakeholders, what are the most and least effective aspects of the training, and what are the barriers and facilitators of implementation?

Method

A before-and-after, non-randomised trial was conducted with N=719 construction workers (n=531 in the Training Group, and n=188 in the Non-Training Group) in NSW. Participants completed hard-copy surveys on-site at baseline (T1), assessing risky drinking (primary outcome), drug use, and a range of knowledge and attitudinal measures (secondary outcomes). Training Group participants were assessed on secondary measures immediately post-training (T2). All participants were re-assessed on all measures approximately three months later (T3). N=15 key stakeholders participated in semi-structured interviews to provide feedback on the training. Statistical analyses assessed the changes in quantitative data outcomes from T1-T2, and T1-T3, and thematic analyses identified common themes in the qualitative data.

Results

The prevalence of AOD use across the sample was exceptionally high. Three in four were risky drinkers. Rates of cocaine and meth/amphetamine use were 3.5 times higher than the national average, and prescribed pain killer use was 3 times higher than the national average. Training Group participants rated the training to be very useful. Immediately following the training, short-term outcomes (based on analyses from T1-T2) were highly successful. Participants reported significant increases in AOD knowledge, greater awareness of impairment factors, higher perceptions of risk to health and workplace safety from AOD use, and increased awareness of, and confidence in, how to access support for AOD and mental health.

From T1-T3, 73% of the sample was lost to follow up, impacting the representativeness of the sample. Caution is therefore warranted in the interpretation of results at T3. Of the remaining sample, 92% of Training Group participants indicated that they thought more carefully about workplace impairment factors since the training. No significant improvements were found for the primary outcome measure of AUDIT-C score or illicit drug use measures, but an improvement in the proportion of workers who were categorised as risky drinkers (AUDIT-C score ≥ 4) was demonstrated in the Training Group when compared to the Non-Training Group. Sustained improvements in the Training Group were also demonstrated for alcohol knowledge, confidence in talking to co-workers about AOD, and knowing how to get help for AOD and mental health issues. Due to the substantial loss to follow up at T3, costs to benefit analyses were not undertaken.

Qualitative feedback from stakeholders was positive, highlighting the importance of the training for opening dialogue, reducing stigma and encouraging help-seeking among workers, to the extent that the training was considered an essential service for construction workers. Stakeholders noted that the positive benefits from the training were being translated on-site: “...people are seeing the benefit in the training”.

Implications for policy and practice

This evaluation has generated numerous findings of key importance for workers and employers, and added value to the limited evidence base informing effective approaches to workplace AOD harm reduction in Australia and overseas.

Notwithstanding the methodological limitations, the findings of the evaluation were generally positive with areas for improvement identified. It provides some support for the continued implementation of the BTGDAP Workplace Impairment Training in the construction industry. An extremely high prevalence of prescribed pain killer, illicit drug and alcohol use was reported in the sample, demonstrating that opioid dependence and high risk from polydrug use is of critical concern to the industry. Three quarters of the sample reported drinking at risky levels, comparable to construction workers nationally. The findings are also valuable in highlighting the emerging issue of exceptionally high and increasing levels of cocaine use, subsequently noted in the National Drug Strategy Household Survey, 2019 [1].

A tailored intervention approach is required to address these issues, and specific coverage of these topics is warranted in the training. Additional issues identified for inclusion in further training were information on withdrawal, available detox facilities and crisis support lines, and nicotine dependence.

As recommended by stakeholders, regular refresher courses are required to reinforce key take-home messages with employees. Consistent with behaviour change research, short refresher to boost attitudes and perceptions of risk at regular intervals is recommended, potentially offered via toolbox talks or other easily accessible on-site options.

To provide the most effective training, companies and trainers can take practical action by ensuring site-facilities are suitable and appropriate, and offering interpreters for workers whose first language is not English. The inclusion of practical guidance for lifestyle change was highlighted as a gap in the training, and workers requested more 'solution-focused' discussions to accompany the educational components.

Feedback from stakeholders supported a 'whole of industry' approach to the training, recognising that while the training met a significant gap for the industry, implementation was inconsistent. Similarly, best practice responses to AOD in the workplace are most effective when they adopt a whole-of-workplace approach targeting workplace conditions as well as culture, norms and controls. The full potential of training alone is unlikely to be realised without close consideration of these factors.

While this evaluation found positive changes from a 2-hour training program, it is noted that more intensive, nuanced approaches are also required. Targeting individual-level education, while useful, will have limited impact in the absence of widespread systemic and cultural change. It is also important to note that logistical challenges led to methodological limitations (i.e. large dropout rate at T3) that reduced the ability to answer research questions 2 and 3. Significant findings reported at T3 require confirmation in future studies.

More generally, the challenges of conducting research within a highly dynamic, transient and time-pressured industry such as construction are considerable. Recruitment and retention challenges due to logistical issues require a high degree of unanticipated travel, time and in-kind contribution. It is important that such challenges are anticipated and met with a realistic level of resourcing in future industry-based projects. A more resource intensive, larger-scale project is required to confirm these findings in a fully randomised trial.

Conclusion

The BTGDAP Workplace Impairment Training shows promise for improving AOD-related outcomes and generating a positive shift in attitudes and cultures by encouraging conversations around AOD and wellbeing, and offering support avenues for workers. The current harm reduction approach in which the training is embedded has made inroads to tackle the high burden of AOD-related health and safety risk in the NSW construction industry, with continued investment and more intensive, consistent industry-wide approaches required.

Publication and Dissemination Activities

Completed publications

- Roche, A. M., Chapman, J., Duraisingam, V., Phillips, B., Finnane, J., & Pidd, K. (2021). Flying below the radar: Psychoactive drug use among young male construction workers in Sydney, Australia. *Substance Use & Misuse*, 1-10. Advance online publication. doi: 10.1080/10826084.2021.1892139

- Chapman, J., Roche, A.M., Duraisingam, V., Phillips, B., Finnane, J., & Pidd, K. (2020). Working at heights: Patterns and predictors of illicit drug use in construction workers. *Drugs: Education, Prevention & Policy*, 28(1), 67-75. doi: 10.1080/09687637.2020.1743645
- Roche, A. M., Chapman, J., Duraisingam, V., Phillips, B., Finnane, J., & Pidd, K. (2020). Construction workers' alcohol use, knowledge, perceptions of risk and workplace norms. *Drug and Alcohol Review*, 39(7), 941-949. doi: 10.1111/dar.13075
- Chapman, J., Roche, A. M., Duraisingam, V., Ledner, B., Finnane, J., & Pidd, K. (2020). Exploring the relationship between psychological distress and likelihood of help seeking in construction workers: The role of talking to workmates and knowing how to get help. *Work (Reading, Mass.)*, 67(1), 47-54. doi: 10.3233/WOR-203251
- Chapman, J., Roche, A.M., Duraisingam, V., Phillips, B., Finnane, J., & Pidd, K. (under review). Prescription pain medication use among Australian male construction workers: Prevalence and predictors.

Planned publications

- Chapman, J., Roche, A.M., Phillips, B., Finnane, J., & Pidd, K. (manuscript in preparation). Is workplace alcohol and drug impairment training effective? Outcomes from an evaluation trial in the Australian construction industry.
- Phillips, B., Chapman, J., Roche, A.M., Finnane, J., & Pidd, K. (manuscript in preparation). Key stakeholder views on construction industry alcohol and drug safety awareness training effectiveness in Australia: Implications for policy and practice.

Conferences and presentations

- Alcohol and drug use among construction workers: Which drugs and which workers? Oral presentation delivered by Dr Janine Chapman, NCETA, at the Australian Public Health Conference, Sept 2019, Adelaide. This abstract was listed as a finalist for the Capacity Building Award from the Public Health Association of Australia.
- Who uses what: Polydrug use among construction workers and implications for intervention. Oral presentation by Prof Ann Roche, NCETA, at the Australasian Professional Society on Alcohol & Other Drugs (APSAD) Conference, Nov 2019, Hobart.
- Dr Janine Chapman will present the results of this project, 'An evaluation of workplace alcohol and drug harm reduction program', to NSW Ministry of Health and stakeholders at the Early Intervention and Innovation Fund (EIIF) Webinar Series, November 2020.

Media and promotion

- Roche, A.M., Pidd, K., Chapman, J., Lender, B., & Finnane, J. (Oct 2018). Evaluation of a workplace alcohol and other drug (AOD) harm reduction program (New Projects). *Drug and Alcohol Research Connections*, online article.
- Flinders University Office of Communication and Engagement published a media article in May 2020 reporting findings from Roche, et al. (2020). Construction workers' alcohol use, knowledge, perceptions of risk and workplace norms. *Drug and Alcohol Review*. doi: 10.1111/dar.13075.

This story was reported on industry-specific news and online magazine channels Safety Solutions, Build Australia, Get Building and general news outlets Mirage News and The National Tribune.

Introduction

The Building Trades Group Drug and Alcohol Program (BTGDAP) delivers alcohol and other drug (AOD) Impairment Awareness Training to construction employees in New South Wales.

In collaboration with the National Centre for Education and Training on Addiction (NCETA), the BTGDAP was funded by NSW Health under the AOD Early Intervention and Innovation Fund to conduct an evaluation of the training program, run over a two year period.

The purpose of the evaluation was to determine whether the training leads to worker knowledge, attitude and behaviour change required to reduce risky AOD use and related harms, and to obtain stakeholder perceptions about training content, implementation and facilitation. The aim of the project was to determine the effectiveness of the training, highlight strengths and areas for improvement, and inform future practice and policy.

Background

AOD use is a leading risk factor for injury and disease and places a substantial cost on the workplace [2, 3]. In Australia, AOD-related absenteeism is estimated to cost up to \$AUS2 billion each year [4] and alcohol use is associated with 11% of all workplace injuries [5], in addition to less quantifiable harms in terms of impaired productivity and reduced worker wellbeing.

In a workplace context, AOD-related impairment can arise from acute intoxication, arriving at work with a hangover from AOD use, or other chronic health conditions related to long-term AOD use such as insomnia, poor mental health or mood disturbances [6, 7]. The effects of AOD on worker performance can increase the risk of workplace accidents and injuries in a number of ways. Alcohol, for example, slows down the body's motor and sensory systems, resulting in impaired coordination, perception and decision-making. Acute effects of cannabis can include drowsiness and distorted motor functioning [8], while stimulant drugs such as cocaine and meth/amphetamine lead to increased arousal and confidence, with negative impacts on cognition [9].

The construction industry, in Australia and overseas, is an identified workforce group with high prevalence of AOD use and related harms [10, 11]. AOD use is known to be elevated in male-dominated blue-collar industries, where traditional masculine norms are prevalent. Typically, drinking forms a major part of the camaraderie dynamic, and alcohol is used as a reward for, and a means of celebrating, a job well done. The industry employs a high rate of inexperienced and potentially impressionable young workers and apprentices, who are often at particular risk from AOD-related harms due to peer pressure and other negative influences [10].

Construction is also recognised as a demanding, dangerous and transient profession. Workers are frequently exposed to shift work, irregular and long hours, high occupational risk, hazardous working conditions and job insecurity [12], all of which may contribute to higher AOD use. Workers employed in male-dominated industries are highly vulnerable to stress and mental illness which may exacerbate AOD problems. Data shows that suicide rates are 80% higher in low-skilled construction workers than in the general population [13]. Furthermore, construction workers are less likely than the general population

to seek help [14], with limited opportunity to discuss their problems, or access quality information about AOD and confidential support pathways.

BTGDAP AOD Workplace Impairment Training

The BTGDAP is a unique industry-based prevention / early intervention and harm reduction strategy designed to educate construction workers about the risk of AOD-related harm to themselves and others, and improve safety on building sites. With over 20 years' experience, BTGDAP provides the construction and building industry in NSW with the skills to recognise and deal with AOD risk and access available treatment options, delivering practical solutions for workers and employers.

As part of a wider 'fit-for-work' policy, the BTGDAP delivers employee Workplace Impairment Training. The training is offered on a fee-for-service basis, payable by the employer. To tender for Commonwealth Government work and comply with the building code, construction industry employers must provide random drug testing, training and support throughout their organisation.

The training is designed for site workers and features talks, videos and other supporting materials that are designed to explain policies and procedures, current legislation and regulatory requirements, ways to recognise impairment in oneself and others, and provide information about help available for workers who receive a positive drug test or are in need of support. All workers employed at a given worksite including labour hire, managers, supervisors and other employees receive the training.

The training runs for two hours and is conducted by a BTGDAP trainer on-site or at a mutually agreed location, with a maximum of 20 participants per session.

Specific training content includes:

- Workplace Health and Safety Act overview
- Harms related to AOD use
- Statistics related to AOD-related workplace fatalities and accidents
- Mental health issues
- Fatigue – causes and coping mechanisms
- Coverage of other impairment factors, e.g. heat stress, noise
- Drug and alcohol testing overview
- Detection rates for illegal drugs
- Drinking responsibly and understanding how long alcohol stays in your system
- Information on Foundation House, a linked counselling and rehabilitation centre in NSW offering 28-day residential services and ongoing out-patient support for relapse prevention.

Participants who have undertaken the training and are deemed competent are provided with an impairment training induction card that is valid for five years from the date of the training.

Project Rationale

Construction workers are at elevated risk of AOD-related harm, requiring specifically tailored training approaches which take into account their unique culture and circumstances in context-relevant settings. The workplace impairment training evaluated through this project is embedded within the wider

BTGDAP program that focuses on workplace safety and employee wellbeing, utilising a 'look after your workmates' approach. The evaluation project aimed to determine whether the training contributed to the reduction of AOD-related harm among a high-risk group, and improved attitudes and behaviours towards help-seeking for AOD and mental health issues among workers who are traditionally reluctant to seek help. The evaluation assessed which risk-related behaviours or attitudes might be differentially impacted, what aspects of the training were most well received, and what areas of the training might require improvement. The evaluation findings will add to the limited empirical evidence base regarding effective workplace AOD harm reduction, and provide insight into best-practice strategies to reduce risk of injury, disease and related costs across the wider building industry in NSW.

Aim and Research Questions

The aim of the evaluation was to examine the impact of the BTGDAP Workplace Impairment Training on workers' AOD-related attitudes, consumption patterns, and help-seeking behaviours that can result in impairment at work. Research questions were as follows:

1. Does the BTGDAP workplace impairment training result in positive changes to:
 - a. AOD consumption patterns and behaviours?
 - b. Knowledge of AOD-related harms and workplace impairment?
 - c. Attitudes and beliefs regarding the impact of AOD on health and safety?
 - d. Awareness and attitudes regarding AOD-treatment and counselling options?
2. What are the training delivery costs and what is the ratio of costs to benefits?
3. From the perspective of workers, trainers and workplace managers, what are the:
 - a. Most / least effective aspects of the training?
 - b. Potential barriers to implementing the training?
 - c. Most useful aspects with regard to facilitating the training?
 - d. Recommendations for improvement?

Method

The evaluation comprised two components:

1. Outcome evaluation: Quantitative trial
2. Process evaluation: Qualitative interviews with key stakeholders.

The outcome evaluation examined the impact of training on AOD-related knowledge, attitudes and behaviour, immediately post-training and after 3 months. The process evaluation identified perceptions of the training delivery and content, and potential barriers to training implementation or facilitators to training effectiveness. An overview of each stage is provided below. The Discussion section integrates quantitative and qualitative data to inform the overall evaluation findings.

Outcome evaluation: Research design

A before-and-after design with a non-randomised, non-matched comparison group was employed for the outcome evaluation.¹ Baseline survey data (T1) were collected from construction industry employees just prior to attending the training (Training Group, 3 worksites) and from workers who had not attended the training and would not do so for the duration of the study (Non-Training Group, 3 worksites). Immediately following the training, T2 survey data were collected from the Training Group. Follow up survey data (T3) were collected from both the Training Group and Non-Training group, approximately 3 months later. For the process evaluation, interviews were conducted during the period between T2 and T3, with key stakeholders who had undertaken the training, and BTGDAP staff who conducted the training (Figure 1).

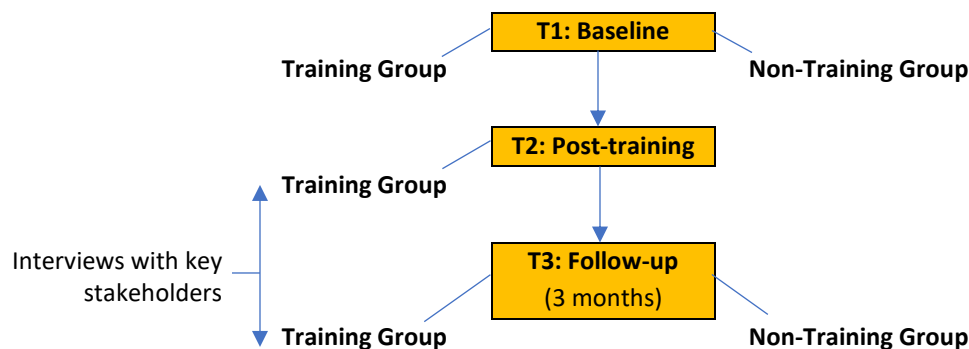


Figure 1. Study design

¹The original design of the outcome evaluation was a cluster randomized crossover trial, with an anticipated sample size of N=600 collected from 30 worksites. This design was not achievable due to logistical challenges associated with worksite access, the transient nature of the workforce, and difficulties identifying workers who had not already attended the training. The outcome evaluation was therefore modified as per our 2nd Technical Feedback Report (2019) to NSW Health.

Procedure

A purpose-designed pen and paper survey was administered to construction industry workers employed at NSW construction sites. Training Group participants consisted of training program attendees who volunteered to participate in the evaluation. Potential participants were verbally informed of the evaluation by a research officer at the beginning of the training session, given a study information sheet and asked to complete three short surveys: (1) before the training (2) immediately following the training, and (3) in approximately 3 months' time. All training sessions were conducted on-site. To recruit Non-Training Group participants, researchers identified and visited construction groups who had not previously undertaken the training, with prior consent from managers. Employees were informed of the evaluation and asked to complete two short surveys: (1) during the site visit, and (2) in approximately 3 months' time.

For all participants, consent was indicated by completing and returning the T1 survey. All surveys were anonymous and contained a non-identifiable code unique to each participant, which was used to match the T1 and later surveys. Follow up (T3) surveys were distributed and collected at participants' workplaces, in negotiation with individual worksite managers. All surveys were administered by the research officer and participants were free to withdraw from the study at any time. Participants received a \$20 gift voucher on completion of the final survey. Ethics approval for the outcome evaluation was obtained by Flinders University's Social and Behavioural Research Ethics Committee (#7932).

Survey measures

Three pen and paper-based questionnaires (to be delivered at T1, T2 and T3) were developed for the evaluation. Each survey took approximately 10-15 minutes to complete. Full details of survey measures, response options and scoring are shown in Appendix 1.

Alcohol and drug use

The primary outcome of risky alcohol use was assessed by the Alcohol Use Disorder Identification Test – Consumption (AUDIT-C), a general population screening tool [15]. Responses to three items (drinking frequency, number of drinks typically consumed and frequency of binge drinking) were summed to give a total AUDIT-C score between 0-12 (higher scores indicating riskier drinking). The score was also dichotomised whereby 0-3=low risk, and scores ≥ 4 =risky drinking.

Drug use for four individual drug types was measured by items adapted from the Australian Institute of Health and Welfare's National Drug Strategy Household Survey [16]. The items were: How often have you used: (1) cannabis, (2) meth/amphetamine, (3) cocaine, and (4) prescribed pain killers in the past 12 months? Response options were: never / every day / once a week or more / once a month / less often, for each drug. All alcohol and drug use measures were included in T1 and T3 surveys.

Secondary outcome measures

Secondary outcomes fell into three categories: (1) Knowledge of AOD-related harms and workplace impairment, (2) Attitudes and beliefs regarding the impact of AOD on health and workplace safety, and (3) Awareness and attitudes regarding AOD-treatment and counselling options. These measures were

purpose-designed for the study. All secondary outcome measures were included in T1, T2 and T3 surveys.

Knowledge of AOD-related harms and workplace impairment

Participants completed three knowledge and awareness measures. The first assessed Alcohol Knowledge (with a possible total score ranging from 0-5). The second assessed Awareness of Impairment Factors in the workplace (total score 0-12), and the third assessed Awareness of Fatigue Management Strategies (total score 0-6). A further six single items assessed workers' level of confidence in recognising signs of impairment. Items asked about confidence in relation to recognising signs of heat stress, poor mental health and fatigue, in themselves and in their co-workers.

Attitudes and beliefs regarding the impact of AOD on health and workplace safety

Perception of AOD-related risk to health was assessed by three measures: AOD-related Risk to Health from regular use (average of 5 items), Harms from Alcohol Use (average of 6 items), and Harms from Drug use (average of 4 items).

To assess perceptions of AOD-related risks to workplace safety, a series of single item measures asked participants to rate the degree of risk associated with alcohol, cannabis, cocaine and prescribed pain killer use: (1) the night before a work day, (2) just before starting work, and (3) during work hours, including lunch and breaks.

Awareness and attitudes regarding AOD-treatment and counselling options

Six single items assessed participants' level of confidence in relation to talking to co-workers about AOD problems and mental health issues, knowing how to get help for AOD problems and mental health issues, and likelihood of help-seeking for AOD problems and mental health issues.

Other measures

Demographic questions asked at T1 were age (years), sex (male / female) and years worked in the construction industry.

Training Group participants were asked to evaluate the training at T2 ('how useful did you find the training?') and T3 ('Since the training, do you think more carefully about factors that lead to impairment?').

AOD-affected workdays and help-seeking behaviour

Participants were asked at T1 and T3 to record the number of days over the past three months that they had: (1) been absent from work due to AOD use, (2) gone to work with a hangover from alcohol or drugs, and (3) avoided or missed work due to concern over being drug tested.

Training Group participants were asked at T1 whether they had sought help for AOD or mental health issues in the past 12 months (Y/N), and asked at T3 whether they had sought help for AOD or mental health issues in the past 3 months (Y/N).

Statistical analysis

The statistical analysis plan was revised in collaboration with NSW Health following the modification of the research design, as per our 2nd Technical Feedback Report (2019). Sample size calculations were based on the primary outcome measure, AUDIT-C score. To achieve a clinically significant reduction of one point in AUDIT-C scores at a significance level of 0.05 and a power estimate of 0.8, N=284 (141 per group) were required [17]. Paired-samples t-tests assessed changes on secondary outcomes in the Training Group from T1-T2, reported with Cohen's d to indicate the magnitude of effect and Bonferroni adjustments for multiple comparisons. Cohen's d can be interpreted as 0.2=small, 0.5=medium, and 0.8=large [18]. Missing data were replaced using Maximum Likelihood algorithm, with sensitivity analyses conducted on complete cases. At T3, missing data could not be reliably replaced due to a large (73%) attrition rate, therefore complete case analyses were conducted. Paired samples t-tests assessed within-subjects change on continuous outcome variables and McNemar tests assessed within-subjects change on binary outcome variables from T1-T3. To assess between-group differences at T3, Analysis of Covariance (for continuous variables) and binary logistic regression (for dichotomous variables) were conducted, adjusting for baseline values. Responses indicating 'don't know' or 'unsure' were removed from secondary outcomes prior to analyses. All analyses were conducted in SPSS (version 25).

Cost analysis

The financial and resource costs of the training program were tracked over a 6-month period to give an indication of the program delivery costs. Information included:

- Financial expenditure e.g., printing of resources
- Travel and training time for trainers / motor vehicle costs
- Training preparation time
- Numbers of employees who attended the training

To estimate a per capita cost of training delivery against evaluation outcome changes, it was planned that the following questions would also be addressed:

- Does the training result in less time off work due to AOD use?
- What is the ratio of costs to benefits?

Process evaluation: Qualitative interviews

The process evaluation sought qualitative feedback from construction workers and managers who had undertaken the training, and BTGDAP trainers who delivered the training. The purpose was to identify components of the training content that participants believed were the most or least effective, and to identify barriers and facilitators to training implementation.

Written consent was obtained from construction companies in Sydney, NSW, to attend on-site training sessions and distribute study information and consent forms to potential interviewees. Interested participants were given the choice to be interviewed on-site or over the phone at a time convenient to them. All participants received a \$20 gift card for their time. Interviews were semi-structured, with topics including AOD culture in the workplace, perceptions of training content and delivery, key 'take home' messages from the training, and areas for improvement. Interviews were audio recorded and

transcribed and thematic analysis identified common themes and topics from stakeholders. Ethics approval for the process evaluation was obtained by Flinders University's Social and Behavioural Research Ethics Committee (#8352).

Outcome Evaluation: Results

Data were collected from 719 workers at T1 (Figure 2). At T2, immediately post-training, n=472 matched surveys were collected from the Training Group. At T3 follow up, n=198 matched surveys were collected, with n=122 in the Training Group and n=76 in the Non-Training Group. These numbers represent a loss of 11.1% from T1–T2, and 72.5% from T1–T3 (Training Group = 77% and Non-Training Group = 60.6%).

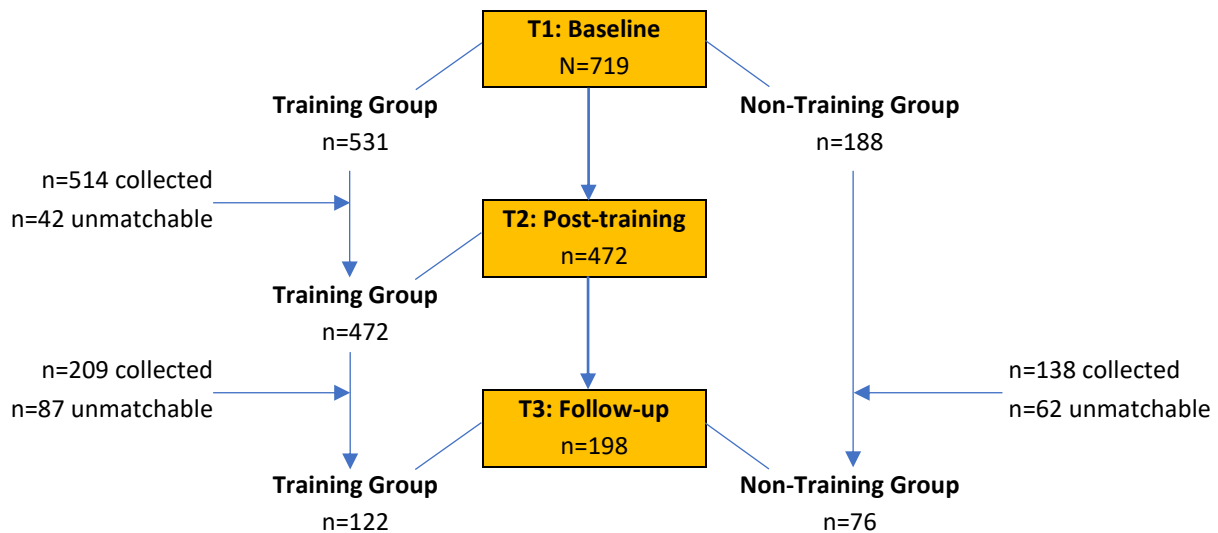


Figure 2. Participant progression through the study

Sample Characteristics

Workers at T1 were predominantly male (96.8%). Nearly half had worked in the construction industry for more than 10 years, and the average age was 35 years (range=15-68). Most workers (37.1%) were in the 25-34 age group (Figure 3).

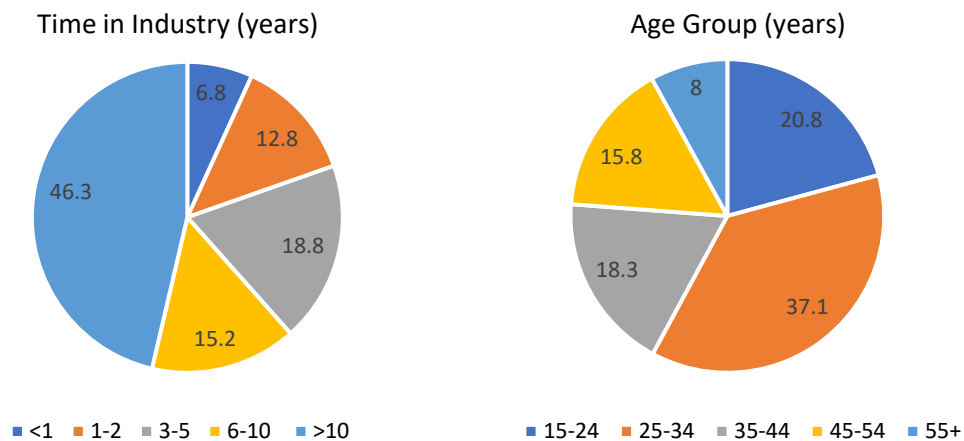


Figure 3. Length of time worked in the construction industry and age group of sample

AOD consumption patterns

Alcohol use

Seventy-point-three per cent of the sample were classified as risky drinkers on the AUDIT-C measure (score ≥ 4), with a total mean score of 5.25 (sd=3.08, range=0-12).

On individual AUDIT-C items, almost one in five reported drinking alcohol more than four times per week, and almost one in five consumed more than 7 standard drinks on a typical drinking day. Over one third of the sample reported consuming five or more drinks on a single occasion on a weekly or daily basis (Figure 4).

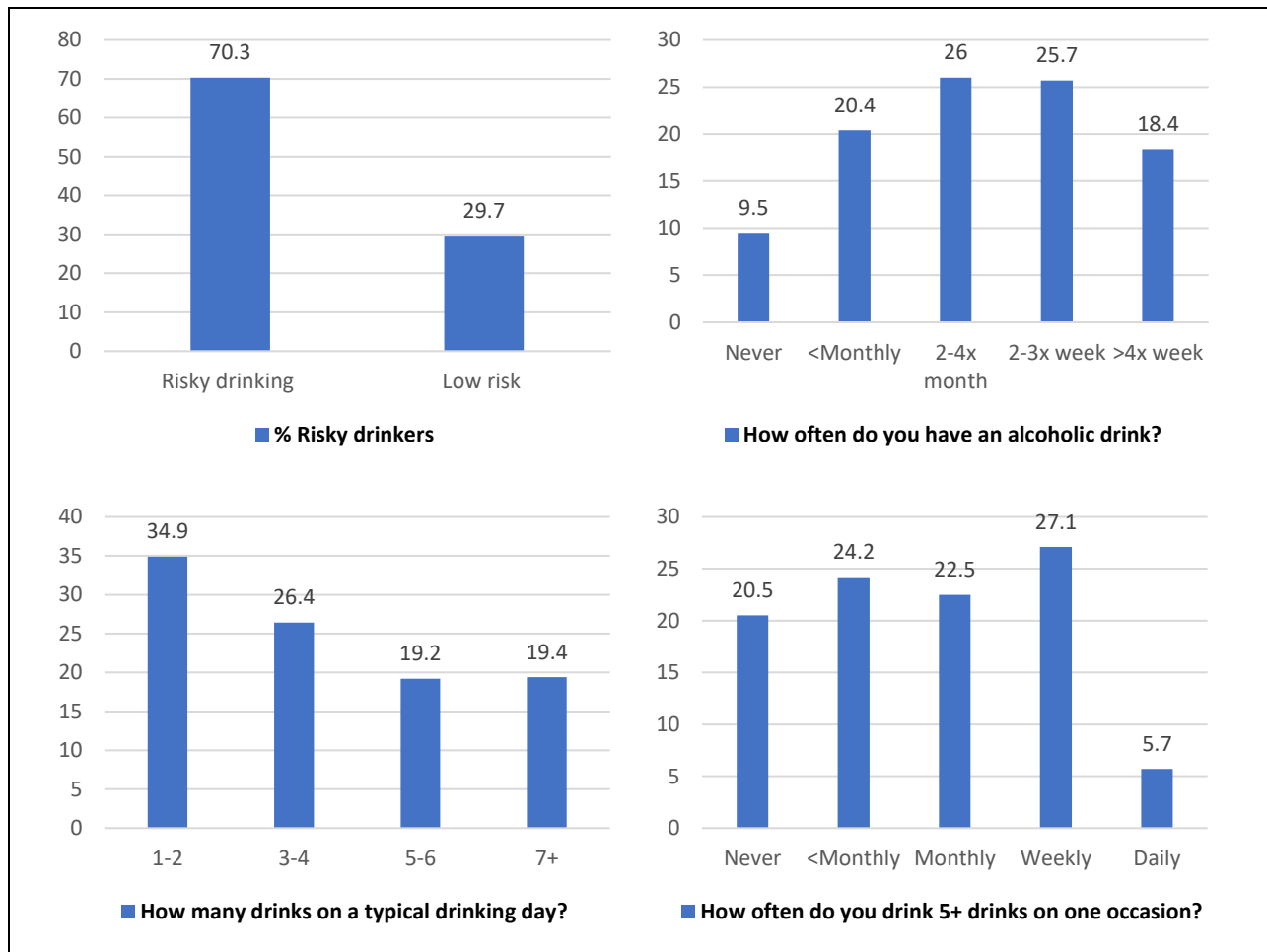


Figure 4. Risky drinking and frequency of alcohol use (%)

Drug use

Twenty-four point nine per cent of workers reported using cocaine yearly or more, and 24.6% reported using cannabis yearly or more. Workers were more likely to use cannabis on a weekly and daily basis (7.2%) compared to other drugs. Around one in ten reported monthly or more cocaine use (9.8%). Six-point-seven per cent reported meth/amphetamine use in the past year. Nearly one quarter of

respondents (23.8%) reported using prescribed pain killers at least once per year, with an additional 13.8% reporting use on a monthly or more basis (Figure 5).

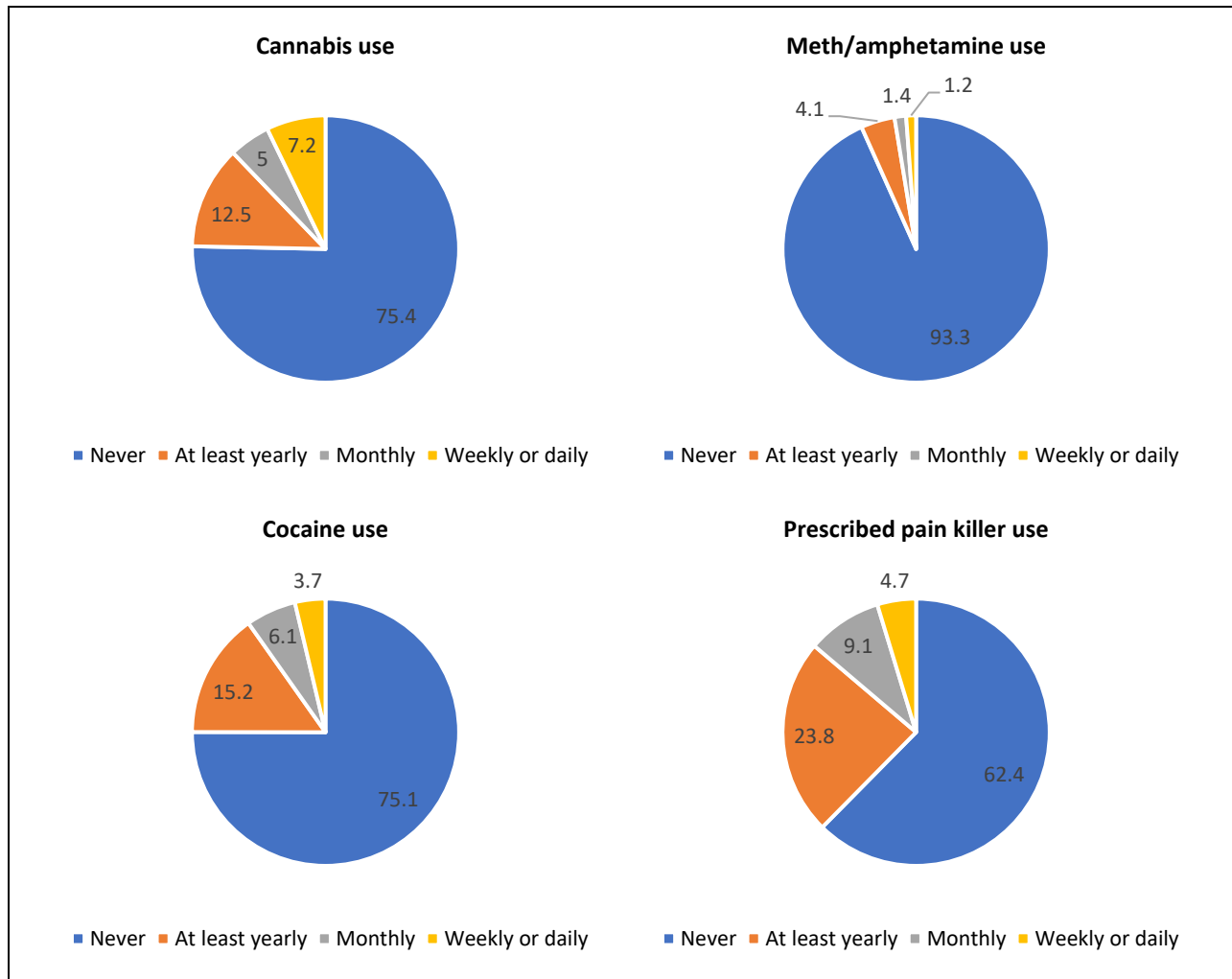


Figure 5. Frequency of drug use

AOD consumption patterns by age group

AOD consumption patterns are known to differ by age, with young construction workers at particular risk from high levels of use [10]. Figure 6 shows the frequency of risky drinking and yearly use of drugs by age group in the sample. Although rates of risky drinking were high in the two youngest age groups (74.7% in 15-24 years and 72.9% in 25-34 year olds), the highest prevalence of risky drinking was found in workers aged 45-54. Cannabis and cocaine showed a decrease from the youngest (15-24) age group to the oldest (55+) age group (37.8% to 12.5% for cannabis and 33.1% to 7.1% for cocaine use, respectively). Meth/amphetamine use was reported by approximately 8% of workers aged 15-44, and decreased to 1.8% in the two oldest age groups. Yearly use of prescribed pain killers was consistent across ages (37.6% ± .06).

Differences across age groups were statistically significant for risky drinking, cannabis and cocaine (all $ps < .001$). There were no significant differences by age for yearly prescribed pain killer use. Significance testing for meth/amphetamine was not undertaken due to low numbers.

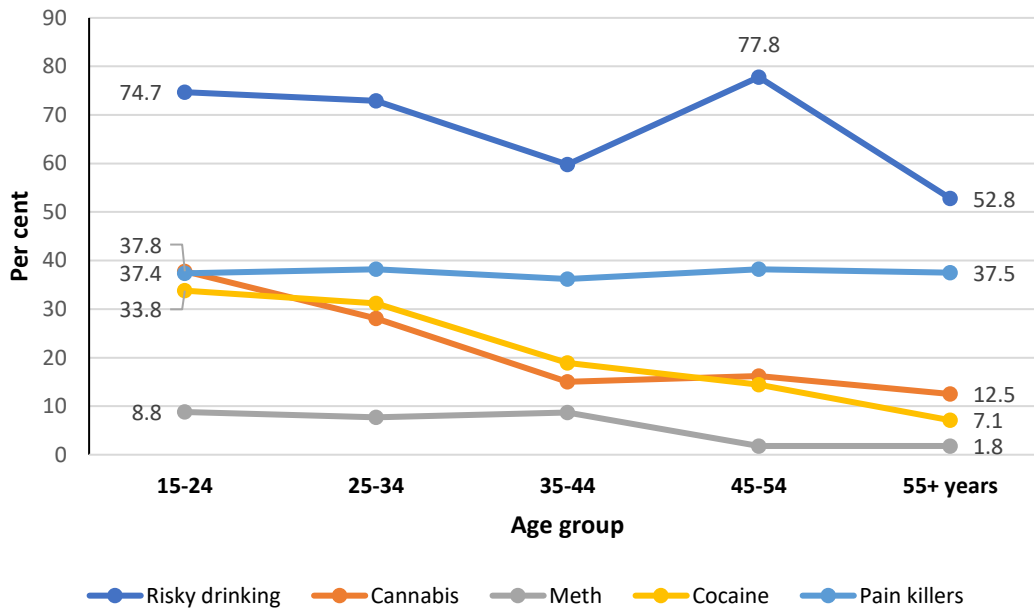


Figure 6. Risky drinking (AUDIT-C score ≥ 4) and yearly AOD across age groups

Comparison with national AOD data

The frequency of risky drinking and yearly cannabis, meth/amphetamine and cocaine use in the current sample were compared to national data for: (1) construction workers, and (2) the general workforce, from the 2016 National Drug Strategy Household Survey (NDSHS) [16]. Proportion estimates were age and sex matched and calculated with probability-weighted data to be representative of the Australian population. Past year prescribed pain killer use was compared with the rate of the population with at least one opioid² prescription dispensed under the Pharmaceutical Benefits Scheme (PBS) during 2016-2017, matched by age³ and sex [19].

The risky drinking rate of 70.3% in the current sample was comparable to construction workers nationally, and 9% higher than the Australian workforce (Figure 7). Cannabis use was approximately 6% higher than national construction workers, and 10% higher than the national workforce. Both meth/amphetamine and cocaine use was over 3.5 times higher than both construction and general workforce national estimates.

Compared to 36.7% of yearly prescribed pain killer use in the current sample, 13.7% of Australians aged between 15-64 years had at least one opioid dispensed under the Pharmaceutical Benefits Scheme (PBS)

²PBS opioids include buprenorphine, codeine, fentanyl, hydromorphone, methadone, morphine, oxycodone, pholcodine, tapentadol and tramadol.

³The current sample included 7 respondents between the age of 65-68 years, whereas the maximum age for the PBS data was up to 64.

during the period 2016-17. This indicates that prescribed pain killer use in the current sample was approximately three times the national average.

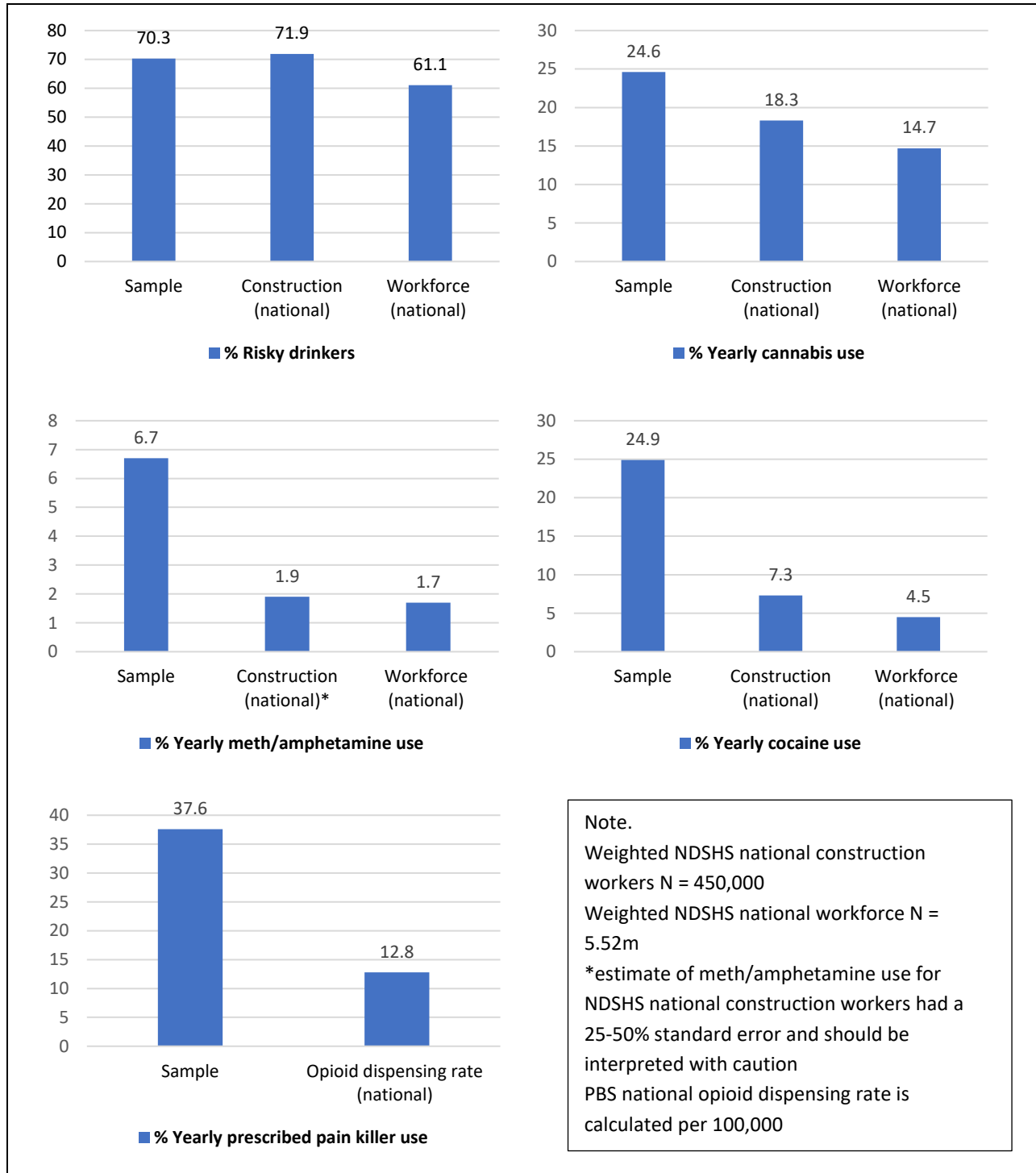


Figure 7. Sample risky drinking and yearly AOD use compared to national prevalence

Knowledge of AOD-related harms and workplace impairment

AOD knowledge and awareness

Respondents were asked five true or false questions about the ways in which levels of alcohol can be reduced in the body. Most participants correctly identified the statement: ‘you can reduce alcohol in your system by having a cold shower’ as false (90.3%). The least frequently selected correct answer was: ‘you can reduce alcohol in your system by eating’ (false: 68.6%). On average, total Alcohol Knowledge across the sample was good, with an average score of 4/5 (Figure 8).

To test awareness of factors that could lead to impairment in the workplace, respondents selected all that applied from a list of 12 potential impairment factors. The most frequently selected correct answer was ‘alcohol and other drugs’. The average Awareness of Impairment Factors score was 8/12.

Awareness of Fatigue Management Strategies was assessed by 6 items. The majority (91.5%) correctly identified ‘putting your head in ice cold water’ as a poor strategy, but under half recognised ‘avoiding incentives for long working hours’ as a good strategy. The total average score was 4/6.

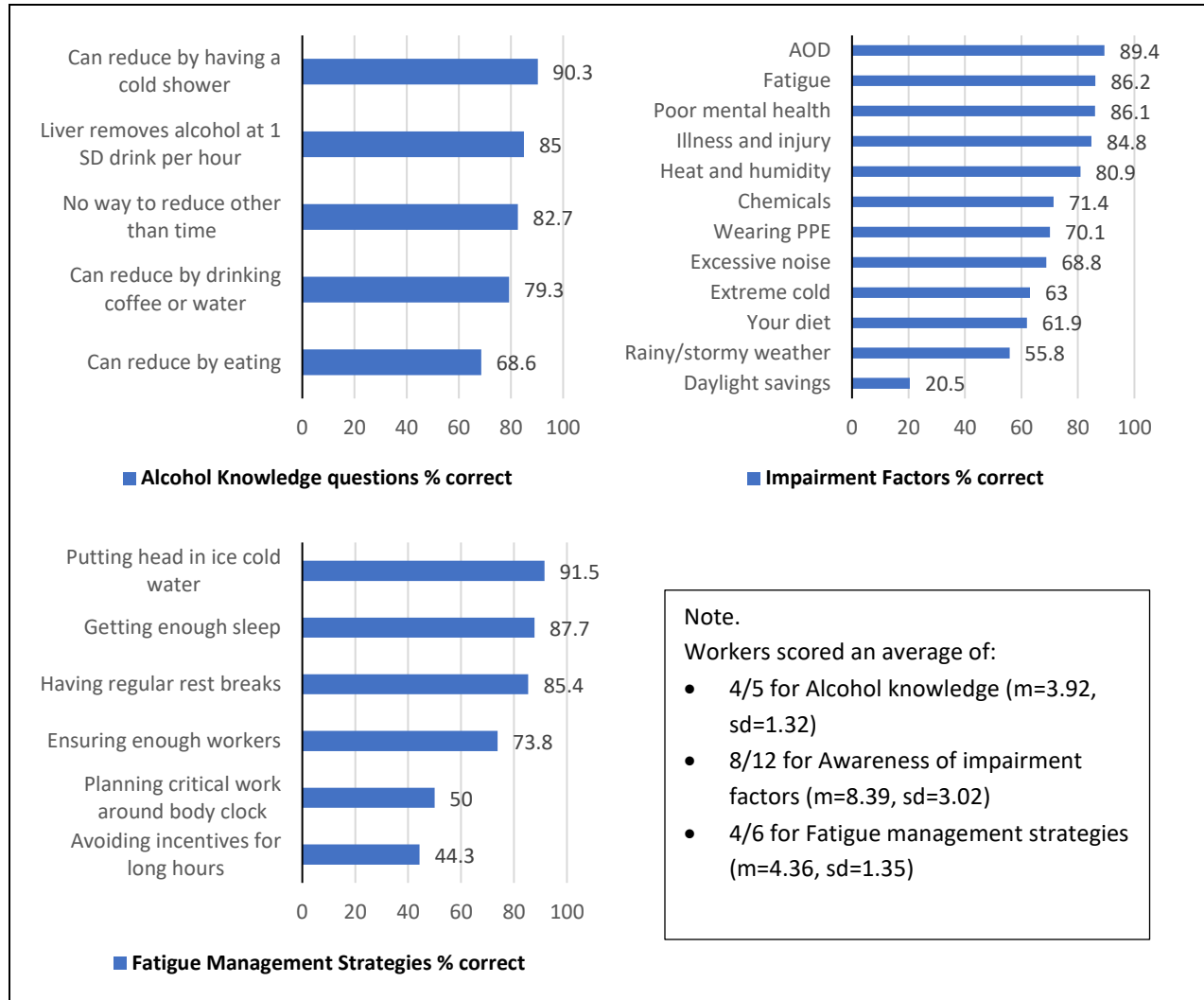


Figure 8. Ranked alcohol knowledge, impairment factors and fatigue management items

Confidence in recognising signs of impairment

Respondents were asked how confident they felt in their ability to recognise signs of impairment, both in themselves and their workmates. Workers were more confident in recognising signs of heat stress, fatigue and poor mental health in themselves than their co-workers (Figure 9). Most confidence was related to recognising personal fatigue (85.4%), and least confidence was reported for recognising poor mental health in co-workers (39.1%). In general, recognising signs of poor mental health generated the lowest level of confidence among the sample.

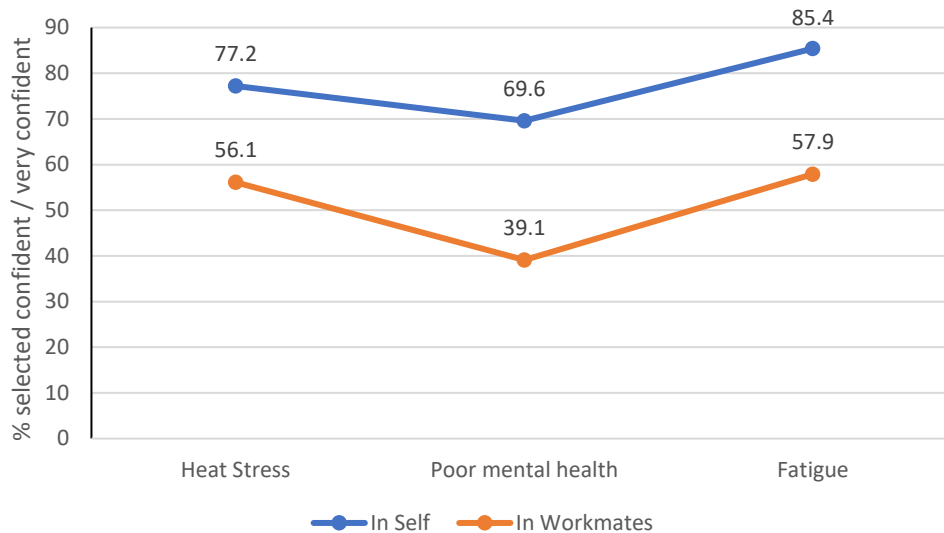


Figure 9. Confidence in recognising signs of impairment

Attitudes and beliefs regarding the impact of AOD on health and safety

Perception of AOD-related risk to health

AOD-related Risk to Health was measured by 5 items that asked the extent to which workers perceived regular use of alcohol and other drugs to be a risk to their health. Average responses indicated AOD use was considered a moderate-to-high risk to health ($m=3.32$, $sd=0.65$, scale range 1-4).

Harms from Alcohol Use was measured by the level of agreement that regular alcohol use could increase the risk of 6 health-related conditions. Agreement was high ($m=4.38$, $sd=0.72$, scale range 1-5).

Harms from Drug Use was measured by the level of agreement that regular illicit drug use could increase the risk of 4 health-related conditions. Again, agreement was high ($m=4.62$, $sd=0.70$, scale range 1-5).

Perception of risk to workplace safety from AOD use

Respondents were asked a series of questions about the degree of safety risk associated with using AOD: (1) the night before work, (2) before starting work, and (3) during work hours, including lunch and other breaks.

In relation to using the night before work, meth/amphetamine use was considered the highest risk (77%), followed by cocaine (68.2%) and cannabis (39.3%). Around one third (31.4%) believed that

drinking more than 4 standard drinks the night before work posed a high risk to workplace safety (Figure 10).

Overall, perception of high safety risk from AOD use before starting work was greater than AOD use the night before work. Responses ranged from 92.7% for meth/amphetamine to 40.6% for prescribed pain killers.

Perception of safety risk from AOD during work hours followed a similar pattern, with most workers (>80%) perceiving meth/amphetamine, alcohol and cannabis use during work hours to be of high risk to workplace safety. Less than half (43.8%) considered using prescribed pain killers at work to be high risk.

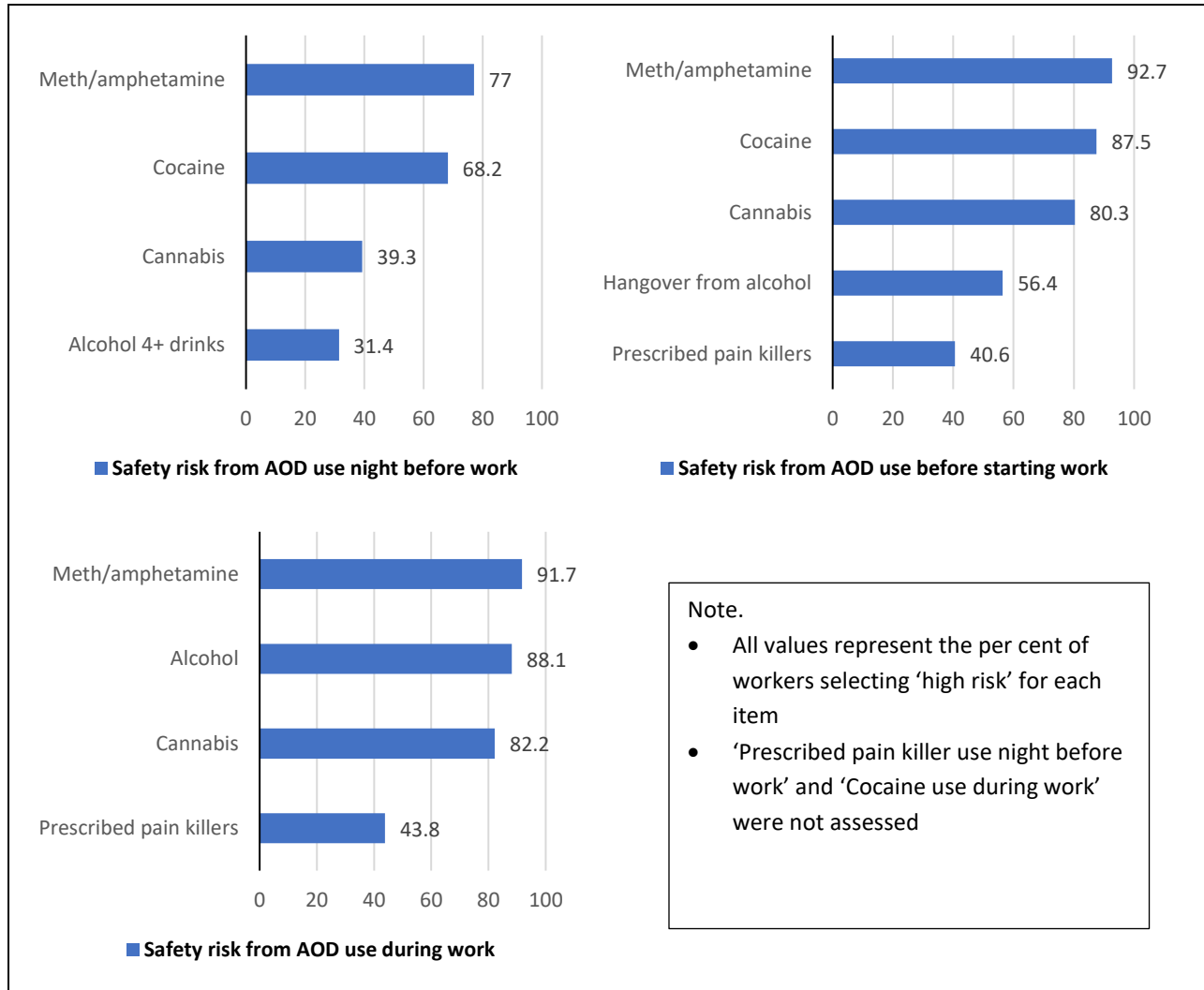


Figure 10. Ranked proportion of workers selecting 'high risk' for safety risk items

Awareness and attitudes regarding AOD-treatment and counselling options

Workers were more confident in talking to workmates about AOD problems than mental health issues (59.5% vs 48.2%). Nearly two-thirds of workers (65.1%) were confident that they knew how to get help for AOD problems. Confidence in knowing how to get help for mental health issues was slightly lower (57%) (Figure 11).

The proportion of workers who reported they were likely to seek help for AOD problems and mental health issues were similar, with slightly more workers for mental health issues compared to AOD problems (62.1% vs 59.9%).

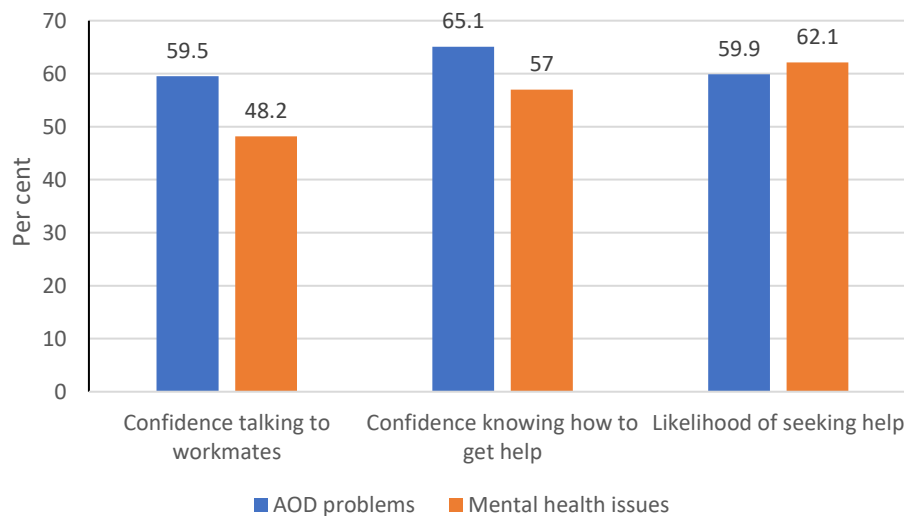


Figure 11. Confidence and likelihood of help-seeking (Per cent represents proportion selecting confident / very confident, or likely / very likely).

AOD-affected workdays over the past three months

Across the sample, one in ten workers reported being absent from work due to AOD use over the past three months (9.8%).

Almost one quarter (23.4%) reported attending work with a hangover due to alcohol or drug use in the past three months and 1.3% reported missing or avoiding work due to concern of being drug tested.

Help-seeking behaviours over the past 12 months

In the past 12 months, 8.6% of participants in the Training Group reported seeking help for mental health issues and 2.8% had sought help for AOD problems.

T1 – T2 Assessment (immediately post-training)

All secondary outcome measures were re-assessed immediately following the training, in relation to: (1) knowledge of AOD-related harms and workplace impairment, (2) attitudes and beliefs regarding the impact of AOD on health and safety, and (3) awareness and attitudes regarding AOD-treatment and counselling options. Missing data at T2 (11%) were replaced and tests were conducted on both imputed and complete case data for sensitivity. Results were consistent and values from imputed data are presented. Significance was assumed at the Bonferroni adjusted p value of .002, with significant results shown in bold font in the tables. Results relate to the Training Group only.

Post-training participant evaluation: How useful was the training?

Following the training, participants were asked: ‘How useful did you find today’s training in increasing your awareness of impairment issues?’ Eighty-nine point three per cent rated the training as useful or very useful, with over half (57%) selecting the ‘very useful’ option (Figure 12).

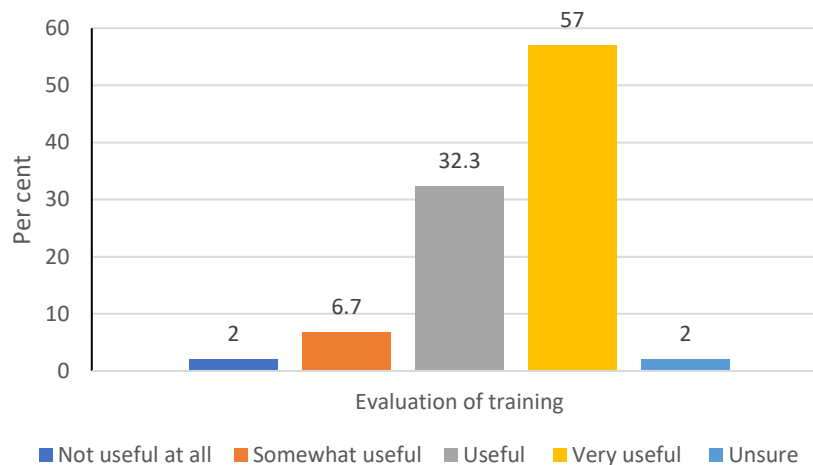


Figure 12. Usefulness of training

Knowledge of AOD-related harms and workplace impairment

Training participants’ Alcohol Knowledge, Awareness of Impairment Factors, and Awareness of Fatigue Management Strategies all showed a significant improvement following the training, with score increases demonstrating medium effect sizes, on average (Table 1). Participants reported they were more confident in recognising signs of impairment following the training, with significant increases in all confidence scores. The greatest improvements were for confidence in recognising signs of impairment in co-workers: heat stress and mental health showed the largest effect sizes (Table 2).

Table 1. AOD knowledge and awareness from T1-T2

Outcome	Range	T1 M (sd)	T2 M (sd)	T1-T2 Difference (CI)	t-test (Cohen's d)
Alcohol Knowledge	0-5	3.97 (1.30)	4.36 (1.01)	+0.39 (0.28–0.50)	t(530)=7.04 (.34)
Impairment Factors	0-12	8.51 (3.00)	9.62 (2.16)	+1.11 (0.88–1.23)	t(530)=9.75 (.42)
Fatigue Management	0-6	4.40 (1.33)	4.98 (1.19)	+0.58 (0.48–0.68)	t(530)=11.57 (.46)

Table 2. Confidence in recognising signs of impairment from T1-T2

Outcome	Range	T1 M (sd)	T2 M (sd)	T1-T2 Difference (CI)	t-test (Cohen's d)
Heat stress (self)	1-4	3.05 (.77)	3.32 (.65)	+0.27 (0.21–0.33)	t(519)=8.44 (.38)
Mental health (self)	1-4	2.95 (.82)	3.22 (.70)	+0.27 (0.20–0.33)	t(516)=8.07 (.35)
Fatigue (self)	1-4	3.20 (.71)	3.33 (.63)	+0.13 (0.07–0.19)	t(526)=4.42 (.19)
Heat stress (co-worker)	1-4	2.68 (.81)	3.08 (.70)	+0.40 (0.33–0.47)	t(506)=11.47 (.53)
Mental health (co-worker)	1-4	2.42 (.84)	2.87 (.78)	+0.45 (0.38–0.53)	t(499)=12.21 (.56)
Fatigue (co-worker)	1-4	2.71 (.79)	3.02 (.70)	+0.31 (0.25–0.37)	t(511)=9.48, (.41)

Attitudes and beliefs regarding the impact of AOD on health and safety

Perceptions of AOD-related Risk to Health, Harms from Alcohol Use and Harms from Drug Use significantly increased following the training (Table 3). In relation to perceptions of risk to safety, the greatest change in risk scores was for using the night before work, particularly for drinking more than four standard drinks and cannabis use (medium effect sizes) (Table 4). Perceptions of risk to safety from using AOD before starting work, or during work hours, showed little change following the training, with the exception of prescribed pain killers. The perception of risk to safety from prescribed pain killer use before and during work increased significantly, with medium effect sizes. A small increase was also shown in the perception to risk to safety from using cannabis before starting work.

Table 3. Perception of AOD-related risk to health from T1-T2

Outcome	Range	T1 M (sd)	T2 M (sd)	T1-T2 Difference (CI)	t-test (Cohen's d)
AOD-related Risk to Health	1-4	3.34 (.61)	3.53 (.52)	+0.18 (0.14–0.23)	t(530)=8.10 (.34)
Harms from Alcohol Use	1-5	4.42 (.71)	4.73 (.48)	+0.31 (0.26–0.37)	t(530)=11.39 (.51)
Harms from Drug Use	1-5	4.65 (.68)	4.81 (.47)	+0.16 (0.11–0.21)	t(530)=6.19 (.27)

Table 4. Perception of AOD-related risk to safety from T1-T2

Outcome	Range	T1 M (sd)	T2 M (sd)	T1-T2 Difference (CI)	t-test (Cohen's d)
Perception of risk to safety from using AOD night before work					
>4 standard drinks	1-4	3.08 (.84)	3.46 (.70)	+0.38 (0.31–0.45)	t(520)=10.50 (.49)
Cannabis	1-4	3.10 (.95)	3.51 (.75)	+0.42 (0.35–0.49)	t(513)=12.10 (.48)
Meth/amphetamine	1-4	3.74 (.55)	3.87 (.37)	+0.13 (0.08–0.17)	t(514)=5.31 (.28)
Cocaine	1-4	3.59 (.71)	3.80 (.50)	+0.20 (0.15–0.26)	t(516)=7.39 (.34)
Perception of risk to safety from using AOD before starting work					
Arriving with a hangover	1-4	3.54 (.63)	3.61 (.58)	+0.07 (0.02–0.17)	t(524)=2.72, ns
Cannabis	1-4	3.75 (.58)	3.84 (.43)	+0.09 (0.05–0.13)	t(519)=4.17 (.18)
Meth/amphetamine	1-4	3.91 (.39)	3.93 (.29)	+0.03 (-0.01–0.06)	t(524)=1.40, ns
Cocaine	1-4	3.86 (.45)	3.89 (.39)	+0.03 (-0.01–0.07)	t(522)=1.65, ns
Prescribed pain killers	1-4	3.22 (.85)	3.61 (.60)	+0.39 (0.32–0.45)	t(514)=11.58 (.53)
Perception of risk to safety from using AOD during work hours					
Drinking alcohol	1-4	3.87 (.44)	3.89 (.35)	+0.02 (-0.01–0.06)	t(525)=1.18, ns
Cannabis	1-4	3.77 (.59)	3.85 (.43)	+0.08 (0.03–0.13)	t(520)=3.44, ns
Meth/amphetamine	1-4	3.89 (.41)	3.94 (.29)	+0.04 (0.01–0.07)	t(524)=2.67, ns
Prescribed pain killers	1-4	3.26 (.84)	3.66 (.58)	+0.40 (0.34–0.47)	t(513)=11.90 (.55)

Awareness and attitudes regarding AOD-treatment and counselling options

All measures associated with AOD-treatment and counselling options showed a significant increase following the training. Training attendees reported increased confidence in talking to co-workers about AOD problems and mental health issues, with the greatest effect size for mental health (Table 5). Confidence in knowing how to get help for AOD problems and mental health issues was significantly higher, as was likelihood of seeking help. All effect sizes were in the small-medium range.

Table 5. Awareness and attitudes regarding AOD-treatment and counselling options from T1-T2

Outcome	Range	T1 M (sd)	T2 M (sd)	T1-T2 Difference (CI)	t-test (Cohen's d)
Confidence talking: AOD	1-4	2.74 (.91)	2.95 (.80)	+0.22 (0.13–0.27)	t(502)=5.46 (.25)
Confidence talking: mental health	1-4	2.55 (.93)	2.91 (.84)	+0.35 (0.28–0.43)	t(501)=9.53 (.41)
How to get help: AOD	1-4	2.83 (.90)	3.11 (.74)	+0.28 (0.21–0.37)	t(507)=7.55 (.34)
How to get help: mental health	1-4	2.71 (.90)	3.07 (.75)	+0.36 (0.29–0.43)	t(511)=10.20 (.43)
Likelihood help-seeking: AOD	1-4	2.71 (.96)	3.04 (.81)	+0.33 (0.25–0.41)	t(496)=8.44 (.37)
Likelihood help-seeking: mental health	1-4	2.75 (.88)	3.01 (.79)	+0.26 (0.19–0.32)	t(501)=7.78 (.31)

T1 – T3 Assessment (3 months' follow up)

The primary outcome measure of AUDIT-C score was re-assessed at T3, along with drug use and other secondary measures. Comparison of baseline (T1) Training Group and Non-Training Group scores demonstrated significant differences on 16 of the 37 outcome measures ($p < .05$), with the Non-Training Group reporting higher AOD use, lower perception of risk, and lower confidence in knowing how to get help. Comparison of baseline scores for T3 completers and non-completers showed that non-completers were more likely to be male, have used meth/amphetamine in the past year, have lower perceptions of safety risk from AOD use, have lower confidence in recognising signs of fatigue, and higher confidence in talking to workmates about AOD ($p < .05$).

The 73% loss to follow up at T3 could not be reliably imputed and results represent complete cases. Findings with a significance level of $p < .05$ are indicated in bold font in the tables, and findings that met the Bonferroni adjusted significance of $p = .001$ are reported in the text with the corresponding magnitude of effect (Cohen's d). Given the limitations of a 73% loss to follow up and the impact on the representativeness of the sample, caution is warranted in the interpretation of significant results. Future studies are recommended to replicate these findings.

Follow-up participant evaluation: Do you think more carefully about impairment factors?

At follow-up, Training Group participants were asked: 'Since the training, do you think more carefully about factors that can impair your health and safety at work?' Half of participants said that they sometimes think more carefully about impairment factors, and 42.4% said that they think more carefully about impairment factors all of the time, since attending training (Figure 13).

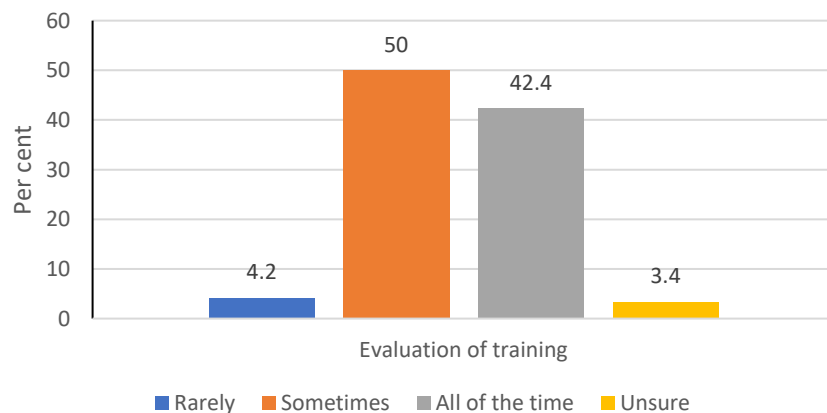


Figure 13. Impact on thinking more carefully about impairment factors

AOD consumption patterns

Total scores on the AUDIT-C did not differ significantly from T1-T3 in either the Training or Non-Training Group. Age-adjusted between group differences were non-significant. For the dichotomised risky drinking variable, the proportion of workers in the risky drinking category decreased by 3.2% in the Training Group, and increased by 2.3% in the Non-Training Group. Neither of the within-subjects

changes from T1-T3 were significant, but the between group difference was significant at $p < .02$ (Odds Ratio = 3.61).

No significant within-subjects or between group tests were found for change in monthly drug use from T1-T3, with the exception of monthly cannabis use, which increased by 3.2% in the Training Group (Table 6).

Table 6. AOD consumption patterns from T1-T3

Outcome	T1	T3	T1-T3 Difference	Significance test
Audit-C score, m (sd), range 0-12				
Training Group	5.15 (2.82)	5.02 (2.96)	-0.13 (-0.52–0.25)	t(112)=-0.68,p=.50
Non-Training Group	6.14 (3.44)	6.29 (3.11)	+0.15 (-0.32–0.63)	t(65)=0.64,p=.53
Between group test	F(1,178)=2.93, p=.09			
Risky drinking (Audit-C >4)	% (n)	% (n)		
Training Group	68.4 (347)	65.2 (75)	-3.2	McNemar test p=.10
Non-Training Group	75.3 (140)	77.6 (52)	+2.3	McNemar test p=.38
Between group test	Odds Ratio = 3.61 (CI 1.25–10.41) p=.02			
Cannabis >monthly	% (n)	% (n)		
Training Group	10.4 (54)	13.6 (16)	+3.2	McNemar test p=.02
Non-Training Group	17.2 (32)	18.6 (13)	+1.4	McNemar test p=.51
Between group test	Odds Ratio = 1.01, p=.98			
Meth/amphetamine >monthly	% (n)	% (n)		
Training Group	1.9 (10)	1.7 (2)	-0.2	McNemar test p=1.0
Non-Training Group	4.3 (8)	2.9 (2)	-1.4	McNemar test p=1.0
Between group test	Odds Ratio = 0.75, p=.83			
Cocaine >monthly	% (n)	% (n)		
Training Group	8.1 (42)	7.7 (9)	-0.4	McNemar test p=1.0
Non-Training Group	14.5 (27)	14.3 (10)	-0.2	McNemar test p=.22
Between group test	Odds Ratio = 2.34, p=.17			
Prescribed pain killers >monthly	% (n)	% (n)		
Training Group	11.6 (60)	14.4 (17)	+2.8	McNemar test p=.30
Non-Training Group	19.8 (37)	8.6 (6)	-11.2	McNemar test p=1.0
Between group test	Odds Ratio = 0.44, p=.17			
Used any illicit drug >monthly	% (n)	% (n)		
Training Group	15.8 (82)	17.8 (21)	+2.0	McNemar test p=.15
Non-Training Group	26.3 (49)	24.3 (17)	-2.0	McNemar test p=.45
Between group test	Odds Ratio = 0.75, p=.75			

Knowledge of AOD-related harms and workplace impairment

The knowledge measures demonstrated a trend towards improvement in all groups from T1-T3. Alcohol knowledge increased significantly from T1 to T3 in the Training Group, satisfying the Bonferroni adjusted criteria of $p < .001$ and representing a medium effect size of $d = .40$. The between group difference was significant at $p = .01$ (Table 7). Awareness of Impairment Factors and Awareness of Fatigue Management Strategies increased in the Non-Training Group. No between group differences were found on these measures.

T1-T3 changes in confidence in recognising signs of impairment were found on three measures. Workers in the Training Group reported increased confidence in recognising heat stress in themselves and co-workers ($p = .03$) (Table 8). Both the Training and Non-Training Group reported increased confidence in recognising fatigue in co-workers ($p < .05$), with no between group difference.

Table 7. AOD knowledge and awareness from T1-T3

Outcome	Range	T1 M (sd)	T3 M (sd)	T1-T3 Difference (CI)	t-test
Alcohol Knowledge	0-5				
Training Group		4.05 (1.28)	4.51 (.98)	+0.46 (0.23–0.68)	t(119)=4.06, p<.001
Non-Training Group		3.82 (1.40)	4.07 (1.23)	+0.25 (-0.07–0.57)	t(75)=1.54, p=.13
Between group test		F(1,195)=6.20, p=.01, $\eta p^2=.03$			
Impairment Factors	0-12				
Training Group		8.92 (2.54)	9.20 (2.66)	+0.28 (-0.21–0.76)	t(118)=1.14, p=.26
Non-Training Group		8.13 (2.88)	9.29 (2.40)	+1.16 (0.48–1.83)	t(75)=3.41, p=.001
Between group test		F(1,194)=1.50, p=.22			
Fatigue Management	0-6				
Training Group		4.60 (1.08)	4.81 (1.25)	+0.21 (-0.04–0.47)	t(120)=1.66, p=.10
Non-Training Group		4.21 (1.38)	4.72 (1.23)	+0.51 (0.19–0.84)	t(75)=3.13, p=.002
Between group test		F(1,196)=0.06, p=.81			

Table 8. Confidence in recognising signs of impairment from T1-T3

Outcome	Range	T1 M (sd)	T3 M (sd)	T1-T3 Difference (CI)	t-test
Heat stress (self)	1-4				
Training Group		3.00 (.77)	3.14 (.68)	+0.14 (0.01–0.27)	t(119)=2.18, p=.03
Non-Training Group		2.95 (.70)	3.05 (.84)	+0.11 (-0.12–0.34)	t(74)=.93, p=.36
Between group test		F(1,194)=0.45, p=.50			
Mental health (self)	1-4				
Training Group		2.85 (.81)	2.79 (.82)	-0.06 (-0.22–0.10)	t(118)=-.72, p=.48
Non-Training Group		2.80 (.83)	2.91 (.80)	+0.11 (-0.10–0.32)	t(73)=1.03, p=.31
Between group test		F(1,192)=1.50, p=.22			
Fatigue (self)	1-4				
Training Group		3.11 (.73)	3.11 (.69)	0 (-.12–0.12)	t(120)=0, p=1.00
Non-Training Group		3.04 (.67)	3.15 (.77)	+0.11 (-0.07–0.28)	t(74)=1.24, p=.22
Between group test		F(1,195)=0.70, p=.40			
Heat stress (co-worker)	1-4				
Training Group		2.61 (.82)	2.78 (.75)	+0.17(0.02–0.31)	t(107)=2.26, p=.03
Non-Training Group		2.59 (.75)	2.73 (.74)	+0.14(-0.06–0.34)	t(70)=1.40, p=.17
Between group test		F(1,178)=0.13, p=.72			
Mental health (co-worker)	1-4				
Training Group		2.33 (.85)	2.41 (.77)	+0.08 (-0.12–0.27)	t(105)=.78, p=.44
Non-Training Group		2.30 (.84)	2.47 (.75)	+0.17 (-0.03–0.36)	t(65)=1.70, p=.09
Between group test		F(1,171)=0.42, p=.52			
Fatigue (co-worker)	1-4				
Training Group		2.59 (.79)	2.76 (.74)	+0.17 (0.03–0.32)	t(110)=2.02, p=.05
Non-Training Group		2.56 (.75)	2.79 (.74)	+0.23 (0.05–0.41)	t(69)=2.57, p=.01
Between group test		F(1,180)=0.19, p=.67			

Attitudes and beliefs regarding the impact of AOD on health and safety

No changes from T1-T3 were demonstrated in the Training Group for any variable assessing workers' perception of AOD-related risk to health or workplace safety. The Non-Training Group showed an increase in perceptions of safety risk from using cocaine the night before a workday and before starting work, and the between group differences were significant on these variables (all $p < .01$). The Non-Training Group also reported a decrease in the perception of safety risk from using cannabis before starting work ($p < .01$). No other within-subjects changes or differences between groups were found. Tables for these results are shown in Appendix 2.

Awareness and attitudes regarding AOD-treatment and counselling options

Participants in the Training Group reported increased confidence from T1-T3 in relation to talking to co-workers about AOD problems, and knowing how to get help for AOD problems ($p \geq .01$). Participants in the Non-Training Group also reported increased confidence in talking to workmates about mental health issues, and knowing how to get help for mental health issues (Table 9). No between group differences were found.

Table 9. Awareness and attitudes regarding AOD-treatment and counselling options from T1-T3

Outcome	Range	T1 M (sd)	T3 M (sd)	T1-T3 Difference (CI)	t-test
Confidence talking: AOD	1-4				
Training Group		2.58 (.86)	2.82 (.82)	+0.24 (0.07–0.41)	t(115)=2.83, p=.01
Non-Training Group		2.47 (.81)	2.67 (.86)	+0.20 (-0.02–0.42)	t(75)=1.81, p=.08
Between group test		F(1,191)=0.91, p=.34			
Confidence talking: mental health	1-4				
Training Group		2.51 (.87)	2.62 (.85)	+0.10 (-0.06–0.26)	t(116)=1.27, p=.21
Non-Training Group		2.26 (.88)	2.51 (.85)	+0.25 (0.06–0.44)	t(72)=2.59, p=.01
Between group test		F(1,189)=0.03, p=.88			
How to get help: AOD	1-4				
Training Group		2.75 (.91)	2.97 (.76)	+0.22 (0.04–0.41)	t(117)=2.36, p=.02
Non-Training Group		2.64 (.82)	2.81 (.80)	+0.17 (-0.04–0.38)	t(74)=1.66, p=.10
Between group test		F(1,192)=1.42, p=.24			
How to get help: mental health	1-4				
Training Group		2.66 (.89)	2.85 (.78)	+0.19 (0.05–0.34)	t(118)=2.69, p=.01
Non-Training Group		2.43 (.83)	2.76 (.82)	+0.32 (0.12–0.53)	t(73)=3.18, p=.002
Between group test		F(1,192)=0.02, p=.90			
Likelihood help-seeking: AOD	1-4				
Training Group		2.63 (.89)	2.73 (.90)	+0.11 (-0.04–0.25)	t(112)=1.42, p=.16
Non-Training Group		2.53 (.95)	2.65 (.87)	+0.12 (-0.10–0.34)	t(73)=1.09, p=.28
Between group test		F(1,186)=0.09, p=.77			
Likelihood help-seeking: mental health	1-4				
Training Group		2.72 (.92)	2.82 (.84)	+0.10 (-0.05–0.26)	t(116)=1.33, p=.19
Non-Training Group		2.58 (.91)	2.78 (.74)	+0.20 (-0.04–0.43)	t(75)=1.67, p=.10
Between group test		F(1,192)=0.01, p=.94			

Did the training reduce AOD-affected workdays?

The proportion of workers who had time off due to AOD use, came to work with a hangover from AOD use, and missed or avoided work due to fear of being drug tested are shown in Table 10. The greatest change from T1-T3 was a reduction in the proportion of workers who had time off due to AOD in the Training Group (-4.3%), although no significant differences were found.

Table 10. AOD-affected workdays from T1-T3

Outcome	T1 % (n)	T3 % (n)	T1-T3 Difference	Significance test
Time off due to AOD				
Training Group	10.6 (48)	6.3 (7)	-4.3	McNemar test $p=.63$
Non-Training Group	7.7 (14)	7.1 (5)	-0.6	McNemar test $p=1.0$
Came to work with a hangover				
Training Group	21.3 (96)	20.3 (24)	-1.0	McNemar test $p=1.0$
Non-Training Group	28.4 (52)	30 (21)	-1.6	McNemar test $p=.63$
Time off: fear of drug testing				
Training Group	1.1 (5)	3.4 (4)	+3.3	McNemar test $p=1.0$
Non-Training Group	1.6 (3)	0	-1.6	McNemar test $p=1.0$

In addition to the proportion of workers who reported days absent shown in Table 10, the change in actual number of days absent to AOD use was also assessed from T1-T3. These analyses were conducted on participants for whom complete data were available. One extreme outlier was replaced by the mode value prior to analysis.

Participants in the Training Group (n=95) reported 11 days off due to AOD in the past 3 months at T1 and 8 days off at T3. This 3 day reduction from T1-T3 was not significant ($p=.18$)

Participants in the control group (n=68) reported 5 days off at T1 and 8 days off at T3. This 3 day increase from T1-T3 was not significant ($p=.50$). There was no significant difference between the groups ($p=.24$).

Did the training improve help-seeking behaviour?

AOD problems

At T1, 2.8% (n=13) of participants in the Training Group reported seeking help for AOD problems in the past 12 months. At T3, 2.5% (n=3) had sought help since attending the training. With the T1 proportion adjusted to the three-month equivalent, this represented a small 1.8% increase in help-seeking for AOD problems.

Mental health issues

At T1, 8.6% (n=40) of Training Group participants reported seeking help for mental health issues in the past 12 months, and 3.4% (n=4) had sought help since attending the training. Compared to a T1-adjusted proportion, this equates to a small increase in help-seeking for mental health issues (1.2%).

Cost / benefit of Training

Cost of the program

The cost of implementing the training program was assessed. Calculations are based on the total cost of delivering the program over a typical six-month period (for this purpose the period October 2018 – March 2019 was selected).

Per-capita costs of providing the training were based on the total number of construction industry workers exposed to the training program (N=3,459) via approximately 140 training sessions conducted during the selected period.

Total costs incurred in program delivery are shown in Table 11. Per-capita training costs were calculated by dividing total program delivery costs by the number of workers exposed to the training: $\$71,843.14 / 3,459 = \20.77 .

Table 11. Training delivery costs (approx. 140 training sessions)

Training delivery costs (October 2018 – March 2019: N=3,459)	
Cost item	\$ Cost
Trainer wages ⁴ (including on-costs)	\$49,227.41
Training resources	\$2,500
Motor vehicle expenses	\$5,747.10
Administration (25% pf delivery costs)	\$14,368.63
TOTAL	\$71,843.14

Potential cost benefits

Due to the methodological limitations associated with the substantial T3 drop-out rate, a cost-benefit analysis could not be reliably undertaken. Therefore, only the first part of research question 2 (“what are the training delivery costs and ratio of costs to benefits”) was addressed.

⁴ Trainers are paid on a contract casual rate of \$58 per hour. Trainers are paid for five hours (\$290) for each two-hour training session they deliver. This covers training preparation and travelling time.

Process Evaluation: Stakeholder Interviews

Fifteen interviews were conducted with construction workers (n=6) and construction managers (n=6) who had attended the training, and BTGDAP trainers (n=3). Interviews took between 20-50 minutes. Eighty-seven per cent of participants were male and ages ranged from 30 to 56 years. Findings are presented in relation to five main themes: (1) most effective aspects of the training, (2) least effective aspects of the training, (3) barriers to implementation, (4) most useful aspects with regards to facilitation, and (5) recommendations for improvement.

Overall, interviewees spoke highly of the training. Workers reported that they enjoyed attending and benefited from the content. In particular, the inclusion of broader work-life issues as they relate to workplace impairment were unexpected and well received; a sentiment echoed by managers:

"I thought it was fantastic... he [the trainer] was speaking about a lot of different subjects... things outside of work, different mitigating factors, peoples families and I guess money, stress, anxiety. A lot of things that I wasn't expecting to hear about." (worker)

"...I get a lot of positive feedback from the people that attend [the training]..." (manager)

Most effective aspects of the training

Opens dialogue and encourages help-seeking

The majority of workplace managers and trainers reported that one of the most effective aspects of the training was its ability to encourage conversation within a traditionally reticent male dominated industry. Trainers spoke about how raising awareness of available support services helped them to counter stigma around AOD use and mental health in construction.

"I talk a lot about their mental health...starting a conversation, and just checking in on each other, you know? They do seem to respond well to it....they see that the culture is changing, you know... having more of that conversation, and hearing about that more in training." (trainer)

In addition to encouragement from the trainer, one part of the training that was thought to be particularly impactful for workers was hearing the lived experiences of peers who were now in recovery from AOD problems, or who have sought help for mental health issues. Interviewees described this as an "eye-opener", and felt that it resonated with and inspired workers to combat stigma. It was noted that disclosure and help-seeking was more prevalent in workers who had attended the training:

"If we get people trained you get a lot of guys come forward about their problems..." (manager)

"We've had a couple of guys who have had the training who have actually put their hands up and been like 'Oh, I have a problem'..." (manager)

Provides an essential service

Due to the lack of support avenues available to construction workers, the training was perceived as an essential service by trainers and managers.

"There's a lot they don't know... [in] construction, they don't know about support services, how they can access different services in their community. Nobody's telling them." (trainer)

*"If they didn't have the training, where else would they get that [support] from, you know?"
(manager)*

A number of managers spoke of witnessing changes in the long standing culture within the workplace of turning a "blind eye" to AOD use. This shift was attributed to the implementation of the training, alongside broader policy and drug testing measures, the benefits of which were being translated on-site:

"...people are seeing the benefit in the training... we're seeing less issues with guys going to the pub at lunchtime or coming in Monday absolutely wrecked off their heads ...so I think the proof is in the pudding when you see all those benefits on-site..." (manager)

From the perspective of workers, the training played an important role in helping them become more aware of their rights and responsibilities. Through the training, workers develop a better understanding of legislation, changes to the building code, and company policy and procedure in relation to drug and alcohol use, workplace impairment, and drug testing.

Raises awareness of the interplay between impairment factors

A further effective aspect of the training was in raising awareness of how impairment factors such as AOD, mental health and fatigue often overlap, presented in a way that is relatable and easy for workers to understand. Trainers spoke about how workers were often unaware of the link between how they feel and how they behave. One example was fatigue, and its links with workers' mental health and AOD use:

"I think the biggest one is fatigue, that's their biggest concern as far as impairment...that's the one that stands out and can lead to all the other issues with impairment..." (trainer)

The link between mental health and AOD use was also seen to be an important yet poorly-understood issue for construction workers, with the training playing a crucial role in awareness-raising:

"I think people [are] blinded a little bit because you know they might be depressed, [but] they don't recognise it. They just drink alcohol or use drugs because it makes them feel better and that's what you do..." (trainer)

Least effective aspects of the training

Unnecessary focus on content covered elsewhere

All participants gave the training a positive review and a number of interviewees said that there was nothing that was ineffective. However, some felt that the important messages regarding AOD and mental health were being diluted by the inclusion of other impairment factors, such as heat, humidity, chemicals and noise. It was mentioned that these factors were covered in other training courses (including worker inductions), therefore they could be omitted or given less content. One manager highlighted the difference between AOD and mental health-related impairment in comparison to the other factors, suggesting they should be covered in separate programs:

"...if you start trying to push all of that in there...it will lose its message...you lose the opportunity to talk about things like Foundation House [support service] and counselling and

stuff like that...if you're experiencing noise at work you don't ring up a counsellor you know. It's different." (manager)

Barriers to implementation

Facilities and timing of training

Participants agreed that for the training to be effective, it was essential that workers were engaged in the process. A number of practical barriers to engagement were identified by interviewees. These included the variation in the suitability of facilities available to conduct the training, and the time of day the training is conducted:

"...if you sort of have it late in the afternoon with the guys that have been working they'd probably be wishing that they could get home ...tends to hold them back from participating." (manager)

"...having it first thing in the morning, middle of the week you know, a room away from [the] site with no distractions...I think that's important." (manager)

"...the room needs to be the right size, everybody's got to be able to have a chair, you need to be able to see the screen, hear the trainer...you've got to be able to get that right otherwise you're sort of coming from a long way back [laughs]" (manager)

Practical ways to best engage the workers in the training were ensuring the onsite facilities were adequate and away from excessive noise, reducing disruptions from latecomers, and paying closer attention to the time of day that the training is delivered. Participants felt that these were important factors in creating an environment for the workers to be open to hearing the information and engaging with the content.

Language barriers

It was noted by participants that some workers did not have English as their first language and no provisions were available to facilitate communication. This was a significant barrier.

"...when the guys aren't engaged or they're forced to go there or sometimes they don't really speak English that well...you feel like you're not getting through and it can be a bit tough..." (manager)

Most useful aspects with regard to facilitation

Using interaction and discussion to generate meaning

Trainers again noted that workers can be difficult to engage or guarded about the topic area, and are sometimes concerned that they may be drug tested during the training. As such, introducing the training in a non-threatening way is important, as is avoiding repetition: *"If they've seen/heard it before they just clock out"* (manager).

The most important aspect with regard to effective facilitation of the training was to provide ample interaction and discussion to hold the worker's interest. Generally, workers did not appreciate lecture style presentations.

"...connecting with the guys, asking questions, making them stay awake and be involved, that's really important..." (manager)

"...the most valuable sessions they've had is when the group opens up and there's a lot of just general chat in the room about that which I think is where the guys get more meaning out of it..." (manager)

Recommendations for improvement

More practical and solution-focused content

Recommendations were made to include more practical information on the range of steps workers could take to address their AOD use or mental health issues, and what to expect when doing so:

"Instead of, say, giving them a phone number - maybe giving an idea of what to expect...explain what happens if you do take the first step or that some people don't need to go to rehab, maybe they just need to go to a meeting or whatever, I think that could possibly help some people change..." (worker)

Trainers agreed that more focus could be placed on solutions rather than education about the impairment factors alone. One trainer gave the example of how most of the content outlines the potential pitfalls arising from AOD, fatigue and mental health, but goes into little detail about how to achieve lifestyle change:

"Imagine doing two hours of ... the place is full of drugs and alcohol, we've got massive amounts of fatigue, we are working around chemicals that are sending us deaf, we've got suicide statistics... mental illnesses... and yet we've got no solutions for any of this except right at the end we've got one thing saying 'Life Balance'. How do you achieve that life balance?" (trainer)

Inclusion of other relevant information

Participants gave suggestions for inclusion of other important topics that would be useful for workers, including education on AOD withdrawal and information on crisis support such as detox facilities, gambling, and a greater focus on relationship issues.

Smoking was also mentioned as a gap in the training. Nicotine dependence was identified as an impairment-related risk which can lead to workers taking short cuts. Workers described the preoccupation with smoking as a "mental obsession" which distracts them from focusing on their work, and can impact their mood and how they relate to others:

"I just bust out my work and then when I need to go for a cigarette I just go and have one because I don't want to be left in that sort of state where all I can think about is having another cigarette. I'm not really focusing on my work...its irritability as well..." (worker)

Inclusion of ongoing refresher courses

It was suggested that the training needs to be run more frequently than the current 5-year period to prevent key messages being lost or forgotten over time. Managers thought that the training would benefit from ongoing refresher courses to keep the issues fresh in workers' minds. It was recommended that refresher courses should address the same relevant impairment issues, presented in a novel way to

prevent repetition. However, given that the training is offered on a fee-for-service basis, there were concerns that some building companies may view the inclusion of more frequent courses as a “money grab”.

Call for a whole-of-industry approach to training

On a broader industry level, inconsistencies within construction around implementing Workplace Impairment Training was identified as a barrier to the program more generally. Managers reported that for the training to “hold its weight” and realise its full potential, there needs to be a whole-of-industry approach.

“...an industry wide approach is probably the best thing for this type of program...something that becomes part of the industry rather than depending on ‘what job’ or ‘who you are working for’, and then it becomes important...” (manager)

“...just like you know you get your scaffold ticket or your forklift ticket, you get your impairment training ticket at the same time.” (manager).

Summary

Feedback from stakeholders was positive, highlighting the importance of the training for opening dialogue, reducing stigma and encouraging help-seeking, to the extent that the training was considered an essential service for construction workers. Managers noted that the positive benefits from the training were being translated on-site. Acknowledgement of the interplay between impairment factors and how these affect work and life were particularly useful. Participants felt that some content could be dropped from the course to make room for more relevant topics such as nicotine dependence, crisis services, and solution-based discussions on lifestyle change. Practical recommendations included ensuring suitable on-site facilities for the training delivery, the use of an interpreter, ongoing refresher courses, and more consistency across the industry.

Discussion

This project was undertaken to evaluate the BTGDAP Worker Impairment Training program, delivered to construction employees across NSW, with evaluation undertaken by NCETA. Key findings are summarised below, together with an overview of the strengths of the training; limitations, including lessons learned from a research and methodological perspective and recommendations for future projects, and broader implications for policy and practice.

Key findings

The first key finding from the evaluation was the high rates of AOD use among participants, consistent with previous data highlighting construction as a high-risk industry. Three quarters of the sample reported drinking at risky levels, comparable to construction workers nationally. Drug use was exceptionally high in comparison to the national averages for the construction industry, particularly for cocaine and meth/amphetamine (approximately 3.5 times higher), and prescribed pain killers (approximately 3 times higher). These findings confirm that these workers are at very high risk and there is a pressing need for ongoing education and intervention efforts.

Notably, this is the first data to record the high prevalence of prescribed pain killers in Australian construction workers. These results are concerning in light of reports from the US, where recent data show construction workers to be six times more likely to die from opioid overdose than workers from any other industry [23]. The current findings underscore the importance of addressing the emerging issue of prescribed pain killer use alongside high stimulant use (including cocaine) and risky drinking, to avert serious health and workplace safety consequences.

Training outcomes: Short-term improvements

Immediately following the training, participants overwhelmingly rated the training to be useful or very useful, and all key stakeholders gave positive reviews of training content and impact.

Short-term findings from the outcome evaluation were highly encouraging. Improvements from T1-T2 were apparent in increased alcohol knowledge, awareness of factors that can lead to impairment at work, and improved awareness of ways to manage fatigue. Workers felt more confident in recognising signs of impairment in themselves and others. Perceptions of AOD use as a risk to health increased, as did the perception of safety risk from using AOD the night before work. Generally, workers' perceptions of risk to safety from using alcohol or illicit drugs just before work or during work were high at T1, with little room for improvement following the training. However, it is encouraging that the perception of risk to safety from prescribed pain killers before or during work showed a highly significant increase following the training, particularly given the high prevalence among workers.

The training also resulted in improved awareness and attitudes regarding AOD-treatment and counselling options from T1-T2, in the form of increased confidence in the ability to talk with co-workers about AOD and wellbeing issues, and increased knowledge of where to get help. Reported likelihood of help-seeking following the training also increased, suggesting that the training was successful in its goal of stimulating conversation and reducing perceptions of stigma around AOD and mental health.

Training outcomes: Sustained improvements

After approximately three months, nearly the entire Training Group sample reported that they thought more carefully about impairment factors since completing the training.

From T1-T3, participants in the Training Group showed a non-significant 3.4% decrease in the proportion of risky drinkers. Fewer Training Group participants reported risky drinking at T3 compared to the Non-Training Group. In the Training Group, alcohol knowledge showed a sustained improvement from T1-T3, as did increased confidence in talking about AOD issues and knowing how to get help for AOD problems and mental health issues. There were also sustained improvements in confidence recognising heat stress in oneself and co-workers, and confidence recognising fatigue in co-workers.

The proportion of Training Group participants reporting AOD-related absenteeism showed a small improvement from T1-T3. Help-seeking behaviours also showed a small improvement from T1-T3, suggestive of more frequent referrals to AOD and wellbeing services following the training. However, neither of these outcomes were statistically significant. Potential cost benefits could not be calculated due to the high participant attrition rate at T3. Caution should be applied when interpreting these long-term results due to the lack of statistical significance and substantial loss of participants at follow-up.

Strengths of the training

The findings from the evaluation show promise and potential to engender positive longer-term outcomes, in relation to reduced AOD impairment related risk to workplace safety and related incidents. Interviews with key stakeholders add weight to these findings by providing context to the training process. Interviewees recognised that the training provides an essential service to workers with limited lines of communication and support otherwise available to them, and saw first-hand the benefits in relation to shifts in culture through conversation, stigma reduction and behavioural improvements on-site. The training demonstrated to workers how problems with AOD, mental health and fatigue are often interlinked, and could help them recognise when AOD was being used as a coping mechanism for other issues, or if their AOD use has become problematic. Employees generally responded well to this approach, and valued the opportunity for open dialogue.

Limitations

The current evaluation project faced considerable challenges in relation to recruitment and retention. The construction industry has a high staff turnover and a transient workforce consisting of multiple contractors and subcontractors, with frequent personnel changes as projects progress and different trade skills are required. Companies run to tight deadlines and tight budgets, meaning that site managers were often reluctant to grant approval for workers to break from work to complete follow-up surveys. Logistically, this made the collection of follow-up data difficult and unpredictable, and considerably more resources, travel and time were spent in the pursuit of follow-up data than originally anticipated.

Recruiting and retaining Non-Training Group participants was also challenging, as the majority of companies in NSW were already involved with the training in some capacity. For those who were not,

there was little motivation to be involved in the research. As an incentive to companies, the BTGDAP offered free training to Non-Training Group participants at the end of the evaluation period, demonstrating the high level of commitment and additional in-kind contributions afforded to the project.

Due to these challenges, the planned randomised controlled design could not be administered in practice and there was very high loss to follow up for T3 data. The Non-Training Group was not directly comparable to the Training Group, meaning that the reliability of between-group comparisons should be treated with caution. Similarly, the drop out rate at T3 meant that only participants who completed the surveys at T3 could be analysed, and the limitations associated with complete case analyses should be noted when interpreting T3 results.

Nonetheless, this evaluation has generated numerous findings of key importance for workers and employers, and added value to the limited evidence base informing effective approaches to workplace AOD harm reduction in Australia and overseas. A more resource intensive, larger-scale project is required to confirm these findings in a fully randomised trial.

Lessons learned and recommendations for future projects

Many of the challenges associated with recruitment and retention are unavoidable when conducting field work within a transient and time-pressured industry. It may help to discuss and plan the dates for follow-up with companies at the T1 data collection and book in advance, although this may not be feasible in such rapidly changing, dynamic environments. While it is important to be as flexible as possible when engaging with industry, project funds, resources and timeframes are finite and multiple repeated visits cannot always be accommodated. It is important that these real and costly challenges are acknowledged and met with a realistic level of resourcing in future industry-based projects.

Pivotal to the success of this project were extremely well-connected and committed team members with intimate knowledge of the NSW construction industry. The role of a 'champion' who can draw upon existing industry relationships and foster wider collaborations is a known facilitator of engaged field research. Our experience was that research of any magnitude within the construction industry would not be achievable without a highly regarded, visionary key player in this role.

In relation to methodological issues, a move from hard copy surveys to online data collection sent directly to participants may go some way to overcoming logistical and gate keeper issues, albeit potentially difficult to administer in this occupational group. In the current evaluation, the use of additional incentives was essential to engage the Non-Training Group and useful for retaining T3 participants when access was granted. It is also recommended that future evaluations be conducted over a longer timeframe, to enable the tracking of longitudinal changes in behaviour and workplace culture over 12 months and over.

Implications for policy and practice

The findings of this evaluation provide support for the continued implementation of the BTGDAP Workplace Impairment Training in the construction industry. Policy and practice recommendations to

build on the existing strengths of the Workplace Impairment Training, and for the construction industry more broadly are:

1. Given the extremely high prevalence of prescribed pain killers, illicit drug use (including cocaine) and alcohol reported in the sample, potential opioid dependence and high risk from polydrug use is of critical concern to the industry. Specific topics focusing on these issues are not currently covered in depth in the training, and would make valuable additions. The comparable risky drinking levels nationally and in the sample support the case for this program, or similar, to be implemented on a national basis.
2. Other useful additions to the training are information on withdrawal, available detox facilities and crisis support lines, and nicotine dependence. Training content on impairment factors that are frequently taught elsewhere, such as noise, chemicals and heat, could be removed or reduced.
3. Regular refresher courses are required to remind employees of key take-home messages. This recommendation from key stakeholders was supported by the results of the outcome evaluation, which found that many of the short-term improvements in secondary outcomes were not maintained over time. A short refresher to boost attitudes and perceptions of risk at regular intervals would be useful. Given that stakeholders reported that lived experience stories were well received by workers attending the training, inviting guest speakers to toolbox talks, including peers in recovery,⁵ may also provide a cost-effective means of providing interim information and motivational 'top-ups'.
4. Ensuring worker engagement in the training is important but often overlooked. There are a number of practical things that can be done to improve engagement. It is recommended that companies pay closer attention to the provision of suitable facilities at an appropriate time of day, and trainers adopt a relatable and inclusive approach, avoiding lecture-style content delivery.
5. Training content would benefit from greater inclusion of practical 'how-to' tips and solutions with regard to making broader lifestyle changes and what to expect when seeking help for a range of AOD issues, most of which do not require rehabilitation facilities.
6. The use of an interpreter in training sessions is required to aid communication with workers for whom English is not their first language.
7. For the training to make a real impact, implementation consistency is required across the construction industry. Feedback from stakeholders supports a whole-of-industry approach. Similarly, good practice responses to AOD in the workplace are most effective when they adopt a whole-of-workplace approach targeting workplace conditions as well as culture, norms and controls. The full potential of training alone is unlikely to be realised without close consideration of these factors and widespread systemic change.

⁵ While reservations about the use of guest speakers and recovered persons more generally are acknowledged, this approach may have utility in these settings.

Conclusion

The Australian construction industry has high levels of AOD use and related harms, with social and cultural influences and workplace conditions traditionally conducive to risky drinking and drug use. The current harm reduction approach in which the training is embedded has made inroads to tackle many of these factors by reducing stigma, encouraging conversations around AOD and mental health, and offering support avenues for workers. This evaluation of the BTGDAP Workplace Impairment Training program demonstrates its promise for improving AOD-related outcomes and changing cultures around AOD and impairment, with more intensive, consistent industry-wide approaches required. Findings from this evaluation offer valuable insights for the construction companies who invest in the training, the Building Trades Group Committee members, policy makers in the construction industry, organisations running similar programs in other states and countries, and for the construction workers themselves.

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Appendix 1: Survey items

Variable	Measure [response options]	Timepoints	Source
Demographics			
Age	<i>What is your age?</i> [years]	T1	N/A
Sex	<i>What is your sex?</i> [M / F]	T1	N/A
Time in Industry	<i>How long have you been working in the construction industry?</i> [<12 months / 1-2 years / 3-5 years / 6-10 years / 10 years +]	T1	N/A
Alcohol	<i>Alcohol Use Disorders Identification Test – Concise (AUDIT-C)</i> assesses: (1) frequency of consumption, (2) number of standard drinks on a typical drinking day, (3) frequency of drinking 5 or more drinks on a single occasion. Responses from each question were summed to give a total score ranging from 0-12. Total scores were dichotomised: [0-3 = 'Low risk drinking' / 4+ = 'Risky drinking']	T1, T3	Bradley et al. 2007
Drugs	<i>How often have you used...</i> [Never / every day / once a week or more / about once a month / less often]	T1, T3	AIHW 2017 (NDSHS)
Cannabis use	<i>...cannabis in the past 12 months?</i>	T1, T3	AIHW 2017 (NDSHS)
Meth/amphetamine use	<i>...meth/amphetamine in the past 12 months?</i>	T1, T3	AIHW 2017 (NDSHS)
Cocaine use	<i>...cocaine in the past 12 months?</i>	T1, T3	AIHW 2017 (NDSHS)
Prescribed pain killer use	<i>...prescribed pain killers in the past 12 months?</i>	T1, T3	Purpose designed
Alcohol knowledge	5 true or false statements about how alcohol is removed from the body (e.g. ' <i>You can reduce the amount of alcohol in your system by eating</i> '). Correct responses were summed to give a total score out of 5	T1, T2, T3	Purpose designed
Awareness of impairment factors	Respondents were asked to select all true statements from a list of 12 factors that could lead to workplace impairment (e.g. ' <i>Alcohol & drugs</i> '). Correct responses were summed to give a total score out of 12	T1, T2, T3	Purpose designed
Awareness of fatigue management strategies	Respondents were asked to select all true statements from a list of 6 strategies that are good for managing fatigue at work (e.g. ' <i>Having regular rest breaks</i> '). Correct responses were summed to give a total score out of 6	T1, T2, T3	Purpose designed
Confidence recognising signs of impairment	<i>How confident are you that you could recognise the signs of...</i> [1 = 'Not confident at all' to 4 = 'Very confident'. 'Unsure' removed]	T1, T2, T3	
Heat stress (in self)	<i>...heat stress in yourself?</i>	T1, T2, T3	Purpose designed
Mental health (in self)	<i>...poor mental health in yourself?</i>	T1, T2, T3	Purpose designed
Fatigue (in self)	<i>...fatigue in yourself?</i>	T1, T2, T3	Purpose designed
Heat stress (in workmates)	<i>...heat stress in your co-workers?</i>	T1, T2, T3	Purpose designed
Mental health (in workmates)	<i>...poor mental health in your co-workers?</i>	T1, T2, T3	Purpose designed
Fatigue (in workmates)	<i>...fatigue in your co-workers?</i>	T1, T2, T3	Purpose designed
Perception of AOD-related risk to health	5 items beginning with the stem: <i>To what extent do you think the following behaviours are a risk to your health?</i> (e.g. ' <i>Drinking on average more than 2 standard drinks every day</i> '). [1 = 'Low risk' to 4 = 'High risk'. 'Don't know' removed]. Items were summed and averaged to give a mean score ranging from 1-4 ($\alpha = 0.82$)	T1, T2, T3	Purpose designed

Perception of harms from regular alcohol use	6 items beginning with the stem: <i>To what extent would you agree or disagree that regular alcohol use can increase the risk of the following conditions?</i> (e.g. 'Liver disease'). [1 = 'Totally disagree' to 5 = 'Totally agree']. Items were summed and averaged to give a mean score ranging from 1-5 ($\alpha = 0.91$)	T1, T2, T3	Purpose designed
Perception of harms from regular drug use	4 items beginning with the stem: <i>To what extent would you agree or disagree that regular illicit drug use can increase the risk of the following conditions?</i> (e.g. 'Poor physical health'). [1 = 'Totally disagree' to 5 = 'Totally agree']. Items were summed and averaged to give a mean score ranging from 1-5 ($\alpha = 0.96$)	T1, T2, T3	Purpose designed
AOD-related risk to workplace safety	<i>To what extent do you think the following behaviours are a risk to workplace safety?</i> [1 = 'Low risk' to 4 = 'High risk'. 'Don't know' removed]	T1, T2, T3	
Alcohol: Drinking > 4 SD night before work	<i>Drinking more than 4 standard drinks on the night before a work day</i>	T1, T2, T3	Purpose designed
Cannabis use night before work	<i>Using cannabis the night before a work day</i>	T1, T2, T3	Purpose designed
Meth/amphetamine use night before work	<i>Using meth/amphetamine the night before a work day</i>	T1, T2, T3	Purpose designed
Cocaine use night before work	<i>Using cocaine the night before a work day</i>	T1, T2, T3	Purpose designed
Alcohol: Coming to work with a hangover	<i>Coming to work with a hangover</i>	T1, T2, T3	Purpose designed
Cannabis use before starting work	<i>Using cannabis before starting work</i>	T1, T2, T3	Purpose designed
Meth/amphetamine use before starting work	<i>Using meth/amphetamine before starting work</i>	T1, T2, T3	Purpose designed
Cocaine use before starting work	<i>Using cocaine before starting work</i>	T1, T2, T3	Purpose designed
Prescribed pain killer use before starting work	<i>Using prescribed pain killers just before starting work</i>	T1, T2, T3	Purpose designed
Alcohol use during work hours	<i>Drinking alcohol during work hours (including lunch & other breaks)</i>	T1, T2, T3	Purpose designed
Cannabis use during work hours	<i>Using cannabis during work hours (including lunch & other breaks)</i>	T1, T2, T3	Purpose designed
Meth/amphetamine use during work hours	<i>Using meth/amphetamine during work hours (including lunch & other breaks)</i>	T1, T2, T3	Purpose designed
Prescribed pain killer use during work hours	<i>Using prescribed pain killers during work hours (including lunch & other breaks)</i>	T1, T2, T3	Purpose designed
AOD-treatment and counselling options	<i>How confident are you that you...</i> [1 = 'Not confident at all' to 4 = 'Very confident'. 'Unsure' removed]		
Confidence talking about AOD	<i>...could talk with your workmates about alcohol or drug issues?</i>	T1, T2, T3	Purpose designed
Confidence talking about mental health	<i>...could talk with your workmates about mental health issues?</i>	T1, T2, T3	Purpose designed
Knowing how to get help for AOD	<i>...would know how get help for alcohol or drug problems?</i>	T1, T2, T3	Purpose designed
Knowing how to get help for mental health	<i>...would know how to get help for poor mental health?</i>	T1, T2, T3	Purpose designed
Likelihood of help-seeking	<i>How likely is it that you would seek help...</i> [1 = 'Not likely at all' to 4 = 'Very likely'. 'Unsure' removed]		
Likelihood of help-seeking for AOD	<i>...for alcohol or drug problems?</i>	T1, T2, T3	Purpose designed
Likelihood of help-seeking for mental health	<i>...if you were suffering from mental health problems?</i>	T1, T2, T3	Purpose designed
Help-seeking behaviour (Training group only)	<i>In the past 3 months have you sought help for... [Y / N]</i>		
Help-seeking for AOD past 3 months	<i>...alcohol or drug problems?</i>	T1, T3	Purpose designed
Help-seeking for mental health past 3 months	<i>...any mental health issues?</i>	T1, T3	Purpose designed
AOD-affected workdays in past 3 months	<i>Have you... [Y / N]</i>		
Had time off due to AOD	<i>...had days off in the past 3 months due to alcohol or drug use?</i>	T1, T3	Purpose designed
Came to work with a hangover from AOD	<i>... come to work with a hangover from alcohol or drugs in the past 3 months?</i>	T1, T3	Purpose designed
Had time off due to fear of being drug tested	<i>... avoided or missed work in the past 3 months due to fear of being drug tested?</i>	T1, T3	Purpose designed

Appendix 2: Attitudes regarding the impact of AOD on health and safety T1-T3

Perception of AOD-related risk to health from T1-T3

Outcome	Range	T1 M (sd)	T3 M (sd)	T1-T3 Difference (CI)	t-test
AOD-related Risk to Health	1-4				
Training Group		3.40 (.56)	3.35 (.56)	-0.05 (-0.19–0.09)	t(105)=-.71,p=.48
Non-Training Group		3.23 (.59)	3.32 (.58)	+0.08 (-0.11–0.25)	t(61)=80,p=.43
Between group test		F(1,167)=0.01, p=.98			
Harms from Alcohol Use	1-5				
Training Group		4.42 (.65)	4.52 (.63)	+0.10 (-0.03–0.23)	t(114)=1.16,p=.15
Non-Training Group		4.23 (.77)	4.30 (.69)	+0.07 (-0.14–0.28)	t(72)=.68,p=.50
Between group test		F(1,187)=2.87, p=.09			
Harms from Drug Use	1-5				
Training Group		4.65 (.65)	4.63 (.68)	-0.03 (-0.18–0.12)	t(116)=-.37,p=.72
Non-Training Group		4.45 (.78)	4.50 (.67)	+0.06 (-0.15–0.26)	t(74)=.55,p=.58
Between group test		F(1,191)=0.53, p=.47			

Perception of risk to safety from using AOD night before work from T1-T3

Outcome	Range	T1 M (sd)	T3 M (sd)	T1-T3 Difference (CI)	t-test
>4 standard drinks	1-4				
Training Group		3.11 (.82)	3.08 (.75)	-0.03 (-0.17–0.10)	t(116)=-.50,p=.62
Non-Training Group		2.79 (.93)	2.75 (.95)	-0.04 (-0.24–0.16)	t(70)=-.42,p=.68
Between group test		F(1,187)=2.17, p=.14			
Cannabis	1-4				
Training Group		3.12 (.86)	3.14 (.83)	+0.02 (-0.16–0.19)	t(115)=.19,p=.85
Non-Training Group		3.10 (.81)	2.97 (.90)	-0.13 (-0.32–0.6)	t(67)1.38,p=.17
Between group test		F(1,183)=1.82, p=.18			
Meth/amphetamine	1-4				
Training Group		3.75 (.49)	3.84 (.41)	+0.09 (-0.02–0.19)	t(116)=1.68,p=.10
Non-Training Group		3.81 (.43)	3.73 (.61)	-0.09 (-0.23–0.05)	t(69)=-1.23,p=.22
Between group test		F(1,186)=3.31, p=.07			
Cocaine	1-4				
Training Group		3.63 (.62)	3.59 (.65)	-0.04 (-0.18–0.10)	t(116)=-.61,p<.54
Non-Training Group		3.57 (.67)	3.83 (.54)	+0.26 (0.08–0.43)	t(69)=2.92,p=.01
Between group test		F(1,186)=8.31, p<.01, ηp²=.04			

Perception of risk to safety from using AOD before starting work from T1-T3

Outcome	Range	T1 M (sd)	T3 M (sd)	T1-T3 Difference (CI)	t-test
Arriving with a hangover	1-4				
Training Group		3.54 (.57)	3.57 (.58)	+0.03 (-0.08–0.13)	t(117)=-.48,p=.63
Non-Training Group		3.45 (.67)	3.36 (.71)	-0.10(-0.26–0.07)	t(72)=-1.15,p=.25
Between group test		F(1,190)=4.01, p=.05, η^2=.02			
Cannabis	1-4				
Training Group		3.83 (.40)	3.78 (.59)	-0.05 (-0.17–0.07)	t(114)=-.84,p=.40
Non-Training Group		3.88 (.37)	3.68 (.64)	-0.19 (-0.32–0.07)	t(72)=-3.01,p=.004
Between group test		F(1,187)=1.80, p=.18			
Meth/amphetamine	1-4				
Training Group		3.97 (.16)	3.97 (.18)	-0.01 (-0.04–0.02)	t(117)=-.58,p=.57
Non-Training Group		3.99 (.12)	3.91 (.37)	-0.07 (-0.15–0.01)	t(68)=-1.93,p=.06
Between group test		F(1,186)=3.37, p=.07			
Cocaine	1-4				
Training Group		3.92 (.30)	3.93 (.29)	+0.01 (-0.04–0.05)	t(116)=-.38,p=.71
Non-Training Group		3.80 (.58)	3.37 (.82)	-0.43 (-0.59–0.27)	t(69)=-5.34,p<.001
Between group test		F(1,186)=47.37, p<.001, η^2=.21			
Prescribed pain killers	1-4				
Training Group		3.22 (.84)	3.29 (.76)	+0.07 (-0.07–0.21)	t(113)=1.02,p=.31
Non-Training Group		2.97 (.79)	3.10 (.86)	+0.13 (-0.07–0.32)	t(70)=1.29,p=.20
Between group test		F(1,184)=0.33, p=.57			

Perception of risk to safety from using AOD during work hours from T1-T3

Outcome	Range	T1 M (sd)	T3 M (sd)	T1-T3 Difference (CI)	t-test
Drinking alcohol	1-4				
Training Group		3.87 (.38)	3.84 (.44)	-0.03 (-0.12–0.06)	t(116)=-.76,p=.45
Non-Training Group		3.85 (.36)	3.88 (.37)	+0.03 (-0.07–0.12)	t(72)=.58,p=.57
Between group test		F(1,189)=0.65, p=.42			
Cannabis	1-4				
Training Group		3.88 (.38)	3.80 (.58)	-0.08 (-0.19–0.03)	t(115)=-1.35,p=.18
Non-Training Group		3.86 (.39)	3.78 (.51)	-0.08 (-0.21–0.04)	t(71)=-1.35,p=.18
Between group test		F(1,187)=0.05, p=.83			
Meth/amphetamine	1-4				
Training Group		3.97 (.19)	3.95 (.22)	-0.02 (-0.06–0.02)	t(117)=-.82,p=.42
Non-Training Group		3.96 (.27)	3.87 (.51)	-0.09 (-0.17–0.03)	t(69)=-1.93,p=.06
Between group test		F(1,188)=2.51, p=.12			
Prescribed pain killers	1-4				
Training Group		3.30 (.83)	3.31 (.75)	+0.02 (-0.12–0.16)	t(114)=-.25,p=.80
Non-Training Group		3.13 (.79)	3.18 (.83)	+0.06 (-0.13–0.24)	t(71)=.62,p=.54
Between group test		F(1,186)=0.18, p=.67			

