MONASH University

Reducing Alcohol-Related Harm in Royal Australian Navy Trainees

Jason Watterson

Bachelor of Health Science (Nursing)

Postgraduate Diploma in Advanced Nursing (Critical Care Nursing)

Master of Education (Adult)

A thesis submitted for the degree of Doctor of Philosophy at Monash University in 2021

Department of Epidemiology and Preventive Medicine

School of Public Health and Preventive Medicine

Faculty of Medicine, Nursing and Health Sciences

Copyright Notice

Abstract

Background

The excessive use of alcohol has been shown to be associated with various adverse consequences and health problems such as fatal and non-fatal injury, blackouts, suicide attempts, unintended pregnancy, sexually transmitted infections, violence as well as an array of mental health conditions. Studies have demonstrated that adolescent-onset risky drinking is more likely to occur among males, and it is more likely to continue into adulthood in males rather than females. In the Australian context, alcohol has been consistently associated with the second-highest costs to the Australian community after tobacco. The ADF in 2011 acknowledged that more needed to be done to address alcohol consumption and related harms within its workforce.

Aims

The aim of this program of research was to examine alcohol use among young naval trainees of the Royal Australian Navy (RAN) and test the effectiveness of an alcohol harm reduction intervention.

Methods

An initial pilot study was undertaken to investigate the feasibility of using the Prevent Alcohol and Risk-Related Trauma in Youth (P.A.R.T.Y.) program with young naval trainees. This study involved 108 RAN trainees who participated in a one-day program at a major trauma hospital between November 2011 and March 2013. This was followed by the implementation of a randomised controlled trial (RCT). The three-arm RCT measured the effectiveness of an in-hospital P.A.R.T.Y. program and an on-base program compared to a control group. The control group received the ADF mandatory annual awareness program, which includes a section on alcohol awareness. Due to the scarcity of evidence in the military setting, a systematic review of the literature that has examined workplace-based interventions to reduce alcohol harms in these settings was conducted following the RCT.

Results

The pilot study demonstrated the feasibility of delivering the P.A.R.T.Y. program in a military setting. Fifteen of the 108 participants were reported for an alcohol incident in the 12 months following their participation in the program. Of the 15 who had a post-program incident, the rate of incidents was higher among participants who had an alcohol-related incident prior to attending the program.

The results of the RCT demonstrated that there was no difference in the risk of reporting an AUDIT score of 8 or above in either the in-hospital or on-base intervention groups, compared to the control group.

The systematic review examined the evidence related to workplace-based interventions for reducing alcohol consumption and related harms in active-duty military personnel and found a small number of interventional studies internationally. However, there was no consistent approach to screening for alcohol consumption or for the evaluation of the interventions.

Conclusion

This thesis has examined the nature and extent of alcohol use in a single cohort of RAN trainees. The development and trial of a variant of the PARTY program that had not previously been used in a military setting was tested. Although the intervention did not result in reductions in consumption or harm, the findings will be useful in informing the development of future screening and intervention programs for the Australian and other defence forces.

Publications During Enrolment

Watterson J, Gabbe B, Dietze P, Thompson J, Oborn M, Rosenfeld JV. Measuring the effectiveness of in-hospital and on-base Prevent Alcohol- and Risk-Related Trauma in Youth (P.A.R.T.Y.) programs on reducing alcohol-related harms in naval trainees: P.A.R.T.Y. Defence study protocol. BMC Public Health [Internet]. 2017 May 02 [cited 2019 Jan 21];17:Article 380. Available from: https://doi.org/10.1186/s12889-017-4330-8 .

Watterson J, Gabbe B, Dietze P, Thompson J, Oborn M, Rosenfeld JV. Piloting an injury awareness and education program for reducing alcohol-related harm in navy trainees. J Subst Use [Internet]. 2018 [cited 2019 Jan 21];23(1):74–8. Available from: https://doi.org/10.1080/14659891.2017.1348556

Watterson J, Gabbe B, Dietze P, Bowring A, Rosenfeld JV. Comparing short versions of the Alcohol Use Disorders Identification Test (AUDIT) in a military cohort. J R Army Med Corps [Internet]. 2018 [cited 2019 Jan 21];165(5):312-6. Available from: https://doi.org/10.1136/jramc-2018-001024

Watterson J, Gabbe B, Rosenfeld J. V, Ball H, Romero L, Dietze P. Workplace intervention programmes for decreasing alcohol use in military personnel: A systematic review of the literature. BMJ Military Health [Internet]. 2021 [cited 2021 Sept 04];167(3): 192–200. Available from: http://dx.doi.org/10.1136/bmjmilitary-2020-001584

Watterson J, Gabbe B, Dietze P, Rosenfeld J. V. A randomised controlled trial of the Prevent Alcohol and Risk-Related Trauma in Youth (P.A.R.T.Y.) program in reducing alcohol-related harms in young naval trainees. Military Medicine [Internet]. 2021 [cited 2021 Nov 13]; Online ahead of print. Available from: http://dx.doi.org/10.1093/milmed/usab444*

Thesis Including Published Works Declaration

I hereby declare that this thesis contains no material which has been accepted for the award of any other degree or diploma at any university or equivalent institution and that, to the best of my knowledge and belief, this thesis contains no material previously published or written by another person, except where due reference is made in the text of the thesis.

This thesis includes five original manuscripts published in peer-reviewed journals. The core theme of the thesis related to reducing alcohol-related harm in navy trainees. The ideas, development and writing up of all the manuscripts in the thesis were the principal responsibility of me, the candidate, working within the Department of Epidemiology and Preventive Medicine under the supervision of Professor Belinda Gabbe.

The inclusion of co-authors reflects the fact that the work came from active collaboration between researchers and acknowledges input into team-based research. In the case of Chapters 2 to 6, my contribution to the work involved the following:

Thesis Chapter	Publication Title	Status	Nature and percentage of student contribution	Co-author name(s), nature and percentage of co-authors' contribution	Co-author(s), Monash student Y/N
2	Piloting an injury awareness and education program for reducing alcohol-related harm in navy trainees	Published	70%. Concept, design, data collection, data synthesis, interpretation of results and writing-up of the manuscript.	Professor Belinda Gabbe – design, data analysis, interpretation of results, manuscript revision – 12.5% Professor Paul Dietze – data analysis, interpretation of results, manuscript revision – 10% Ms Jennifer Thompson – Concept, design of data collection, manuscript revision – 2.5% CAPT Michael Oborn – concept, manuscript revision – 2.5% Professor Jeffrey V. Rosenfeld – Concept, manuscript revision – 2.5%	No
3	Measuring the effectiveness of in-hospital and on-base Prevent Alcohol and Risk-related Trauma in Youth (P.A.R.T.Y.) programs on	Published	70%. Concept, design, writing-up of the manuscript	Professor Belinda Gabbe – concept, design, manuscript revision – 12.5% Professor Paul Dietze – design, manuscript revision – 10% Ms Jennifer Thompson – concept, manuscript revision	No

Thesis Chapter	Publication Title	Status	Nature and percentage of student contribution	Co-author name(s), nature and percentage of co-authors' contribution	Co-author(s), Monash student Y/N
	reducing alcohol-related harms in naval trainees: P.A.R.T.Y. Defence study protocol			2.5% CAPT Michael Oborn – concept, manuscript revision 2.5% Professor Jeffrey V Rosenfeld – concept, design, manuscript revision 2.5%	
4	A randomised controlled trial, measuring the effectiveness of the in-hospital and new on-base P.A.R.T.Y. (Prevent Alcohol and Risk-related Trauma in Youth) programs in reducing alcohol-related harms in young naval trainees	Published	70% Concept, design, data collection, data synthesis, interpretation of results and writing-up of the manuscript.	Professor Belinda Gabbe – concept, design, manuscript revision 12.5% Professor Paul Dietze - design, manuscript revision 10% Professor Jeffrey V Rosenfeld – concept, design, manuscript revision 7.5%	No
5	Workplace intervention programs for alcohol use in military personnel: A systematic review of the literature	Published	70%. Study design, search strategy, review of included papers, manuscript preparation and revision	Professor Belinda Gabbe – study design, search strategy, review of included papers, manuscript revision 12.5% Professor Jeffrey V Rosenfeld – manuscript revision 2.5% Ms Hayley Ball – review of included papers, manuscript revision 2.5% Ms Lorena Romero – search strategy, manuscript revision 2.5% Professor Paul Dietze – study design, search strategy, manuscript revision – 10%	No
6	Comparing short versions of the Alcohol Use Disorders Identification Test (AUDIT) in a military cohort	Published	70%. Concept, design, data collection, data analysis, interpretation of results and writing-up of the manuscript.	Professor Belinda Gabbe – concept, data analysis, interpretation of results, manuscript revision 10% Professor Paul Dietze – concept, data analysis, interpretation of results, manuscript revision 10% Dr Anna Bowring – concept, data analysis, interpretation of results, revision of manuscript 7.5% Professor Jeffrey V Rosenfeld – manuscript revision 2.5%	No

I have renumbered sections of submitted or published papers in order to generate a consistent presentation within the thesis.

Student name: Jason Watterson

Date: 14 November 2021

I hereby certify that the above declaration correctly reflects the nature and extent of the student's and co-authors' contributions to this work. In instances where I am not the responsible author, I have consulted with the responsible author to agree on the respective contributions of the authors.

Main Supervisor name: Professor Belinda Gabbe

Date: 14 November 2021

Presentations During Candidature

Watterson, J. (2018). *Measuring the effectiveness of P.A.R.T.Y. (Prevent Alcohol and Risk-Related Trauma in Youth) programs in reducing alcohol-related harms in young naval trainees: P.A.R.T.Y. Defence* [Paper presentation]. Australasian Professional Society on Alcohol and Other Drugs, Auckland, New Zealand.

Watterson, J. (2018). *Comparing short versions of the Alcohol Use Disorders Identification Test (AUDIT) in a military cohort* [Poster presentation]. Australasian Professional Society on Alcohol and Other Drugs, Auckland, NZ.

Watterson, J. (2018). *Comparing short versions of the Alcohol Use Disorders Identification Test (AUDIT) in a military cohort* [Paper presentation]. Australasian Military Medicine Association, Canberra, ACT.

Watterson, J. (2017). *Measuring the effectiveness of P.A.R.T.Y. (Prevent Alcohol and Risk-Related Trauma in Youth) programs in reducing alcohol-related harms in young naval trainees: Results of an RCT* [Paper presentation]. Australasian Military Medicine Association, Brisbane, Qld.

Watterson, J. (2016). *Reducing alcohol-related harms in young naval trainees* [Invited speaker]. Australian P.A.R.T.Y. Program Coordinators Workshop, Liverpool Hospital, Sydney, NSW.

Watterson, J. (2016). *Measuring the effectiveness of P.A.R.T.Y. (Prevent Alcohol and Risk-Related Trauma in Youth) programs in reducing alcohol-related harms in young naval trainees: Motivations to drinking* [Paper presentation]. Australasian Military Medicine Association, Melbourne, Vic.

Watterson, J. (2015). *Measuring the effectiveness of P.A.R.T.Y. (Prevent Alcohol and Risk-related Trauma in Youth) programs in reducing alcohol-related harms in young naval trainees: Preliminary findings of early use of screening tools* [Paper presentation]. Australasian Military Medicine Association, Hobart, Tas.

Watterson, J. (2013). *Reducing alcohol-related incidents over 12 months in at-risk naval trainees' post-participation in the in-hospital trauma prevention program, P.A.R.T.Y. (Prevent Alcohol & Risk-related Trauma in Youth): A pilot evaluation* [Paper presentation]. Australasian Military Medicine Association, Adelaide, SA.

Grants Awarded During Candidature

Establishment grant (associate investigator) – Piloting and injury awareness and education program for reducing alcohol-related harm in naval trainees: AUD$50,000, Defence Health Foundation

Booster grant (associate investigator) – Measuring the effectiveness of in-hospital and on-base Prevent Alcohol and Risk-related Trauma in Youth (P.A.R.T.Y.) programs on reducing alcohol-related harms in naval trainees: AUD$300,000, Defence Health Foundation

Acknowledgements

This thesis would not have been possible without the support and assistance of my supervisors, family, friends, and colleagues. The support of my community has sustained me throughout the years of my candidature. I would like to particularly acknowledge a few people.

First, my three supervisors who from the beginning provided a robust structure to enable me to establish the project and meet the many needs of the stakeholders involved. They have all supported my ongoing growth with kindness and respect and the correct balance of critique I needed to continue to question and challenge myself. Professor Belinda Gabbe has from our very first meeting when this project was just a thought, listened and supported my ideas and then helped to reshape them when they needed it. Her enthusiasm and willingness to make time for many discussions has kept me going through many challenges. She is an inspiration to me and has always understood the path I wanted to follow through this PhD. Professor Paul Dietze took some convincing to take on this project, which is why I knew he would be the perfect supervisor and play such an important role in shaping the journey I would take throughout this PhD. He is a very generous and thoughtful person who has given so much along the way. Professor Jeffrey V. Rosenfeld provided valuable insights into the military aspects of this study. For me, personally, there has been no greater honour than to have Professor Rosenfeld as a supervisor. He is truly an inspiration to me as a clinician and a military officer. My thanks go also to Mrs Pam Simpson who spent many hours, (probably more than I was supposed to have) slowly, and carefully showing me how to use STATA to uncover the many statistical surprises of this program of work.

I am grateful for the financial support provided by the National Trauma Research Institute (NTRI) through the Defence Health Foundation grant which supported the study. I would like to especially thank Professor Mark Fitzgerald and Dr Teresa Howard for smoothing the road.

This research study could not have been conducted without the support of the Prevent Alcohol and Risk-Related Trauma in Youth (P.A.R.T.Y.) team at the NTRI (Janet McLeod, Rebecca Chapman, Anna Gunn and Hayley Ball). A very special thankyou to Hayley Ball who also worked closely with me throughout the project as an administrative assistant (this title does not do justice to the level of work Hayley achieved). Thank you to the Command team at *HMAS Cerberus*, starting in 2011 with RADM (then CAPT) Mark Hill, who had the vision to try something different. The successive Commanding Officers also put their commitment behind the research, and I would also like to thank CAPTS Richardson, Bowater and Standen. CAPT Michael Oborn, who, at the beginning of this project, was the XO of *HMAS Cerberus* was without doubt one of the key drivers

in the success of the partnership between the RAN and the NTRI in ensuring this project ran as smoothly as it did. CAPT Oborn provided me, as a researcher and junior RAN officer, with time beyond that for which I might have expected from someone with such a demanding job. I would also like to thank CAPT Verho (XO 2015 – 2017) and WO Woodsall (SWO 2011 – 2017) and the many faculty heads and staff who enabled the trainees to participate in the research.

To the young men and women of the Royal Australian Navy who willingly participated in the research, I thank you for taking the time out of your training to participate.

To my family and friends who have supported me throughout this process and accepted that at times I have been difficult to deal with – thank you. I would particularly like to thank my RAN brothers and dear friends WO Matthew Wood, LCDR Paul Wirth and CMDR Martin Richardson. You three gentlemen have supported me and encouraged me throughout this PhD, and I am truly grateful for your friendship and mateship.

To my co-investigators in this study MAJ GEN Professor Jeffrey V Rosenfeld, Professor Belinda Gabbe, CDRE Elizabeth Rushbrook, CMDR Michael Oborn and Ms Jennifer Thompson. Thank you for your support as we journeyed through the three years of the RCT. Thank you for your wisdom, advice, and belief in me.

Thank you to Brenton Thomas, from Fresh Eyes Australia, who provided editing assistance in accordance with the requirements of the *Guidelines for Editing of Research Theses*, which form part of the Australian Standards for Editing Practices.

Finally, to my wife, Dina, and my two gorgeous daughters, Amelia, and Lucy. You have been the foundation to which I have turned to each day throughout this long journey. This would not have been possible without your patience and unending love. I look forward to being more present now.

Table of Contents

List of Figures

List of Tables

List of Abbreviations

ADF	Australian Defence Force
ADFAMS	Australian Defence Force Alcohol Management Strategy
ANZCTR	Australia New Zealand Clinical Trials Registry
AOD	Alcohol and Other Drugs
ATOD	Alcohol Tobacco and Other Drugs
AUDs	Alcohol Use Disorders
AUDIT	Alcohol Use Disorders Identification Test
CO	Commanding Officer
FARE	Foundation for Alcohol Research and Education
HED	Heavy Episodic Drinking
IET	Initial Entry Trainees
MAAT	Mandatory Annual Awareness Training
MDMQ-R	Modified Drinking Motives Questionnaire – Revised
NDS	National Drug Strategy
NDSHS	National Drug Strategy Household Survey
NHMRC	National Health and Medical Research Council

NTRI	National Trauma Research Institute
P.A.R.T.Y.	Prevent Alcohol- and Risk-Related Trauma in Youth
RAAF	Royal Australian Air Force
RAN	Royal Australian Navy
RCT	Randomised Controlled Trial
RSOD	Risky Single-Occasion Drinking
WPR	Western Pacific Region
XO	Executive Officer

Chapter 1
Introduction

1.1 Background and Rationale

Alcohol consumption in Australia results in significant fiscal and health costs,[1] thereby reflecting the health and social problems it causes[2]. At the individual level, the health effects can surface in the immediate period following the consumption of alcohol (e.g., alcohol-related violence or road accidents) or after the long-term use of alcohol (e.g., alcohol-caused liver diseases and cancers).[3] The impact of alcohol use and its adverse outcomes extends beyond individuals to their families and society more broadly.[3] The cost of alcohol-related harm (including harm to others) in Australia in 2010 was estimated to be $36 billion,[4] with costs arising from direct responses (e.g., through first responders such as police) as well as indirectly through the costs to businesses that have resulted from lost-worker productivity and absenteeism.[5,6]

The Australian Defence Force (ADF) – a large employer comprising the Royal Australian Navy (RAN), the Australian Army and the Royal Australian Air Force (RAAF) – is a workplace that has been impacted by alcohol consumption and related harms. There have been direct impacts of alcohol use and harm, but there have also been additional sensitivities for the ADF, with estimates suggesting that the negative television, radio and press coverage in 2010–11 of alcohol use and its consequences was equivalent to an advertising space rate of $4,445,812.[7] In this thesis, the use of alcohol in the military, with particular focus on the RAN, is examined.

1.1.1 The Use of Alcohol in the General Population

Alcohol consumption is often a feature of numerous social, cultural, and religious practices among many groups in the community, and, at the individual level, provides pleasure for many users.[8,9] However, recognition that alcohol can cause harm to individuals and societies more broadly has resulted in the development of interventions to reduce these harms at the individual and community levels.

Excessive use of alcohol is associated with various adverse consequences and health problems, such as fatal and non-fatal injury, blackouts, suicide attempts, unintended pregnancy, sexually transmitted infections and violence.[1, 10-12] Excessive use of alcohol is also a major avoidable risk factor for neuropsychiatric disorders.[3] In the Australian context, alcohol has been consistently

ranked as the second-highest cost after tobacco.[3] The WHO identified in its report on the global status of alcohol and health in 2018 that, while only half of the world's adults consumed alcohol in the period of the report, the global burden of disease caused by its harmful use had been enormous.[13]

The burden of disease attributable to alcohol consumption has been linked to three factors: the volume of alcohol consumed; the patterns of drinking; and the quality of the alcohol consumed. In 2016, 2.8 million deaths were attributed to alcohol use.[14] This figure corresponds to 2.2% of total age-standardised deaths among females and 6.8% among males.[14] Age continues to play an important factor in health risks related to alcohol, with young people disproportionally represented in relation to harm from alcohol-related accidents and injuries.[1]

Australia is the third-highest per capita consumer of alcohol, and the third-highest for heavy episodic drinking (HED) in the Pacific region.[13] HED is defined as the consumption of greater than 60grams of pure alcohol (or six standard drinks or more) in a single occasion.[13,16] Among people aged 20 to 24 years, Australia is the second highest in the Pacific region for HED.[13] The most recent Australian National Drug Strategy Household Survey (NDSHS) provides some sense of progress, with results indicating that there has been a decline in the overall consumption of alcohol reported between the 2016 and 2019 strategies, as well as a decline in the proportion of people exceeding the single-occasion risk guidelines.[15]

In response to alcohol consumption and its link to harm, the National Health and Medical Research Council (NHMRC; 2020) of Australia has produced guidelines (see Figure 1), which state that "to reduce the risk of harm from alcohol-related disease or injury, healthy men and women should drink no more than 10 standard drinks a week and no more than 4 standard drinks on any one day".[16 p2]

Figure 1

Australian Guidelines to Reduce Health Risks From Drinking Alcohol[16]

Alcohol-related harms are typically described based on consumption that exceeds the lifetime risk guidelines or the single-occasion risk guidelines.[17] In the 9 years between the 2010 and 2019 NDSHS, there has been a steady decline in the proportion of people exceeding the lifetime and single-occasion risk guidelines; however, HED continues to sit at around 25%.

1.1.2 Consumption Trends and Patterns of Alcohol Use in Young Adults

The WHO's recommendation from the global strategy to reduce the harmful use of alcohol outlines national and international trends in the consumption of alcohol that are related to disease outcomes.[10] These trends serve as tools for monitoring policy changes at country, regional and global levels.[18] Accordingly, data on alcohol consumption and patterns of use need to be systematically collected and rigorously analysed to ensure the current patterns are being adequately managed for harm reduction.

Both the individual's personality and the context of alcohol use have been associated with an individual's motives and expectancies to use alcohol, as has been described in the literature since 1988.[19–22] An examination of the consumption behaviours of young adults from the most recent NDSHS reveals that the number of young adults consuming alcohol on a daily basis has decreased significantly, whilst there has been a significant increase in consumption in the young adult group on Friday and Saturday nights.[1]

1.1.3 Drinking Expectancies and Motivations

Drinking expectancies and motivations are important factors in relation to alcohol use by young adults. Young adults' beliefs and knowledge regarding the effect of consuming alcohol are based on their past and current exposures to drinking. [23] Expectancies span positive or negative behavioural, emotional, and cognitive effects of alcohol intake. Research has found that negative expectancies predict a decrease in consumption; conversely, positive expectancies appear to increase an individual's alcohol consumption. [24] These expectancies, in turn, have been thought to then lead the individual to form drinking motivations.[25] Understanding an individual's alcohol-related expectations and motivations can help inform the development of interventions designed to reduce alcohol consumption and/or harm.

These beliefs and knowledge, in turn, have led to the expectations young people develop towards the consumption of alcohol, including their mood, behaviour and emotions.[24] Then the expected outcomes from consuming alcohol are what leads to individuals' motivations to consume in

different circumstances.[23] In their 1988 motivational model of alcohol use, Cox and Klinger[26] describe motivation as being the final common pathway to alcohol consumption, where an individual's decision, consciously or unconsciously, to consume or not consume alcohol is based on whether or not he or she expects that the positive affective consequences of drinking will outweigh those of not drinking.

Cox and Klinger[26] initially characterised their motivational model of alcohol use as being two underlying dimensions that reflect the valence (positive and negative) and source (internal and external) of the outcomes the individual hopes to obtain when drinking.[27] There are four primary classes of motive, typically described as – (a) enhancement; (b) social; (c) coping; and (d) conformity – in Cox and Klinger's model.[27] The literature supports the notion that the enhancement and coping motives are more commonly associated with the most problematic drinking in young adults; whereas social and conformity motives are generally associated with less problematic drinking.[28]

Social motives arise when young adults feel motivated to drink because they are in a social setting. Individuals who consume alcohol for primarily social motives have been shown to engage in heavy drinking or to suffer from alcohol problems less frequently than those who consume alcohol for other motives such as coping.[25] The second motive associated most commonly with young adults is conformity, which, not unlike social motives, tends to be influenced by social gatherings, where an individual drinks to avoid social disapproval.[25] Cooper[27] suggests that conformity motives tend to weaken as an individual increases in age maturity.

Kuntsche et al[29] describe the motivating factors of young people in relation to the use of alcohol. They found that most young people drink as a result of social and conformity motives, some for enhancement motives, and only a few for coping motives. Kuntsche et al.'s model assumes that people drink to attain certain outcomes.[26,29]

Understanding the expectations and motivations of young adults in their consumption of alcohol will assist in the future development of interventions tailored to the individual or to groups.

1.1.4 Prevention, Early Intervention, Harm Reduction, and the Treatment of Substance and Alcohol Use in Young People

In order to inform prevention and intervention programming, Stockings et al[30] describe three levels of interventions that have been used to address substance use in young people. The first level they

describe – universal prevention and population interventions – involves structural interventions, such as laws, policies, taxation and school-based programs and family-based interventions. The second level is early intervention and harm reduction, which involves selective interventions, indicated prevention, screening, brief intervention, and harm reduction, such as roadside alcohol and drug testing or motivational interviewing. The third and final level is specialised treatment, which is focused on supporting individuals with substance dependence.

The selection of an appropriate approach to intervention varies depending on factors such as the age and level of substance use.[30] In order for alcohol interventions to be effective and appropriately targeted at the correct level as described by Stockings et al[30], it is pivotal that all agencies involved in the response, including health care, education, social services, liquor regulators, law enforcement, the justice system and local government are collaborative in the approach.[1] Australia's NDS is one such example of a unified approach, which has resulted from inter-agency collaboration that has enabled the development of a strategy at a national level. By adopting this approach, Australia has implemented a range of measures to reduce alcohol-related harms through a combination of education, restrictions, law enforcement initiatives, and treatment. Ultimately, these measures need to be balanced in order to reduce alcohol-related harms through early intervention and, where appropriate, treatment programs.[1]

Accordingly, the type and the target of interventions needs to consider the age of the people concerned and the level of substance abuse that is occurring. The use of a program that has been traditionally targeted at school-aged young people who have not yet started using alcohol, or who have other limiting factors, may not work for young adults who have moved away from home and are now living independently among their peers.[31] This is the case in the military where many, for the first time, are living independently and experiencing greater influence from their peers.[7] Early intervention in these military populations, or in similar civilian young adult populations, needs to be tailored to the correct level of the audience.

1.1.5 The Use of Alcohol in the Military

There has been limited research conducted on the consumption of alcohol among military personnel.[32] Harmful alcohol use and its associated problems within military populations is not a new phenomenon.[7] Available evidence on alcohol use in the military covers a wide range of situations from active serving military through to the more dominant focus on veteran populations.[33–39]

Most of the published research that has explored alcohol use in military populations has originated from the United States of America (USA), with the remaining contributions coming from the United Kingdom (UK), Canada, Switzerland, and several other, mainly European, countries. Much of this work has been focused on veteran populations and not active-duty personnel. Whilst veterans are important, a focus on veterans alone would fail to address the potential for early intervention among active-duty personnel to prevent problems from occurring in the first instance. [37–44] These interventional studies are described in more detail in chapter 5 and the related journal article.[45]

The work that has been undertaken within the veteran population has highlighted the high burden on the health system that is related to alcohol use disorders (AUDs) faced by veterans. It has been estimated that one in 10 veterans from the recent conflicts in Iraq and Afghanistan would meet the criteria for AUDs.[44] Similarly, research undertaken in veteran populations has identified a link between combat exposure and poor mental health and hazardous drinking.[46] The findings from much of the research conducted in veteran populations has been linked to the motives of enhancement and coping, which were described earlier. More recent research involving active serving military populations in the USA, UK and Canada has identified the increasing use of alcohol, which has been attributed to coping with stress, including maladaptive coping mechanisms to stress as well as boredom and loneliness.[32,36,37,47–50] In their study of the Canadian Armed Forces, Richer et al[32] concluded that regular binge drinkers were less likely to have experienced alcohol-related problems, and, therefore, efforts targeting this group should be focused on health promotion and education programs that encourage healthier social norms and the responsible use of alcohol.

Thandi et al[36], in their publication of a longitudinal study that explored alcohol misuse in the UK military examined Alcohol Use Disorders Identification Test (AUDIT) scores in a sample of 4722 active serving members from the army, navy, marines and the air force. The sample consisted of members who had been deployed in the first phase of the Iraq war in 2003 with a sample of members who had not been deployed. In Phase 2 of the study, they followed up with the members recruited in Phase 1, this time following a subsequent deployment to Iraq or Afghanistan in 2007. The results demonstrated a statistically significant decrease in AUDIT scores between Phase 1 and Phase 2. The major strength of the study was the utilisation of a validated measure of alcohol use and consumption in a longitudinal study of military personnel.

The similarities between the literature describing the general population and the military in relation to conforming and social motivations in the use of alcohol are not surprising given that the military

population reflects the general populations from where they are recruited. Historically, and more contemporarily, the literature related to alcohol use and motivations in the military have reported that the predominant setting for the consumption of alcohol is a social setting, such as a mess function or a celebration.[7,51–53] This phenomenon has prompted the need to highlight the challenges within the ADF and international militaries in managing alcohol supply, demand and health promotion within the military.[32,50,54] Stockings et al[30] conclude that there is a need to improve the coverage and quality of the evidence for interventions that target young people and substance use.

1.1.6 The Use of Alcohol in the Australian Defence Force

There have been few studies that have examined the consumption of alcohol in the ADF. The 2011 report of the independent advisory panel on the Use of Alcohol in the Australian Defence Force[7] has been the most comprehensive review to date into aspects of Defence and ADF culture that are concerned with the use of alcohol. The focus of the report was to explore both the negative and positive aspects of alcohol use in the ADF. Hamilton et al[7] highlight this as being essential because "to focus on one without the other is ultimately limiting".[7 p27] In particular, the report focused on the following:

i. What are the key influences on drinking attitudes and behaviours in the ADF?
ii. What represents best practice in workplace alcohol management?
iii. How does the ADF compare with best practice, and what are the priority areas for the ADF in which to adopt best practice?
iv. What are the areas of good and promising performance that might warrant additional attention and support in the short, medium, and long term, and who are potential internal leaders and external partners?
v. What will be required to support the implementation and sustainability of organisational change?[7]

The panel was guided by principles consistent with international policy and practice in managing alcohol in the workplace. In defining the terms of reference for the review, the panel also used the National Drug Strategy (NDS) 2010–2015,[55] which was underpinned by a philosophy of harm minimisation. When applied to the use of alcohol, this philosophy utilised three pillars:

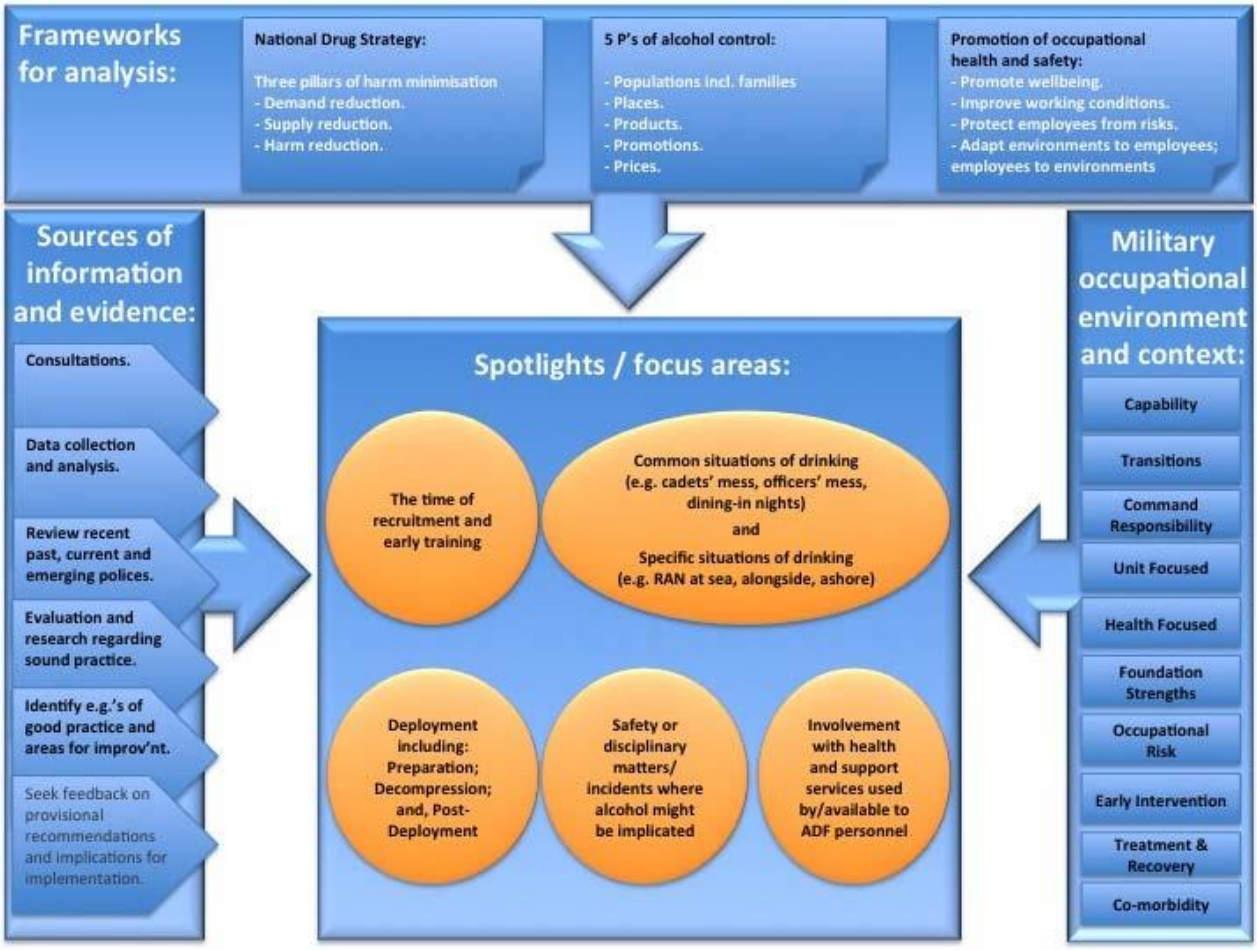
- *Demand reduction*, which is intended to prevent the uptake and/or delay the onset of the use of alcohol.

- *Supply reduction,* which is designed to control, manage and/or regulate the availability of alcohol.
- *Harm reduction*, which is intended to reduce the adverse health, social and economic risks and consequences that arise from the use of alcohol.

This approach has continued to be used in subsequent strategies and to guide the ADF's alcohol management strategies since the 2011 review.[56] Figure 2 illustrates the comprehensive approach taken in the review and provides a graphical representation of its key recommendations. The aim of the review was to bring a balance to the current concepts and underpinnings of alcohol management within the ADF and those within the civilian community.

Figure 2

Review of the Use of Alcohol in the Australian Defence Force 2011 (Key Frameworks and Information Sources)



Note. From *The Use of Alcohol in the Australian Defence Force* (p. 29), by M. Hamilton, S. Allsop, J. Wiggers, and P. Alexander, 2011, Commonwealth of Australia. Reprinted with permission from the Joint Health Command, Department of Defence.

Despite the identification of alcohol-related harms as a key priority for the ADF, and the panel's report, there have been few published studies of alcohol consumption by members of the ADF. Consistent with the international literature described in the previous sections, much of the peer-reviewed work on alcohol consumption among ADF personnel has focused on the veteran population and on alcohol and its association with mental health issues in veterans.[34,57,58] Indeed, prior to 2011 there had been limited understanding of the prevalence of alcohol misuse by serving members of the ADF, and there was no published literature that had explored either alcohol use or interventions for managing alcohol use in the ADF. The review highlighted that there was a considerable amount of data stored in many sites throughout the ADF, which was being used primarily for the purpose of managing individual incidents or personnel. This data has not been archived to a central repository for the benefit of policy or practice monitoring, evaluation or planning in a whole-of-defence manner.[7]

The ADF is a subculture of the broader Australian community and, therefore, the ADF shares many of the contributing factors that can lead to potentially harmful alcohol use with the broader Australian community. Nevertheless, in their report on the review, Hamilton et al[7], guided by the terms of reference as previously outlined, identified factors specific to the ADF that could increase the probability of risky and harmful alcohol use. These factors included the age and gender profile of the ADF, with a high population of young (aged less than 25 years) and mostly male (80 to 85%) members. The demographic profile presented from the data examined in the 2011 ADF review is consistent with one of the few recent studies – a small study of an Australian Army combat brigade[59] – that investigated the negative alcohol and tobacco consumption behaviours in the ADF. This study, together with the findings from the 2011 ADF review, highlighted the potential vulnerability of young adults and particularly that of recruits, with the early shaping of drinking behaviour among the recruits as well as the use of alcohol in rituals, celebrations and team-bonding activities.[7] Hamilton et al[7] also highlighted in their report the potential heightened risk of alcohol misuse due to the greater availability and affordability of alcohol in the ADF workplace, which has a culture that accepts, and sometimes expects, higher levels of alcohol use.

Informing the establishment of effective policies to reduce alcohol-related harms through prevention, early intervention, harm reduction and treatment of substance and alcohol use requires knowledge of the prevalence of alcohol use within the ADF. The 2011 review of alcohol use in the ADF highlighted limited systematic analyses of how alcohol has contributed to risk in the ADF and, furthermore, detailed the limited data available concerning alcohol consumption, particularly in

relation to ADF recruits.[7] The panel highlighted the collection of data in 2010 through the ADF Mental Health Prevalence and Wellbeing Study (WHPWS), including the collection of alcohol use data using the AUDIT tool.[60] The panel suggested that the regular collection of data should be possible for the ADF to be able to monitor and respond to such harms in a meaningful way. Following the release of this report, the ADF implemented the Australian Defence Force Alcohol Management Strategy (ADFAMS), with its approach based on evidence drawn from the NDS 2010–2015 and the WHO.[10,55,61]

The ADFAMS was a four-year strategic plan that had been designed to guide the decisive action required for minimising alcohol-related harm in the ADF[17,61] using a stepped-care approach, with interventions being directed towards prevention, early intervention and best-practice treatment and support.[61] All ADF members are required to undertake a suite of mandatory annual awareness training (MAAT) programs. Among them is an annual program in relation to alcohol and other drugs (AOD). This annual awareness training is preferably delivered in a face-to-face format, but it is also made available for online delivery for participants not able to attend a face-to-face program. The face-to-face approach in the RAN is delivered by a defence member who has completed as a minimum a Certificate IV in AOD counselling and may or may not be from a health-related background. ADF members are presented with a standardised set of slides from a PowerPoint presentation. The online version is a self-directed version of the face-to-face content. This annual AOD training is the only mandatory alcohol education and prevention program for ADF members. For the majority of ADF members, this is the extent to which they will be exposed to alcohol education and prevention programs.[7]

In addressing prevention, early-intervention and harm reduction strategies, the ADF and other militaries need to consider that defence members are largely recruited from a broad and dynamic group of older adolescents (aged 17 and 18)[62] and young adults (aged 19 to 30).[62] Richer et al,[32] in their examination of alcohol use among Canadian military personnel, describe a similar age distribution to that of the ADF. They argue that given that many risky or heavy episodic drinkers are less likely to have experienced alcohol-related problems, health promotion and education efforts should focus on promoting responsible alcohol use and creating healthier social norms for drinking.

A systematic review in 2016 that examined the prevention, early intervention, harm reduction and treatment of substance use in young people also identified that most young people using substances generally did not have established drug and substance dependence.[30] In their systematic review, Stockings et al[30] outline the broad implications for harm reduction and even treatment approaches.

They emphasise the unique platforms by which interventions could be delivered to this age group, which includes in educational settings and mobile and online methods, that have far greater uptake in this age group than in the older age groups. These principles may well apply to military recruits.

1.1.7 Summary and Rationale

The use and misuse of alcohol has been, and continues to be, a concern for the ADF and international militaries.[32, 34, 36, 42, 54, 58, 59] The identification of problems concerning alcohol use within the ADF was highlighted by the independent review into the Use of Alcohol in the Australian Defence Force in 2011.[7] Active-duty military, including those of the ADF, represent a group within the population who continue to feature in data related to alcohol use and misuse. Despite this situation, there have been few studies that have examined the issue of alcohol consumption within the ADF, nor how to prevent or manage any associated harms.[37–43] The partnership established between the National Trauma Research Institute and *HMAS Cerberus* created the collaboration that was recommended by the independent review in 2011[7] and, consequently, provided the foundation for undertaking this doctoral program of research.

1.2 Research Aim and Objectives

1.2.1 Research Aim

The overall objective of this thesis was to examine alcohol use among young naval trainees of the Royal Australian Navy and test the effectiveness of an alcohol harm reduction intervention.

1.2.2 Research Objectives

To achieve this aim, the following research objectives were addressed:

1. Determine the feasibility of implementing the Prevent Alcohol and Risk-related Trauma in Youth (P.A.R.T.Y.) program as an intervention in a military population.

2. Examine the effectiveness of the P.A.R.T.Y. Defence program in reducing alcohol consumption and related harms in a military trainee population in a randomised controlled trial (RCT).

3. Review available evidence on workplace-based interventions in military populations for reducing harmful alcohol use.

4. Examine the nature and extent of hazardous/harmful drinking in a military trainee population by screening a cohort of military personnel using the AUDIT, a validated screening tool for hazardous/harmful alcohol use.

1.3 Thesis Overview

This doctoral thesis is presented as a *thesis by publication*, consisting of seven chapters (see Table 1). The remaining chapters (2 to 7) are outlined as follows:

Chapter 2 describes the findings of a retrospective observational pilot study that tested the feasibility of implementing an existing intervention, the P.A.R.T.Y. program, in a military setting for trainees deemed to be at risk from alcohol-related harm. This study was published in *The Journal of Substance Use* and the key findings were used to design a randomised controlled trial of this intervention (Chapter 3).

Chapter 3 provides an overview of the methods used in the randomised controlled trial (RCT). A description of the setting, data sources and study definitions are provided. This chapter also presents the protocol paper for the RCT of the P.A.R.T.Y. program. This manuscript was published in the *BMC Public Health* journal.

Chapter 4 presents the manuscript describing the results of the RCT. This manuscript was published in the *Military Medicine* journal.

Chapter 5 presents the findings of a systematic review that was undertaken to examine the existing evidence that pertained to workplace-based alcohol intervention programs for active-duty military populations. The review included experimental, or quasi-experimental studies, that explored alcohol interventions in the military and was published in the *BMJ Military Health* journal.

Chapter 6 presents a manuscript of the study that explored the performance of the established and novel shortened version of the Alcohol Use Disorders Identification Test (AUDIT) tool for monitoring hazardous/harmful alcohol consumption within ADF. The data for this study was drawn from the baseline AUDIT data collected for the RCT described in Chapters 3 and 4. This manuscript was published in the *BMJ Military Health* journal.

Finally, Chapter 7 presents a consolidated discussion of the findings of this thesis and provides a series of recommendations regarding program implementation and future research to better understand and manage alcohol use in in the ADF.

Table 1

Thesis Structure

Chapter	Title and/or relationship to research objective	Content
1	Introduction	
2	Pilot Study (Research Objective 1) *Journal Article: Piloting an injury awareness and education program for reducing alcohol-related harm in navy trainees*	• Description of the use of the P.A.R.T.Y. program in a military setting. • Description of the impact of the program on participants.
3	Methods (Research Objective 3) *Journal Article: Measuring the effectiveness of in-hospital and on-base Prevent Alcohol and Risk-related Trauma in Youth (P.A.R.T.Y.) programs on reducing alcohol-related harms in naval trainees: P.A.R.T.Y. Defence study protocol*	• Provision of an overview of the thesis methods. • Description of the setting of the research. • Description of the data sources. • Description of the study definitions and measurements. • Description of the aims of the RCT. • Description of the methodology for the RCT.
4	RCT Results (Research Objective 3) *Journal Article: A randomised controlled trial of the Prevent Alcohol and Risk-Related Trauma in Youth (P.A.R.T.Y.) program in reducing alcohol-related harms in young naval trainees*	• Description of the processes undertaken in completing the RCT. • Discussion of the primary and secondary results of the RCT. • Description of the strengths and limitations of the RCT.
5	Systematic Review (Research Objective 4) *Journal Article: Workplace intervention programs for decreasing alcohol use in military personal: A systematic review of the literature*	Systematically describe and evaluate available evidence on workplace-based interventions for reducing alcohol use in military populations.
6	Alcohol Use Disorders Identification Test (AUDIT) (Research Objective 2) *Journal Article: Comparing short versions of the Alcohol Use Disorders Identification Test (AUDIT) in a military cohort*	• Description of the tools used in RCT. • Examination of the feasibility of using a shortened version of the AUDIT (existing or novel) as a screening tool in military populations.
7	Discussion and Conclusion	• Summary of the key findings of the thesis. • Discussion of the strengths and limitations of the thesis. • Discussion of the recommendations based on the key findings.

Chapter 2
Pilot Study

2.1 Overview

Chapter 1 outlined the use of alcohol in the general population, the approaches for reducing alcohol-related harms, the current knowledge regarding alcohol use in the military and some of the challenges pertaining to this population. This chapter describes the conduct and findings of a pilot study that was conducted between 2012 and 2014. The aim of this pilot study was to test the feasibility of implementing a harm reduction program in a military cohort. As noted in Section 1.1.7, the Royal Australian Navy (RAN) partnered with the National Trauma Research Institute (NTRI) to deliver the Prevent Alcohol and Risk-Related Trauma in Youth (P.A.R.T.Y.) program in a military setting. This partnership was established in response to the death of two young sailors, and serious injury to a further two sailors, because of drinking and driving.

The P.A.R.T.Y. program was originally designed for senior secondary school-aged youth within the tertiary trauma hospital setting. This harm minimisation program and the partnership between the NTRI and the ADF also involved delivering the P.A.R.T.Y. program to RAN trainees. Ho et al[63] undertook a retrospective cohort study of juvenile justice offenders following the offenders' participation in the P.A.R.T.Y. program to determine if this program was able to reduce the risk-taking behaviour and consequent injuries in this cohort. Ho et al. did conclude "that this injury prevention program is effective in reducing risk-taking behaviours and injuries in young people who have committed traffic- or violence-related offences". [63 p2] This was of interest to the pilot study and more broadly as the Department of Defence was considering designing an RCT to test the effectiveness of the P.A.R.T.Y program in a military cohort. The contents and details of the P.A.R.T.Y. program intervention are examined in further detail in Chapters 3 and 4 in this thesis.

In this chapter, the findings of the pilot study in relation to the implementation of the P.A.R.T.Y. program are presented. The aim of this study was to

- Describe the use of the P.A.R.T.Y. program in a military setting.
- Describe the impact of the program on participants.

The study was undertaken with the involvement of RAN trainees who were considered to have been "at risk". Pre-and post-program questionnaire responses were compared, and the RAN alcohol-

related incident data for all participants in the 12-month period following their participation in the pilot program was analysed.

2.2 Journal Article

The following paper, *Piloting an injury awareness and education program for reducing alcohol-related harm in navy trainees*, was published in *The Journal of Substance Use* in 2018.

Journal of Substance Use

ISSN: 1465-9891 (Print) 1475-9942 (Online) Journal homepage: http://www.tandfonline.com/loi/ijsu20

Piloting an injury awareness and education program for reducing alcohol-related harm in Navy Trainees

Jason Watterson, Belinda Gabbe, Paul Dietze, Jennifer Thompson, Michael Oborn & Jeffrey V. Rosenfeld

To cite this article: Jason Watterson, Belinda Gabbe, Paul Dietze, Jennifer Thompson, Michael Oborn & Jeffrey V. Rosenfeld (2018) Piloting an injury awareness and education program for reducing alcohol-related harm in Navy Trainees, Journal of Substance Use, 23:1, 74-78, DOI: 10.1080/14659891.2017.1348556

To link to this article: https://doi.org/10.1080/14659891.2017.1348556

Published online: 30 Aug 2017.

JOURNAL OF SUBSTANCE USE
2018, VOL. 23, NO. 1, 74–78
https://doi.org/10.1080/14659891.2017.1348556

Taylor & Francis
Taylor & Francis Group

Piloting an injury awareness and education program for reducing alcohol-related harm in Navy Trainees

Jason Watterson[a,b,c], Belinda Gabbe[a], Paul Dietze[a,d], Jennifer Thompson[a,b], Michael Oborn[e], and Jeffrey V. Rosenfeld[f,g,*]

[a]Department of Epidemiology and Preventive Medicine, School of Public Health and Preventive Medicine, Monash University, Melbourne, Australia; [b]National Trauma Research Institute, Alfred Health, Melbourne, Australia; [c]Royal Australian Navy Reserve, Canberra, Australia; [d]Centre for Population Health, Burnet Institute, Melbourne, Australia; [e]Royal Australian Navy, Canberra, Australia; [f]Department of Neurosurgery, Alfred Hospital, Melbourne, Australia; [g]Australian Army, Canberra, Australia

ABSTRACT

Objectives: Alcohol consumption and associated risk-taking behaviors, are known issues among trainees in the Australian Defence Force. We evaluated the impact and feasibility of a 1 day injury awareness program designed to reduce alcohol-related risk-taking behavior and associated harms in young naval trainees in this pilot study. Method: One hundred eight naval trainees participated in the 1 day Prevent Alcohol and Risk related Trauma in Youth (P.A.R.T.Y.) program at a hospital in Melbourne, Australia between November 2011 and March 2013. Participants completed pre- and postprogram questionnaires, on the day of the program, that included questions on perceptions of the program and their own risk-taking behavior. Alcohol-related incidents reported on their military record were collected at 12 months postprogram. Pre- and postprogram questionnaire responses were compared using descriptive statistics. Survival analysis was used to assess the association between pre-program alcohol-related incidents and the rate of reporting of alcohol-related incidents in the 12 months after the program. Results: Fifty of the 108 (46%) participants were reported for ≥1 alcohol-related incident prior to study participation. Fifteen (14%) were reported for an alcohol-related incident within 12 months of completing the program. Participants perceived the program positively with 92% reporting that the program would definitely influence their behavior after program completion compared to 82% suggesting so before. The rate of reported alcohol-related incidents following the program was higher for participants who had a preprogram incident on record than those who did not. Conclusion: Our findings suggest that PARTY participation was associated with a change in participants' perceptions of risk-taking behavior. We found that alcohol-related incidents after attending the P.A.R.T.Y. program occurred more frequently among participants who had prior alcohol-related incidents suggesting the program may have less impact on this group. Further work is required to establish effectiveness of the P.A.R.T.Y. program in the military setting.

ARTICLE HISTORY
Received 19 December 2016
Revised 30 May 2017
Accepted 20 June 2017

KEYWORDS
Alcohol; awareness; ethanol; military personnel; risk-taking

Introduction

The Australian Defence Force (ADF) targets "risk takers" in their marketing campaigns,recruiting drives, and orientation programs as the best profile of a young person to defend the country (Hamilton, 2011). These types of personal characteristics of trainees and the structural characteristics of their living conditions (i.e., living on-base) suggest greater potential for alcohol-related harm in ADF trainees compared to the general population. There is therefore a need to address alcohol consumption in the ADF, as this relates to the experience of harms (Hamilton, 2011). However, there is a paucity of literature describing the feasibility and effectiveness of programs for reducing alcohol-related harm specifically developed for the defense force setting. One possibility in this regard is to adapt and use awareness programs that have been developed and tested in civilian populations (Agabio et al., 2015; Banfield, Gomez, Kiss, Redelmeier, & Brenneman, 2011; Ho et al., 2012). The Prevent Alcohol and Risk-related Trauma in Youth (P.A.R.T.Y.) program is a trauma prevention and health promotion initiative that seeks to build resilience in participants as they experience the workings of a major trauma service, aiming to effect change in the perception that traumatic injury will not happen to them (Banfield et al., 2011). While previously demonstrated to reduce recidivism in juvenile justice young offenders (Ho et al., 2012), whether the P.A.R.T.Y. program could be implemented and be effective in a military setting is not known. We aimed to (i) pilot the implementation of the P.A.R.T.Y. program in a military setting; and (ii) explore the impact of the program on participant perceptions of risk-taking and subsequent alcohol-related incidents in a cohort of at risk defense recruits.

Methods

Design

A prospective pilot study comparing pre- and postintervention measures in Royal Australian Navy (RAN) trainees deemed "at risk" was used to evaluate the impact of the P.A.R.T.Y. program.

CONTACT Jason Watterson Jason.watterson@monash.edu Level 5, 99 Commercial Road, Melbourne, Victoria 3004, Australia.
*Present address: Department of Surgery, F. Edward Hebert School of Medicine, Uniformed Services University of Health Sciences, Bethesda, MD, USA.

Ethics approval

Ethics approval was obtained from the Australian Defence Human Research Ethics Committee (HREC) and the Alfred Health HREC.

Setting

Participants were based at Her Majesty's Australian Ship (HMAS) Cerberus naval base on the Mornington Peninsula, Victoria. The intervention took place at the Alfred hospital trauma center 45 km from the base. The HMAS Cerberus trains approximately 6000 personnel annually (800 on-base at any one time). These trainees undertake their specialist training within one of five faculties; Engineering, Seamanship, Defence Force School of Signals, Supply and Health, and the School of Music.

Participants

Participants were eligible to participate if they met any of the following criteria:

(i) Posted to any HMAS Cerberus faculty
(ii) Deemed "at risk" by their divisional staff as a result of disciplinary action
(iii) Deemed "at risk" as a result of an alcohol-related offence assessed as either level 1 or 2 by the Royal Australian Navy, Alcohol and Drug Program Coordinator (RAN ADPC) (Richardson & Hurley, 2013).

Naval trainees under disciplinary or administrative action likely to result in their removal from the service, and those expected to be at HMAS Cerberus for less than 3 months following recruit school, were excluded.

Procedures

Participant recruitment

One hundred eight RAN trainees deemed "at risk" either as a result of a formal report for an alcohol-related incident or serious concerns raised by divisional officers (supervisors). Participants identified by these criteria were ordered by their military superiors to attend the P.A.R.T.Y. program; the exception being participants who had been exposed to trauma in the preceding 3 months (in line with the P.A.R.T.Y. program standard operating procedures).

Measures

The P.A.R.T.Y. program questionnaires, whilst not formally validated, are currently used at all Australian P.A.R.T.Y sites. The preprogram questionnaire included questions about the participants' frequency of alcohol consumption, as well as questions about risk-taking behavior and perception of risk taking related to a series of listed activities. Four risk-related behavior questions were consistent in both questionnaires:

(i) Imagine you are a driver/passenger in a car and you are not wearing a seatbelt. Do you think you would be injured if the car crashed? (not at all, not really, probably or definitely).
(ii) Do you think you are likely to be injured in some way if you took part in a physically risk-taking activity? (not at all, not really, probably or definitely).
(iii) Do you think the P.A.R.T.Y. program will make a difference to the way you think about your actions in the future? (not at all, not really, probably or definitely).
(iv) It's a Saturday night and you go out with mates. You are driving. You all drink various amounts of alcohol. You are probably over the legal limit to drive. Would you risk it and drive your car back to base? (yes, maybe, or definitely not).

The secondary outcome measure was alcohol incidents 12 months postparticipation in the P.A.R.T.Y. program. This data was available through the RAN as a result of mandatory reporting for all personnel

P.A.R.T.Y. program delivery

For this study, the P.A.R.T.Y. team (a group of health professionals working in the trauma setting) from trauma center delivered a full day, inhospital, educational program involving presentations from health professionals and encounters with trauma patients and their families, tours through the wards and critical care areas of the hospital, and hands on rehabilitation (Banfield et al., 2011). Each participant attended the program once (meaning the intervention was administered on four occasions in total). All participants completed the P.A.R.T.Y. program's pre- and postprogram questionnaires.

Data analysis

Frequencies and percentages (and 95% confidence intervals) were used to show the pre- and postprogram responses to selected questions from the P.A.R.T.Y. questionnaire. For the first three questions used in the comparison, responses were dichotomized to not at all/not really versus probably/definitely. The fourth question was dichotomized as no/maybe versus yes.

The number of, and time to, alcohol-related incidents amongst participants, as recorded by the RAN ADPC based at HMAS Cerberus, within 12 months of completing the program was assessed. All RAN personnel are required to report civilian police charges to the RAN, and all alcohol-related offences occurring on base are recorded in personnel files. The log rank test for equality of survivor function was used to compare the time to an alcohol-related incident postprogram between participants who had an alcohol-related incident on record prior to the program with participants who had no recorded incident prior to the program. Censoring at the 12 month postprogram date was used. Kaplan-Meier curves were used to show the rate of reported alcohol incidents between the groups. Analyses were performed using Stata version 12 and $p < 0.05$ was considered statistically significant.

Results

One hundred and eight participants completed the program; 86 (80%) were men and 22 (20%) were women. The median age of participants was 21 (range 17–32) years. On the

preprogram questionnaire, 63% of participants reported consuming alcohol 1–3 times per week, while the remainder reported consuming alcohol 1–2 times per month or less.

Fifty of the 108 (46%) participants were reported for at least one alcohol-related incident prior to participation in the study. Of the 108 trainees who participated in the program, 15 (14%) trainees were reported for at least one alcohol-related incident within 12 months of completing the program. Three participants (3%) were reported twice in this timeframe (Table 1). The rate of reported alcohol-related incidents following the program was higher for participants who had a preprogram incident on record (Figure 1, p = 0.02).

Pre- and postprogram questionnaires

The pre- and postprogram questionnaires were completed by 98% of participants. Table 2 shows the percentages of participants responding in the affirmative (probably/definitely) in the pre- and postprogram questionnaires. Question 1, which asked participants before and after the program if they thought the program would influence their actions in the future resulted in the highest change in responses by participants, with most shift in response occurring in males aged 17–19 years (Table 2).

There was little change evident in the percentage of affirmative answers to the second question which asked participants if they thought they would be injured in a car crash if they were a driver/passenger in a car and not wearing a seatbelt, but almost all participants responded in the affirmative. Similarly, questions 3 and 4 demonstrated only a small change in affirmative response in the postprogram questionnaire.

Discussion

This pilot study shows that the P.A.R.T.Y. program was able to be delivered within a military setting, with strong commitment evidenced by staff and trainees from HMAS Cerberus attending the four programs included in this pilot study. Fifteen participants in the program went on to have a reportable alcohol-related incident in the 12 months after participating in the program, and the rate of reportable offences during follow up was significantly higher in the group with previous incidents on their record. Ninety-two percent of participants reported after the program, that the P.A.R.T.Y. program would probably/definitely make a difference to how they think about their actions in the future, compared to 82% of participants prior to the program. The findings of this study show that delivering the P.A.R.T.Y. program to a military cohort is not only feasible, but that there is an immediate impact on the participants' perceptions of risk, and 92% of participants believed that participation in the program would make a difference in the future.

Of note, however, was that the rate of postprogram reported incidents in the "at risk" group without a previous alcohol incident was low, comparable to the wider trainee group, whereas reported incidents occurred more frequently in the group with a previous alcohol-related incident on record. This finding could suggest that educational programs such as P.A.R.T.Y. may be best suited to individuals who have not previously had an alcohol-related incident. Our findings contrast with those of Ho and colleagues, (2012) who demonstrated a reduction in alcohol related traffic and

Table 1. Number of postprogram incidents by preprogram incident grouping.

		No incident preprogram (n = 58)		Incident preprogram (n = 50)		All participants (n = 108)	
		n	% (95% CI)	*n*	% (95%CI)	n	% (95% CI)
Post-program incident	No	54	93 (86–100)	39	78 (67–90)	93	86 (80–93)
	Yes	4	7 (0.4–14)	11	22 (11–34)	15	14 (7–20)

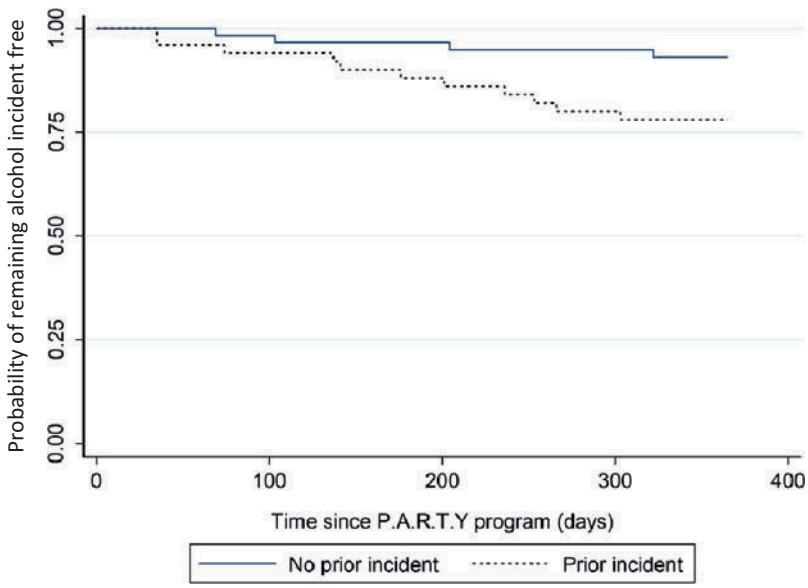


Figure 1. Kaplan–Meier survival curves for time to alcohol-related incident postparticipation in P.A.R.T.Y. program according to prior incident category.

Table 2. Distribution of affirmative (probably/definitely) responses across age, gender, and preprogram incident categories for pre- and postprogram questionnaires.

		1. Do you think the P.A.R.T.Y program will make a difference to the way you think about your actions in the future? Response: Probably/Definitely				2. Imagine you are a driver/passenger in a car and you are not wearing a seatbelt. Do you think you would be injured if the car crashed? Response: Probably/Definitely				3. Do you think you are likely to be injured in some way if you took part in a physically risk-taking activity? Response: Probably/Definitely				4. It is a Saturday night and you go out with your mates. You are driving. You all drink various amounts of alcohol. You are probably over the legal limit to drive. Would you risk it and drive your car back to base? Response: Probably/Definitely			
		Before *n*	Before % (95% CI)	After *n*	After % (95% CI)	Before *n*	Before % (95% CI)	After *n*	After % (95% CI)	Before *n*	Before % (95% CI)	After *n*	After % (95% CI)	Before n	Before % (95% CI)	After n	After % (95% CI)
All cohort	*n* = 108	87	82 (75, 89)	97	92 (86, 97)	105	99 (97, 100)	106	100 (100, 100)	89	84 (77, 91)	98	93 (88, 98)	89	84 (77, 91)	98	93 (88, 98)
Gender	Male	66	79 (70, 86)	75	89 (83, 95)	83	99 (97, 100)	84	100 (100, 100)	68	81 (74, 88)	76	92 (87, 97)	68	81 (74, 88)	77	89 (83, 95)
	Female	21	95 (91, 99)	22	100 (100, 100)	22	100 (100, 100)	22	100 (100, 100)	21	95 (91, 99)	22	100 (100, 100)	21	95 (91, 99)	22	100 (100, 100)
Age group	17–19 y	23	85 (78, 92)	27	100 (100, 100)	27	100 (100, 100)	27	100 (100, 100)	21	78 (70, 86)	25	96 (92, 100)	21	78 (70, 86)	26	96 (92, 100)
	20–21 y	32	91 (86, 97)	33	94 (90, 99)	35	100 (100, 100)	35	100 (100, 100)	30	86 (79, 93)	33	94 (89, 99)	30	86 (79, 93)	31	89 (79, 99)
	22 + y	32	71 (58, 84)	36	80 (68, 92)	42	93 (86, 100)	43	95 (87, 100)	37	82 (71, 93)	39	87 (77, 97)	37	82 (71, 93)	40	89 (80, 98)
Pre-program incident	No	49	86 (79, 93)	54	95 (90, 99)	57	100 (100, 100)	57	100 (100, 100	51	89 (83, 95)	56	100 (100, 100)	52	90 (82, 98)	57	98 (94, 100)
	Yes	38	78 (70, 86)	43	88 (81, 94)	48	98 (95, 100)	49	100 (100, 100)	38	76 (64, 88)	42	84 (74, 94)	38	76 (64, 88)	42	84 (74, 94)

violence offences post attendance at the P.A.R.T.Y. program in a group of juvenile justice offenders sentenced by court magistrates (Ho et al., 2012). This difference suggests the need for further evaluation of the effectiveness of the program overall, with a specific focus on subgroups of the trainee such as those reported for alcohol-related incidents. Future studies should address the cost-effectiveness of the program in the defense force setting prior to recommendation of widespread uptake.

Our study was limited by its observational nature and relatively small sample size. Nevertheless, this pilot project showed that the P.A.R.T.Y. program could be delivered in a military setting and these preliminary findings suggest a positive response from participants to the program. Further research is required to fully assess the effectiveness of the P.A.R.T.Y. program for preventing injury related to risk-taking behavior, in particular alcohol-related harms in the broader military population. A three arm RCT using the P.A.R.T.Y. program as a intervention in two arms is now underway. This RCT includes the use of two validated questionnaires the Alcohol Use Disorders Identification Test (AUDIT) and the Modified Drinking Motives Questionnaire – Revised (MDMQ-R) as well as a nonvalidated tool with questions based on the FARE alcohol poll and the recommendation from the report by Hamilton (2011), "The use of Alcohol in the Australian Defence Force."

Acknowledgments

The authors would also like to acknowledge the participants of the study, along with their instructors and supervisors who enabled their participation. We thank the command team of HMAS Cerberus for their support of this program. We also thank the P.A.R.T.Y. program team, and the team at the NTRI for their contributions to the program.

Funding

This project was funded by a Defence Health Foundation establishment grant. Belinda Gabbe was supported by a National Health and Medical Research Council (NHMRC) Career Development Fellowship (GNT1048731) and Paul Dietze is an NHMRC Senior Research Fellow.

References

Agabio, R., Trincas, G., Floris, F., Mura, G., Sancassiani, F., & Angermeyer, M. C. (2015). A systematic review of school-based alcohol and other drug prevention programs. *Clinical Practice and Epidemiology in Mental Health: CP & EMH*, 11(Suppl 1 M6), 102–112. doi:10.2174/1745017901511010102

Banfield, J. M., Gomez, M., Kiss, A., Redelmeier, D. A., & Brenneman, F. (2011). Effectiveness of the P.A.R.T.Y. (Prevent Alcohol and Risk-related Trauma in Youth) program in preventing traumatic injuries: A 10-year analysis. *Journal of Trauma-Injury Infection & Critical Care*, 70(3), 732–735. doi:10.1097/TA.0b013e31820783a3

Hamilton, M. (2011). The use of alcohol in the Australian defence force (Report of the independent advisory panel on alcohol). Department of Defence, Canberra, Australia.

Ho, K. M., Litton, E., Geelhoed, E., Gope, M., Burrell, M., Coribel, J., … Rao, S. (2012). Effect of an injury awareness education program on risk-taking behaviors and injuries in juvenile justice offenders: A retrospective cohort study. *PLoS One*, 7(2), e31776. doi:10.1371/journal.pone.0031776

Richardson, D., & Hurley, D. J. (2013). *Military Personnel Policy Manual*. Canberra, Australia: Defence Publishing Service. Retrieved from http://www.defence.gov.au/dpe/pac/milpersman.pdf

2.3 Chapter Summary

The findings of this pilot study supported the feasibility of using the P.A.R.T.Y. program in a military population. It demonstrated that the program could be delivered in this setting and showed that the program had an impact on the participants' perceptions of risk. Ninety-two per cent of the participants believed that participation in the program would make a difference for their decision making in the future.

Notably, the study found a significantly higher rate of post-program alcohol-related incidents in participants who had a pre-program alcohol-related incident compared to participants who were deemed at risk but had no alcohol-related incident on their record prior to the implementation of the P.A.R.T.Y. program. While the study confirmed the feasibility of the program's implementation, a shift in the participants' perceptions and belief that the program was useful as well as the effectiveness of the P.A.R.T.Y. program for changing alcohol use patterns and reducing harms could not be ascertained. Establishing the effectiveness of the P.A.R.T.Y. program would, therefore, require an experimental design, and the findings of this pilot study were used to inform the methods for the subsequent randomised controlled trial (RCT) presented in Chapter 4.

Chapter 3
Methods

3.1 Overview

The pilot study presented in the previous chapter established the need to further explore the use of the P.A.R.T.Y. program in a defence setting.[64] The findings highlighted the need for an experimental study that would determine the effectiveness of the P.A.R.T.Y. program in understanding alcohol consumption and its related harms. This chapter provides an overview of the methods that were used to address this research question, which were informed by the findings of the pilot study.[64] In this chapter, a description of the approach to ethical clearance, the study setting, the data sources, the study definitions, and the methods used to analyse the data are detailed and the published protocol is included.

3.2 Research Ethics and Trial Registration

3.2.1 Ethics Approvals

The studies reported in this thesis were approved by the Australian Defence Force Human Research Ethics Committee (739-13; see Appendix A), Alfred Health Human Research Ethics Committee (155/16; see Appendix B) and the Monash University Human Research Ethics Committee (CF14/1667 – 20140007831 see Appendix C).

One of the key considerations when working with the participants in this study was ensuring that there was strict adherence to the NHMRC's National Statement on Ethical Conduct in Human Research. This statement includes a section that relates to working with participants in a dependent or unequal relationship, which has specific relevance to research that is conducted in a military setting. The group of RAN members who consented to participate in this study were junior trainees. Because of their relative youth, it was important that an environment for the consent process was provided that would prevent inadvertent coercion of these trainees to consent. This involved using staff to recruit and obtain the consent of trainees who were not already members of the RAN/ADF and ensuring that no senior RAN staff were in attendance during the consent process.

3.2.2 Trial Registration

The trial was registered with the Australian New Zealand Clinical Trials Registry (ANZCTR): ACTRN12614001332617 (see https://www.anzctr.org.au/Trial/Registration/TrialReview.aspx?ACTRN=12614001332617). Reporting of this study was consistent with the Consolidated Standards of Reporting Trials (CONSORT) statement.

3.3 Participants

3.3.1 Inclusion/Exclusion Criteria

The inclusion and exclusion criteria were informed by the results of the pilot study described in Chapter Two. In the pilot study, trainees who had already been reported for an alcohol-related incident experienced higher rates of alcohol-related incidents following the P.A.R.T.Y. intervention. As a result, it was decided that this cohort would be excluded from the RCT because it was deemed that they needed an intervention tailored to their individual needs and these needs were beyond the scope of the P.A.R.T.Y. program intended for this RCT.

3.4 Journal Article

The following paper, *Measuring the effectiveness of in-hospital and on-base Prevent Alcohol and Risk-related Trauma in Youth (P.A.R.T.Y.) programs on reducing alcohol-related harms in naval trainees: P.A.R.T.Y. Defence study protocol*, was published in the *BMC Public Health* journal in 2017.

Watterson et al. BMC Public Health (2017) 17:380
DOI 10.1186/s12889-017-4330-8

BMC Public Health

STUDY PROTOCOL Open Access

Measuring the effectiveness of in-hospital and on-base Prevent Alcohol and Risk-related Trauma in Youth (P.A.R.T.Y.) programs on reducing alcohol related harms in naval trainees: P.A.R.T.Y. Defence study protocol

Jason Watterson[1,3,5*], Belinda Gabbe[1], Paul Dietze[1,7], Jennifer Thompson[1,3], Michael Oborn[4] and Jeffrey V. Rosenfeld[2,6]

Abstract

Background: Reducing alcohol related harms in Australian Defence Force (ADF) trainees has been identified as a priority, but there are few evidence-based prevention programs available for the military setting. The study aims to test whether the P.A.R.T.Y. program delivered in-hospital or on-base, can reduce harmful alcohol consumption among ADF trainees.

Methods/design: The study is a 3-arm randomized controlled trial, involving 953 Royal Australian Navy trainees from a single base. Trainees, aged 18 to 30 years, will be randomly assigned to the study arms: i. in-hospital P.A.R.T.Y.; ii. On-base P.A.R.T.Y.; and iii. Control group. All groups will receive the routine ADF annual alcohol awareness training. The primary outcome is the proportion of participants reporting an Alcohol Use Disorders Identification Test (AUDIT) score of 8 or above at 12 months' post-intervention. The secondary outcome is the number of alcohol related incidents reported to the Royal Australian Navy (RAN) in the 12 months' post-intervention.

Discussion: This is the first trial of the use of the P.A.R.T.Y. program in the military. If the proposed intervention proves efficacious, it may be a useful program in the early education of RAN trainees.

Trial registration: Australian New Zealand Clinical Trials Registry (ANZCTR): ACTRN12614001332617, date of registration: 18/12/2014 'retrospectively registered'.

Keywords: Military personnel, Awareness, Risk-taking, Alcohol

Background

Almost all societies that consume alcohol experience related health and social problems [1]. Excessive alcohol consumption, and associated harm, is a major contributor to morbidity and mortality in Australia and other developed countries [1–3]. Therefore, interventions to reduce excessive consumption and associated harm are needed.

To reduce the occurrence and cost of substance abuse problems, it is important to intervene early before harmful patterns of substance use are established [4, 5]. One intervention that is commonly used in an effort to reduce alcohol related harm in young people is the P.A.R.T.Y. program. P.A.R.T.Y. is an in-hospital, injury awareness and prevention program which

* Correspondence: Jason.watterson@monash.edu
[1]Department of Epidemiology and Preventive Medicine, School of Public Health and Preventive Medicine, Monash University, Melbourne, Australia
[3]National Trauma Research Institute, Alfred Health, 553 St Kilda Road, Melbourne, VIC 3004, Australia
Full list of author information is available at the end of the article

originated in Canada in 1986, and now operates in over 100 sites around the world.

P.A.R.T.Y. is a full day program that involves interaction, generally of school groups, with emergency services personnel, health professionals, and patients who have experienced trauma and survived. Holding the program within a hospital environment is expected to leave a significant and lasting impression of the consequences of preventable trauma and risk taking behaviours [6, 7] (Additional file 1: Appendixes 1 and 2).

Case-control studies have shown that attendance at P.A.R.T.Y. reduced major trauma presentations in senior school students in Canada [6], and recidivism in juvenile justice young offenders [7]. Further, a pilot cohort study explored the feasibility of delivering the P.A.R.T.Y. program to 108 'at risk' naval trainees, and found that 12 months after program participation, 14% of participants had been reported for an alcohol related incident, with the rate of reported alcohol related incidents following the program higher for participants who had a pre-program incident on record (Watterson, Gabbe, Oborn, Thompson and Rosenfeld: Piloting an injury awareness and education program for reducing alcohol related harm in Navy Trainees, Submitted).

While these observational studies provide promising supporting evidence for P.A.R.T.Y., the efficacy of this program in reducing risk taking behaviour and alcohol related harms has not been established. Our study will test whether participation in either an in-hospital or on-base version of the P.A.R.T.Y. program leads to a reduction in prevalence of risky drinking (hazardous/harmful, measured using the Alcohol Use Disorders Identification Test, AUDIT) [8–10] at 12 months' post-intervention in a randomised controlled trial (RCT). We expect that naval trainees who participate in an on-base, or in-hospital, P.A.R.T.Y program will have a lower prevalence of hazardous or harmful drinking behaviour, compared to naval trainees who do not attend the P.A.R.T.Y. program.

Methods

Setting

Participants for this study will be recruited from Initial Entry Trainees who are completing their specialist training at the RAN's key training establishment in Victoria. The intervention (P.A.R.T.Y.) will be delivered at two settings; at The Alfred ('in-hospital') and at the participating naval base ('on-base').

Ethics approval and trial registration

Ethical approval for the study was obtained from the Australian Defence (739–13), Alfred Health (155/16) and Monash University (CF14/1667–2,014,000,783) Human Research Ethics Committees. The trial is registered in the Australian New Zealand Clinical Trials Registry (ANZCTR) ACTRN12614001332617.

Study design

In this non-blinded RCT, participants will be randomised to one of three arms:

i. In-hospital P.A.R.T.Y. program and annual alcohol and other drugs awareness training;
ii. On-Base P.A.R.T.Y. program and annual alcohol and other drugs awareness training; and
iii. Annual alcohol and other drugs awareness training only (Fig. 1).

Participants and procedure

Inclusion and exclusion criteria

Naval trainees will be eligible for inclusion in the study if they meet the following criteria:

i. Stationed at the participating naval base for training of at least 12 weeks' duration following initial entry training (IET), and;
ii. No alcohol related incident on their service record since joining the RAN.

Procedures

Screening

Participants will be recruited from all initial entry trainees based at the participating naval base. The recruitment process is scheduled from March 2014 to May 2016 and will be conducted by the research project staff. Eligible participants will be provided with a baseline screening pack which includes a participant information and consent form, a copy of the Australian Defence Human Research Ethics Committee – Guidelines for Volunteers information sheet, a demographics form, and three screening questionnaires:

i. Alcohol Use Disorders Identification Test (AUDIT) is a 10-item questionnaire validated in a cross-national study initiated by the World Health Organization (WHO) in 1982 [10]. AUDIT is used to screen for hazardous and harmful drinking, with scores ≥8 typically taken to indicate hazardous or harmful drinking [10–12].
ii. Modified Drinking Motives Questionnaire – Revised (MDMQ-R), first conceptualised in 1988 [13] to describe the motivators for the use of alcohol. The MDMQ-R consists of 28 items, each of these contribute to one of five subscales: social, coping-anxiety, coping-depression, enhancement and conformity; and
iii. P.A.R.T.Y. Defence Attitudes and Behaviours Questionnaire, developed specifically for this study

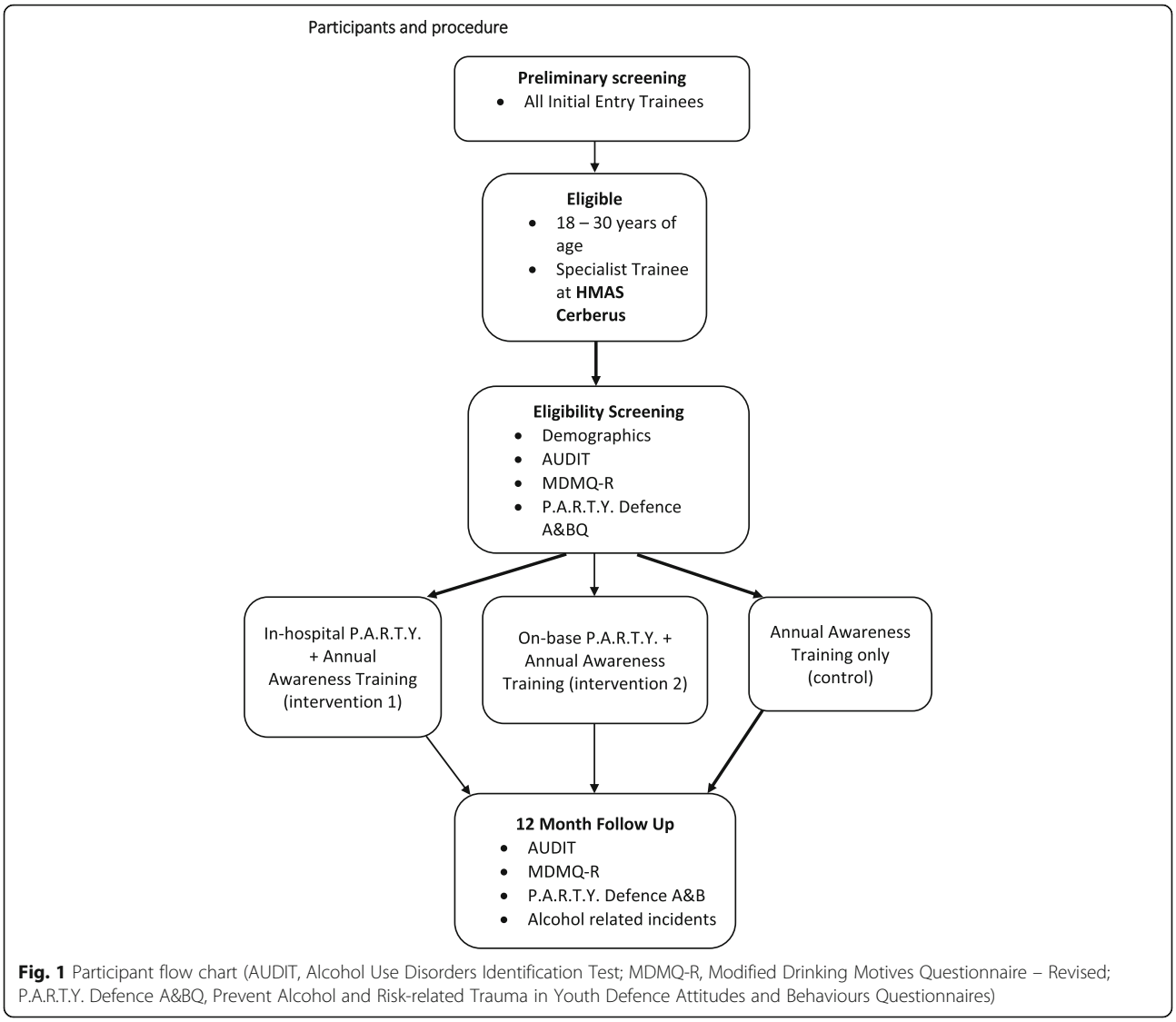


Fig. 1 Participant flow chart (AUDIT, Alcohol Use Disorders Identification Test; MDMQ-R, Modified Drinking Motives Questionnaire – Revised; P.A.R.T.Y. Defence A&BQ, Prevent Alcohol and Risk-related Trauma in Youth Defence Attitudes and Behaviours Questionnaires)

comprising questions stemming from both the annual alcohol poll conducted by the Foundation for Alcohol Research and Education (FARE) and recommendations from the review of the use of alcohol in the Australian Defence Force (ADF) Additional file 1: Appendix 1 [14, 15].

Randomisation

Following completion of consent forms and baseline screening measures, consented participants will be randomly allocated in a 1:1:1 ratio to one of the three trial arms. Randomisation will be stratified by gender in block sizes of 3, 6, 9, 12 or 15 patients. Randomisation will take place at an individual level. The allocation will be performed by a designated person not involved in the conduct of the programs, measurement of the outcomes, or analysis of the data. An opaque envelope containing computer-generated (RALLOC, Stata12) random intervention allocation will be provided for each participant.

Blinding

Given the nature of the intervention, it is not feasible to blind the participants to their group assignment. However, the P.A.R.T.Y. programs will be delivered independent of the research team, limiting the potential for the study to influence program content and conduct. Project personnel involved in randomisation will not participate in collection of outcomes data for the study cohort, conversely the personnel involved in collecting baseline and 12 month follow up data will not be involved in the randomisation of participants.

Sample-size calculation

Similar studies have not previously been conducted in the ADF setting. Therefore, we based the effect-size on

unpublished data provided on request from the RAN summarising the AUDIT scores and alcohol incident rates of RAN personnel. Published data show 1 in 5 (20%) ADF personnel report an AUDIT score of 8 or above, which represents hazardous or harmful alcohol consumption behaviour [15]. Our study was powered to detect an 8% lower prevalence of moderate to high risk behaviour (AUDIT score 8+) in the intervention groups relative to the control group with 80% power. To achieve this, 284 participants in each group is needed and this will be increased to 310 per group to allow for a 10% loss to follow-up.

Study groups

In-hospital P.A.R.T.Y.

The In-Hospital P.A.R.T.Y. is a full day (6 h) harm minimisation and prevention program. Additional file 1: Appendix 2 describes the schedule of the in-hospital program. At the commencement of the program participants are provided with context talks from various health professionals, followed by interactive tours of the trauma centre, Intensive Care Unit and a ward area. These tours are facilitated by clinical staff in the areas and, in the case of the ICU and ward area, the participants also spend time with a family or patient. The afternoon is spent with Allied Health professionals who describe/show the effects of trauma to help participants better understand the consequences of disability following trauma. Overall, the program is designed to provide pertinent information to participants in order for them to be more aware of injury-producing situations, make informed prevention-orientated choices, and adopt behaviours and actions to minimise risk of injuries [7].

On-base P.A.R.T.Y.

The on-base P.A.R.T.Y. program is a four-hour adaptation of the in-hospital program. The content is consistent with the in-hospital program but the program is delivered by health professionals and trauma survivors, with the aid of simulation, in the health centre at the participating naval base. Additional file 1: Appendix 3 describes the schedule of the on-base program.

Annual awareness training

The ADF delivers a number of mandatory training modules to all personnel annually. One of these is an annual alcohol and other drug awareness program. The alcohol and other drug annual awareness training module is delivered by a designated and trained Alcohol and Other Drugs Program counsellor. This training typically consists of a PowerPoint presentation outlining the ADF/RAN responsibilities for all members and the organisation in relation to the sales and consumption of alcohol. The presentation takes approximately 1 h and is currently delivered as a face-to-face presentation.

Measures

Primary outcome

The primary outcome measure will be the proportion of participants reporting an AUDIT score of 8 or above at 12 months' post-intervention.

Secondary outcomes

The secondary outcome measure will be the number and time to alcohol related incidents in the 12 months' post-intervention. All participants will be able to be followed up as a result of the ADF's requirement of all members to report all civilian legal actions against them. This includes alcohol related offences.

Data analysis

Data will be analysed on a per-protocol and intention to treat basis. Summary statistics will be used to describe the difference between groups and ascertain if balance of groups has been achieved through the randomisation process. Frequencies and percentages will be used for categorical variables and mean and standard deviations, or median and inter-quartile range for continuous variables.

The primary outcome will be analysed using a modified Poisson regression model with a robust variable estimator [16]. The relative risk, and 95% confidence intervals (CI) of reporting an AUDIT score of 8 or above in the intervention groups will be calculated relative to the control group. Where necessary, the model will be adjusted for factors not balanced between the groups through the randomisation process.

The secondary outcome will be analysed using a Cox Proportional Hazards regression model assessing time to an alcohol related incident reported to the RAN, with participants not reported for an alcohol related incident censored at 12 months' post-intervention. Where a participant leaves the RAN, these participants will be censored at the date of discharge from the RAN [16–18]. Hazard ratios, and 95% CI will be reported. For both analyses, multivariate models will be used if there is baseline imbalance between the groups.

Discussion

The ADF forms part of a broader Australian community, so many factors that contribute to a potentially harmful drinking culture which exist in ADF are a reflection of those that occur in the broader Australian community [15]. To our knowledge this will be the first RCT investigating the efficacy of the P.A.R.T.Y. program in reducing risky drinking. The study will evaluate the effectiveness of two versions of the P.A.R.T.Y. program in young navy

trainees. The findings of this project will allow evidence-informed decision-making related to further roll out of the program.

Our study is limited by our choice to include only participants who will only recently have joined the RAN, and exclude trainees who will have previously been identified as having had an alcohol related problem. We also acknowledge that whilst we will have recruited from the RAN's largest training base, we are only considering trainees who will remain at this specific base for their ongoing training, missing trainees who will go on to complete their training on other Australian Defence Force bases.

Conclusion

To our knowledge, our study will be the first RCT of the P.A.R.T.Y. since its inception in 1986. This is the first trial of the use of the P.A.R.T.Y. program in the military. Our study will determine the efficacy of two versions of the P.A.R.T.Y. program compared to usual training in a pragmatic RCT. Our design will allow us to make direct comparisons of the effects of the in-hospital program versus the on-base program. If the proposed intervention proves efficacious, it may be a useful program in the training of military personnel to reduce the prevalence of risky drinking behaviours and alcohol related incidents.

Additional file

Additional file 1: Appendix 1. P.A.R.T.Y. Defence Attitudes and Behaviours Questionnaire. Appendix 2. P.A.R.T.Y. Defence In-Hospital Program. Appendix 3. P.A.R.T.Y. Defence On-Base program. (DOCX 1173 kb)

Abbreviations

ADF: Australian Defence Force; AODP: Alcohol and Other Drug Program; AUDIT: Alcohol Use Disorders Identification Test; HMAS: Her Majesty's Australian Ship; IET: Initial Entry Training; MDMQ-R: Modified Drinking Motives Questionnaire – Revised; P.A.R.T.Y. Defence A&BQ: Prevent Alcohol and Risk-related Trauma in Youth Defence Attitudes and Behaviours Questionnaire; P.A.R.T.Y.: Prevent Alcohol and Risk-related Trauma in Youth; RAN: Royal Australian Navy.

Acknowledgements

This project was funded by a Defence Health Foundation booster grant. The authors would also like to acknowledge the participants of the study, along with their instructors and supervisors who enabled their participation. We thank the command team of HMAS Cerberus for their support of this program. We also thank the P.A.R.T.Y. program team, and the team at the NTRI for their contributions to the program. Special thanks to Pam Simpson, statistician School of Public Health and Preventive Medicine, Monash University for her advice and review of the data analysis for this project and the manuscript.

Funding

The RCT was funded by a Defence Health Foundation Booster grant. The foundation had no role in the development of the research or the writing of the manuscript.

Availability of data and materials

The datasets generated and/or analysed during the current study are not publicly available due to the participants being part of the Australian Defence Force, but are available from the corresponding author on reasonable request.

Authors' contributions

JVR, BG, MO, JT and JW designed the study. JVR is the Chief Investigator for this study. JW managed the trial including recruitment and consent for all participants, liaison with the Royal Australian Navy and HMAS Cerberus staff, coordination of participant's attendance at interventions, and 12 month follow up phone calls. JW wrote the first draft of this paper, BG and PD revised the first draft and all authors contributed to successive drafts. All authors read and approved the final manuscript.

Competing interests

JW, BG, JT, MO and JVR declare that they have no competing interests. PD has received an untied educational grant from Reckitt Benckinser and an investigator-driven grant from Gilead Sciences for work unrelated to this paper.

Consent for publication

Not applicable.

Ethics approval and consent to participate

Ethical approval for the study was obtained from the Australian Defence (739–13), Alfred Health (155/16) and Monash University (CF14/1667–2,014,000,783) Human Research Ethics Committees. All participants were provided with a Participant Information and Consent Form (PICF) and a copy of the Declaration of Helsinki. Informed written consent was obtained from all participants in the trial.

Author details

[1]Department of Epidemiology and Preventive Medicine, School of Public Health and Preventive Medicine, Monash University, Melbourne, Australia. [2]Department of Neurosurgery, Alfred Hospital, Melbourne, Australia. [3]National Trauma Research Institute, Alfred Health, 553 St Kilda Road, Melbourne, VIC 3004, Australia. [4]Royal Australian Navy, Canberra, Australia. [5]Royal Australian Navy Reserve, Canberra, Australia. [6]Australian Army, Canberra, Australia. [7]Centre for Population Health, Burnet Institute, Melbourne, Australia.

Received: 11 April 2017 Accepted: 27 April 2017
Published online: 02 May 2017

References

1. Rehm J, et al. Global burden of disease and injury and economic cost attributable to alcohol use and alcohol-use disorders. Lancet. 2009;373:2223–33.
2. Huckle T, Pledger M, Casswell S. Trends in alcohol-related harms and offences in a liberalized alcohol environment. Addiction. 2006;101(2):232–40.
3. Manning M, Smith C, Mazerolle P. The societal costs of alcohol misuse in Australia. Trends Issues Crime Crim Justice. 2013;41(5):1–6.
4. Spooner C, Hall W. Public policy and the prevention of substance-use disorders. Current Opinion in Psychiatry. 2002;15(3):235–9.
5. Botvin GJ. Preventing drug abuse in schools: social and competence enhancement approaches targeting individual-level etiologic factors. Addict Behav. 2000;25(6):887–97.
6. Banfield JM, et al. Effectiveness of the P.A.R.T.Y. (Prevent alcohol and risk-related trauma in Youth) program in preventing traumatic injuries: a 10-year analysis. Journal of Trauma-Injury Infection & Critical Care. 2011;70(3):732–5.
7. Ho KM, et al. Effect of an injury awareness education program on risk-taking behaviors and injuries in juvenile justice offenders: a retrospective cohort study. PLoS One. 2012;7(2):e31776.
8. Foxcroft DR, Kypri K, Simonite V. Bayes' theorem to estimate population prevalence from alcohol use disorders Identification test (AUDIT) scores. Addiction. 2009;104(7):1132–7.
9. Patton R, Boniface S. Prevalence of hazardous drinking among UK 18-35 year olds; the impact of a revision to the AUDIT cut score. Alcohol Alcohol. 2016;51(3):281–2.
10. Babor T, et al. The alcohol use disorders Identification test: guidelines for use in primary care. 2nd ed. Geneva: World Health Organization, Department of Mental Health and Substance Dependence; 2001.

11. Saunders JB, et al. Development of the alcohol use disorders Identification test (AUDIT): WHO collaborative project on early detection of persons with harmful alcohol consumption - II. Addiction. 1993;88:791–804.
12. Schmidt A, Barry K. L., and M. Fleming, F., *Detection of problem Drinkers: The Alcohol Use Disorders Identification Test (AUDIT)*. South Med J. 1995;88(1):52–9.
13. Cox WM, Klinger E. A motivational model of alcohol use. J Abnorm Psychol. 1988;97(2):168–80.
14. FARE, *Foundation for Alcohol Research and Education Annual Alcohol Poll: Attitudes and Behaviours*. 2014, Foundation for Alcohol Research and Education.
15. Hamilton M. The use of alcohol in the Australian Defence Force. Report of the independant advisory panel on alcohol: Commonwealth of Australia; 2011.
16. Zou G. A modified Poisson regression approach to prospective studies with binary data. Am J Epidemiol. 2004;159(7):702–6.
17. StataCorp. Stata: release 13, in statistical software. College Station, TX: StataCorp LP; 2013.
18. van Dijk P. C., et al., *The analysis of survival data in nephrology basic concepts and methods of cox regression*. Kidney Int. 2008;74:705–9.

3.5 Chapter Summary

In this chapter, the study methods used for the RCT were described. Like all research, the attention to detail in the planning of all aspects was pivotal to the subsequent smooth undertaking of the recruitment; the conduct of the intervention(s); the collection of the data (both at baseline and follow-up); the analysis of the data; and the reporting of the findings. The prior publication of such protocols was important scientifically to ensure that the researchers were accountable to the participants, the funders, the ethical review boards, and the readers of the study findings.

Chapter 3 has provided an overview of the methods used to address the research objectives for the RCT and this doctoral thesis. In this chapter, the study protocol that was developed specifically for the main RCT study of this thesis was outlined. The manuscript included the study setting, the intervention, the ethical approval process, and the rationale for the selection of the tools used for measurement, together with the statistical methods proposed to be used. The reporting of the study was in line with the CONSORT statement.

Chapter 4
RCT Results

4.1 Overview

Chapter Three provided an overview of the methods, which included the RCT protocol that had been developed to address the research objectives for the RCT and this doctoral thesis. In this chapter the results of the RCT that was conducted between March 2014 and December 2017 and involved 952 RAN trainees are reported. The accepted manuscript for the journal describes the use of the P.A.R.T.Y. program with a cohort of RAN trainees. Prior to this study, the P.A.R.T.Y program had not been used in a military cohort and had not been used in an RCT in either a civilian setting or military setting.

4.2 Journal Article

The following paper, *A randomised controlled trial of the Prevent Alcohol and Risk-Related Trauma in Youth (P.A.R.T.Y.) program in reducing alcohol-related harms in young naval trainees*, was published in the *Military Medicine* journal in 2021.

A Randomized Controlled Trial of the Prevent Alcohol and Risk-Related Trauma in Youth Program in Reducing Alcohol-Related Harms in Young Naval Trainees

LCDR Jason R. Watterson, MEd, RAN[*,†,‡]; *Belinda Gabbe, PhD*[*,§]; *Paul Dietze, PhD*[*,‖]; *Maj Gen Jeffrey V. Rosenfeld, MD, Australian Army, MC (Ret.)*[¶,**,††]

ABSTRACT

Background:

The aim of this study was to test whether participation in an alcohol risk reduction program known as Prevent Alcohol and Risk-Related Trauma in Youth (P.A.R.T.Y.) is effective in reducing the prevalence of risky drinking at 12 months' post-intervention in a sample of Royal Australian Navy (RAN) trainees.

Methods:

A non-blinded randomized controlled trial of 952 RAN trainees comparing two forms of P.A.R.T.Y. plus RAN annual alcohol and other drug awareness training with annual alcohol and other drugs awareness training only (Control). Participants were screened at baseline and at 12-month follow-up using the Alcohol Use Disorders Identification Test (AUDIT). Participants were randomized to one of three arms: (1) in-hospital P.A.R.T.Y program, (2) on-base P.A.R.T.Y. program, or (3) control.

The primary outcome measure was the percentage of participants reporting an AUDIT score of 8 or above at 12 months in each group. A secondary outcome considered was reports of alcohol-related incidents in the 12-month follow-up.

Results:

There was no difference in the risk of reporting an AUDIT score of 8 or above in either the in-hospital (Relative Risk (RR) 0.96, 95% CI: 0.75-1.23; $P = .75$) or on-base (RR 1.11, 95% CI: 0.89-1.369; $P = 0.35$) intervention groups, compared to the control group. Compared to the on-base group, there was no difference in the risk of reporting an AUDIT score of 8 or above in the in-hospital group (RR 1.16, 95% CI: 0.90-1.48; $P = .24$). The rate of reporting an alcohol-related incident was not different for the in-hospital (Hazard Ratio (HR) 0.60, 95% CI: 0.27-1.33; $P = .21$) or on-base (HR 0.50, 95% CI: 0.21-1.16; $P = .11$) intervention groups when compared to the control group.

Conclusion:

Participation in either an on-base or an in-hospital P.A.R.T.Y. program did not affect the proportion of naval trainee participants screening positive for risky drinking on the AUDIT.

INTRODUCTION

The harmful use of alcohol globally causes approximately 3.3 million deaths each year, with 5.1% of the global burden of disease attributed to alcohol consumption.[1] High-income countries such as Australia continue to experience health-related and social problems as a result of harmful alcohol consumption.[2–4] The World Health Organization (WHO) global strategy defines "harmful use" of alcohol as "drinking that causes detrimental health and social consequences for the drinker, the people around the drinker and society at large."[1]

A number of high-risk populations for harmful drinking have been identified, including construction industry workers, university and college students, and military or defense personnel. Each population has been associated with harmful drinking and, in particular, heavy episodic drinking (HED).[5] These populations share many common characteristics. They are typically young and may be for the first time managing their own money and establishing longer-term intimate relationships and new post-school social networks.[6] This transition period or developmental stage may include experimenting with alcohol and/or other drugs.[5] Notably, the construction and military populations are also predominantly male, with high-risk drinking and the consequent disability-adjusted life years attributable to alcohol higher in men than in women.[4]

[*]Department of Epidemiology and Preventive Medicine, School of Public Health and Preventive Medicine, Monash University, Melbourne, VIC 3004, Australia

[†]Royal Australian Navy, Canberra, ACT 2600, Australia

[‡]Department of Intensive Care Medicine, Frankston Hospital, Peninsula Health, Frankston, VIC 3199, Australia

[§]Health Data Research, Swansea University Medical School, Swansea SA1, UK

[‖]Behaviours and Health Risks Program, Burnet Institute, Melbourne 3004, Australia

[¶]Department of Neurosurgery, Alfred Hospital, Melbourne, VIC 3004, Australia

[**]Australian Army, Canberra, ACT 2600, Australia

[††]Department of Surgery, F. Edward Hebert School of Medicine, Uniformed Services University of Health Sciences, Bethesda, MD 20810, USA

All authors: C/- SPHPM, Monash University, 553 St Kilda Road, Melbourne, Victoria 3004, Australia.

doi:https://doi.org/10.1093/milmed/usab444

The U.S. military, like many other of the world militaries, have made progress in the past decade in reducing tobacco and illicit drug use among their personnel.[7,8] However, significant problems persist in the military with the use of alcohol.[9,10] Data obtained during a review of the nature and extent of alcohol use and associated problems in the Australian Defence Force (ADF) suggest that 26% of ADF members report consuming alcohol at hazardous or harmful levels.[6] Therefore, interventions to reduce excessive consumption and any associated harms are needed. The available literature related to alcohol harm reduction interventions including that which specifically examines alcohol use in the military covers many types of interventions which could have been used in this population.[11] However, as the base command team had already developed a working relationship with the Prevent Alcohol and Risk-related Trauma in Youth (P.A.R.T.Y.) program team, they ultimately decided to continue with this program. As a result, this was the program evaluated in this study.

Early intervention, before hazardous or harmful patterns of substance use are established, is needed to reduce the occurrence and cost of substance use problems.[12,13] The P.A.R.T.Y. program was developed with the aim of reducing alcohol-related harm in young people. The P.A.R.T.Y. program has been introduced into many trauma centers around the world. The program involves interaction between program participants and emergency services personnel, health professionals, and patients who have experienced traumatic injury, with the aim of educating participants about the consequences of preventable trauma and risk-taking behaviors.[14,15]

Previous studies of senior school students and juvenile offenders have shown that P.A.R.T.Y. participation was associated with reduced major trauma presentations[14] and lower rates of recidivism,[15] respectively. While these studies suggest benefits arising from P.A.R.T.Y., the efficacy of this program for reducing HED and/or alcohol-related harms has not been established. The aim of this study was to test whether the P.A.R.T.Y. program delivered in-hospital or on-base could reduce the prevalence of hazardous and harmful alcohol consumption among naval trainees.

METHOD

Design

This study was a non-blinded randomized controlled trial, where participants were randomized to one of three arms: (1) in-hospital P.A.R.T.Y program and annual alcohol and other drugs awareness training; (2) on-base P.A.R.T.Y. program and annual alcohol and other drugs awareness training; or (3) annual alcohol and other drugs awareness training only (control).

The full study protocol is published elsewhere and a summary is provided here.[16]

Ethics Approval and Trial Registration

Approval for this trial was received from the Australian Defence (739-13), Alfred Health (155/16), and Monash University (CF14/1667-2014000783) Human Research Ethics Committees. The trial was registered with the Australian New Zealand Clinical Trials Registry: ACTRN12614001332617. Reporting of this study is consistent with the CONSORT statement.

Inclusion Criteria and Recruitment

Participants were recruited from initial entry trainees who were completing their specialist training at the Royal Australian Navy (RAN)'s key training establishment in Victoria, Australia.

Naval trainees were eligible for inclusion in the study if they were stationed at the participating naval base for training of at least 12 weeks following initial entry training and had no alcohol-related incident on their service record since joining the RAN.

PROCEDURES

Screening

Participants were recruited between March 2014 and December 2016. Of the 2,163 initial early trainees screened in this time frame, 1,209 were excluded based on the study criteria, that is they were not posted to the base participating in the study long enough to compete an intervention should they have been randomized to one. A further two trainees were not willing to provide consent. Nine hundred and fifty-two participants consented to participate in this study and completed the baseline questionnaires. They were then randomized to the in-hospital P.A.R.T.Y. group ($n = 321$), the on-base P.A.R.T.Y. group ($n = 317$), or the control group ($n = 314$). All participants were provided with a baseline questionnaire and information pack which included a copy of the participant information and consent form, a copy of the Australian Defence Force Human Research Ethics Committee—Guidelines for volunteer's information sheet, a demographics form, and three questionnaires:

1. Alcohol Use Disorders Identification Test (AUDIT); a 10-item questionnaire validated in a cross-national study initiated by the WHO in 1982.[17] The AUDIT is used to screen for hazardous and harmful drinking, with scores ≥ 8 typically indicative of hazardous or harmful drinking.[17–19]

The following questionnaires were administered at baseline and at 12-month follow-up but are not reported in this paper. Data collected from these questionnaires will be published in future work.

1. Modified Drinking Motives Questionnaire—Revised[20]
2. P.A.R.T.Y. Defence Attitudes and Behaviours Questionnaire[6,21]

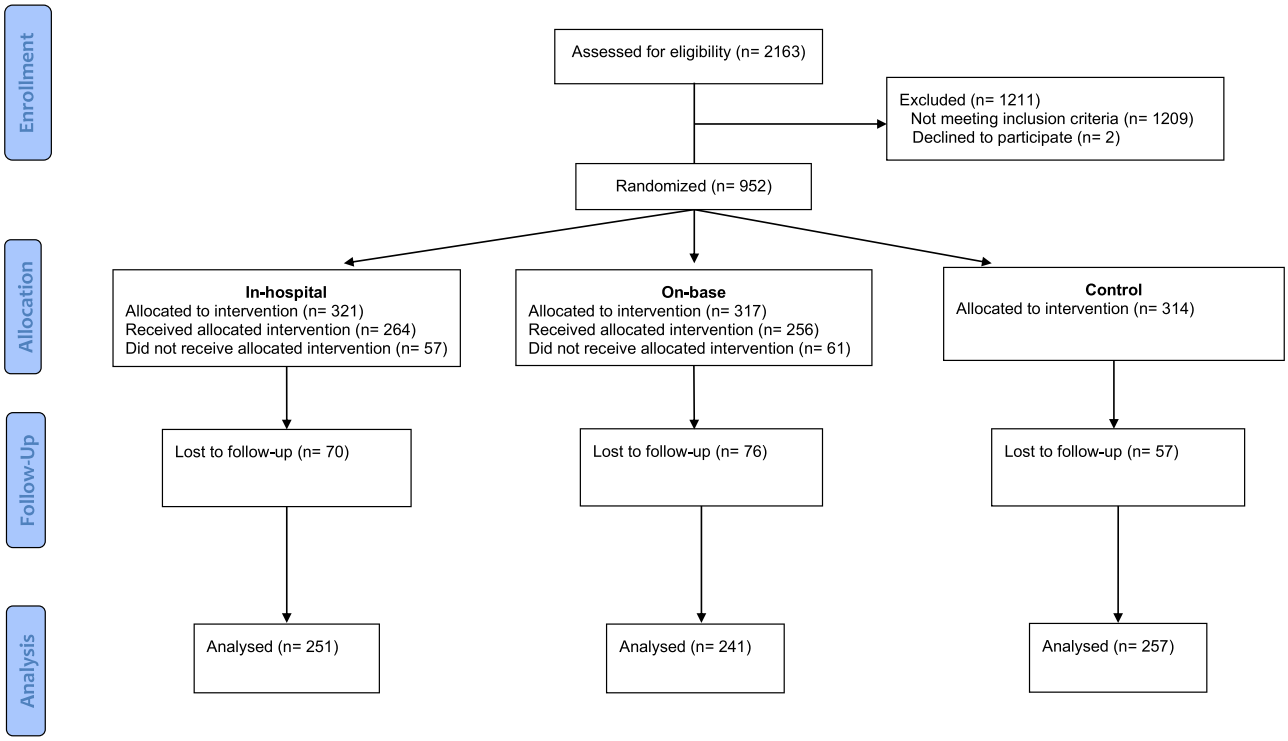


FIGURE 1. Participant flowchart (AUDIT, Alcohol Use Disorders Identification Test; MDMQ-R, Modified Drinking Motives Questionnaire—Revised; P.A.R.T.Y. Defence A&BQ, Prevent Alcohol and Risk-related Trauma in Youth Defence Attitudes and Behaviours Questionnaires).

The questionnaires are described in detail in the published study protocol[16] and were repeated 12 months post-participation in the intervention or 12 months after recruitment for the control group. Figure 1 illustrates the screening and intervention process.

PARTICIPANTS AND PROCEDURES

Randomization and Interventions

Randomization

Consented participants were randomly allocated in a 1:1:1 ratio to one of the three trial arms. Randomization was stratified by gender in block sizes of 3, 6, 9, 12, or 15 participants. Randomization took place at an individual level. The random allocation sequence was generated by the study statistician. A computer-generated (RALLOC, Stata Version 12) random intervention allocation was provided to each participant concealed in an opaque envelope. Study investigators were not involved in the randomization process which was conducted by administrative staff from both the National Trauma Research Institute and the RAN.

In-hospital P.A.R.T.Y. program. Participants randomized to the in-hospital P.A.R.T.Y. program arm were required to attend the in-hospital P.A.R.T.Y. program. This was a 6-hour harm minimization and prevention program conducted within a tertiary trauma hospital involving presentations from trauma clinicians, a tour of key areas of the trauma center, and time spent with a patient or their family member. The overall aim was for participants to become more aware of injury-producing situations, enable them to make informed prevention-orientated choices, and to adopt actions that minimize risk of injury.[15] The full schedule of activities is provided as Supplementary Material.

On-base P.A.R.T.Y. program. The participants randomized to the on-base P.A.R.T.Y. program attended a 4-hour adaptation of the in-hospital program. Located within the health care center of the participating defense force base, the on-base program utilized simulation delivered by health professionals involved in trauma care, and trauma survivors, to convey the same injury awareness messages to the hospital-based program. The On-base version of the program enabled up to 80 participants compared to the 25-30 able to attend the in-hospital version of the program. It was for this reason that the RAN felt it important to test the efficacy of the on-base version compared to the in-hospital version. The full schedule of activities is provided as Supplementary Material.

Annual awareness training. All participants, including the participants randomized to the control group, received the mandatory ADF annual awareness training, an annual alcohol awareness program which all ADF personnel must complete in either a face-to-face session or an online training session. This alcohol awareness session is generally delivered on the same day as other mandatory training sessions.

The annual alcohol awareness training module is delivered by a designated and trained Alcohol and Other Drugs Program counselor. This training typically consists of a PowerPoint presentation outlining the ADF/RAN responsibilities for all members and the organization in relation to the sale and consumption of alcohol.

OUTCOMES

Primary Outcome

The primary outcome measure was the percentage of participants reporting an AUDIT score of 8 or above at 12 months. Previously published data show that 26% of ADF personnel report an AUDIT score of 8 or above, which represents risky/hazardous alcohol consumption behavior.[6]

Secondary Outcomes

The secondary outcome measure was the number of, and time to, alcohol-related incidents at 12 months. ADF members are required to report all civilian legal actions against them, including alcohol-related offenses. These data were made available to the study investigators.

Sample Size Calculation

Similar studies have not previously been conducted in the ADF setting. As such, the effect size was based on unpublished RAN data provided directly to the study investigators. Our study was powered to detect an 8% lower prevalence of moderate- to high-risk behavior (AUDIT score 8+) in the intervention groups relative to the control group with 80% power. To achieve this, 284 participants were needed in each group, and this was increased to 310 per group to allow for a 10% loss to follow-up.

DATA ANALYSIS

Data were analyzed on both an intention-to-treat (ITT) and per-protocol basis. For the ITT analysis, every participant was analyzed according to their randomization assignment, ignoring the fact that some participants did not receive the allocated intervention, by either crossover to another group or not attending the intervention. For the per-protocol analysis, crossovers were analyzed according to the intervention they received. As almost all participants received their intended intervention, we report only ITT here.

Summary statistics were used to describe the difference between groups and ascertain if balance on key characteristics had been achieved through the randomization process. Frequencies and percentages were used for categorical variables, and mean and standard deviations, or median and inter-quartile range for continuous variables, dependent on the distribution.

The primary outcome was analyzed using a log-binomial regression. The relative risk,and 95% CIs of reporting an AUDIT score of 8 or above are reported. The model was adjusted for the baseline AUDIT score as there was an imbalance between the groups at baseline. A modified Poisson regression model with a robust variable estimator was planned[22] to take the place in our registered Analysis of covariance (ANCOVA) analysis. However, it was ascertained that the modified Poisson regression model was not an appropriate fit for the data and a log-binomial regression was used instead.

The secondary outcome was analyzed using a Cox proportional hazards regression model assessing time to an alcohol-related incident reported to the RAN, with participants not reported for an alcohol-related incident censored at 12 months' post-intervention or randomization (control group). Where a participant left the RAN, these participants were censored at the date of discharge from the RAN.[22–24] Hazard ratios and 95% CI are reported.

RESULTS

Overview

Characteristics of the baseline sample are shown in Table I. Most participants were male (80%), with a mean age of 21.5 years (SD 2.8). The RAN describes their specialist training schools using the term "faculty." The three main faculties represented within this cohort are three of the larger specialist training schools within the RAN. They are representative in size to the numbers of specialist sailors subsequently working in other RAN establishments and ships following training. Forty percent of participants screened positive for risky drinking at baseline (AUDIT ≥ 8). There was a balance between the groups for all characteristics except the baseline AUDIT score (Table I).

Intervention Participation

The proportion of participants who completed their allocated intervention was 82% for the in-hospital group and 81% for the on-base group. There were 12 (1.3%) crossovers. This included one (0.3%) crossover from the control arm to the in-hospital intervention arm, five (1.6%) crossed over from the in-hospital intervention arm to the on-base intervention arm, and six (2%) completed the in-hospital program when randomized to the on-base program. This small number of participants who crossed over to non-allocated interventions had no effect on the outcomes measured. In fact, this was such a small number that the results on the ITT and the per-protocol analysis were almost identical. The 18% of participants not able to attend their intervention resulted from training/operational conflicts.

Follow-up

The overall follow-up rate at 12 months was 79% ($n = 747$); 78% ($n = 251$) for the in-hospital group, 76% ($n = 241$) for the on-base group, and 82% ($n = 257$) for the control group. There was no evidence of differential loss to follow-up ($X^2(2) = 1.11$, $P = .57$).

TABLE I. Baseline Characteristics of Young RAN Participants

	In-hospital $n = 314$	No intervention $n = 304$	On-base $n = 301$	*P*-value
Baseline characteristics				
Gender				.99
Male *n* (%)	249 (79)	242 (80)	240 (80)	
Female *n* (%)	65 (21)	62 (20)	61 (20)	
Age (years) mean (SD)	21.7 (2.6)	21.3 (2.9)	21.5 (2.8)	.38
Faculty				.28
Engineers *n* (%)	175 (55.7)	182 (59.9)	190 (63.1)	
Boatswains *n* (%)	70 (22.3)	60 (19.7)	64 (21.3)	
DFSS *n* (%)	55 (17.5)	52 (17.1)	40 (13.3)	
Other *n* (%)	14 (4.5)	10(3.3)	7 (2.3)	
AUDIT at baseline				.003
AUDIT = 0-7 *n* (%)	212 (67)	165 (54)	178 (59)	
AUDIT = 8-40 *n* (%)	102 (33)	139 (46)	123 (41)	

Abbreviations: AUDIT = Alcohol Use Disorders Identification Test, DFSS = Defence Force School of Signals.

TABLE II. Twelve-Month Follow-up of Young RAN Participants

Outcomes at 12 months	In-hospital $n = 314$	No-intervention $n = 304$	On-base $n = 301$
Alcohol-related incidents			
No *n* (%)	304 (97)	288 (95)	293 (97)
Yes *n* (%)	10 (3)	16 (5)	8 (3)
AUDIT at 12 months	$n = 248$	$n = 257$	$n = 242$
AUDIT = 0/7 *n* (%)	179 (72)	171 (66)	155 (64)
AUDIT = 8/max *n* (%)	69 (28)	86 (34)	87 (36)

Abbreviation: AUDIT = Alcohol Use Disorders Identification Test.

Most ($n = 136$) participants lost to follow-up were unable to be contacted, while 35 declined to complete the questionnaire, and one participant died during the follow-up period. The prevalence of reporting an AUDIT score of 8 or above decreased in all groups when compared to baseline (Table II).

Primary Outcome

When adjusted for the imbalance in baseline AUDIT scores or not, there was no difference in the risk of reporting an AUDIT score of 8 or above in either the in-hospital (adjusted RR 0.96, 95% CI: 0.75-1.23; $P = .75$; unadjusted RR 0.83, 95% CI: 0.63-1.08) or on-base (adjusted RR 1.11, 95% CI: 0.89-1.37; $P = .35$; unadjusted RR 1.07, 95% CI: 0.84-1.36) intervention groups, compared to the control group. Compared to the on-base group, there was no difference in the unadjusted or adjusted risk of reporting an AUDIT score of 8 or above in the in-hospital group (adjusted RR 1.16, 95% CI: 0.90-1.48; $P = .24$; unadjusted RR 1.29, 95% CI: 0.99-1.67).

Secondary Outcome

Figure 2 presents the Cox proportional hazards regression for the likelihood of a participant having an alcohol-related incident in the 12 months following the intervention or randomization (control group). The rate of reporting an alcohol-related incident was not different for the in-hospital (HR 0.60, 95% CI: 0.27-1.33; $P = 0.21$) or on-base (HR 0.50, 95% CI: 0.21-1.16; $P = 0.11$), intervention groups when compared to the control group.

DISCUSSION

We examined the efficacy of the P.A.R.T.Y. program in a military population, using two versions of the program: on-base and in-hospital. While the proportion of participants reporting an AUDIT score of 8 or above decreased for all groups between baseline and follow-up, there was no difference between the intervention and control groups in the percentage of participants reporting an AUDIT score of 8 or above at the 12 months of follow-up. This finding suggests that attendance at the P.A.R.T.Y. program did not impact the prevalence of self-reported hazardous or harmful levels of alcohol consumption at 12 months. Further, there was no difference in the rate of alcohol-related incidents reported to the RAN in the first 12 months after program participation. Similarly, we found no significant decrease in alcohol-related incidents in the in-hospital and on-base intervention groups compared to the control group.

Overall, comparison of the findings with the literature is challenging as this appears to be the first RCT to evaluate the effectiveness of the P.A.R.T.Y. program on alcohol consumption behavior overall, and similar interventions have not been trialed in military populations. A number of studies exploring alcohol interventions in the military exist, but most of these explored the use of web-based or face-to-face brief interventions, where the brief interventions were generally based on motivational interviewing techniques.[25,26] Further work on the impact of early screening and targeted intervention also appears warranted based on the results of this study and would be consistent with the recommendation for the ADF from the review of alcohol use in the ADF.[6]

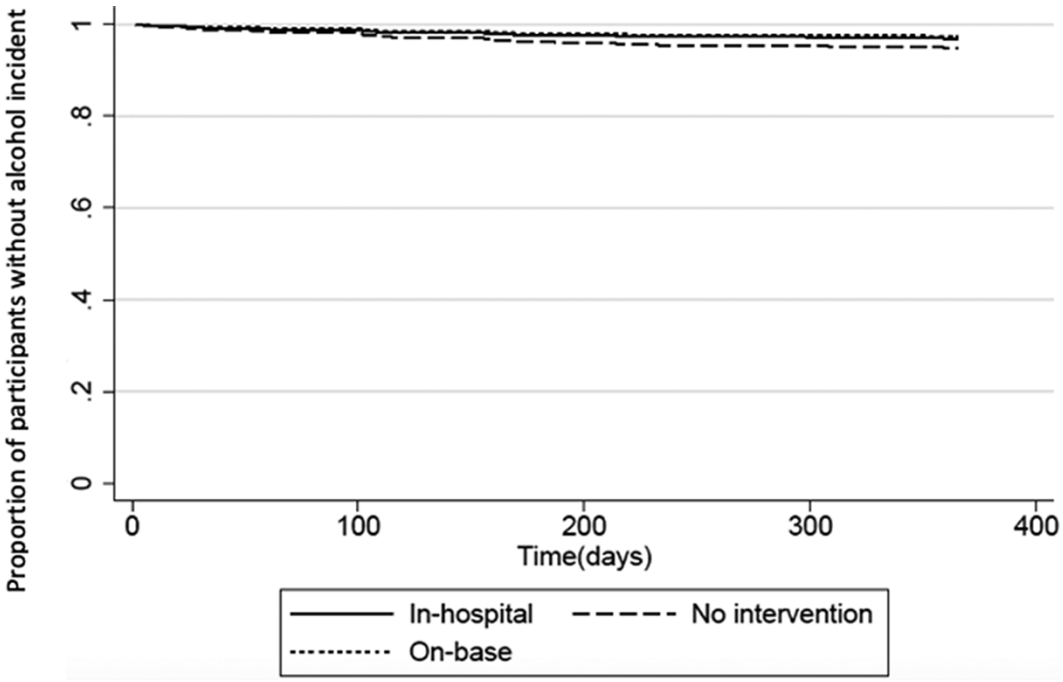


FIGURE 2. Survival curve showing the proportion of participants who were alcohol-incident free in the first 12 months following intervention or randomization (control).

Strengths

As previously indicated, while this study included only a single service within the ADF, we expect that similar findings would emerge in the other two services (Australian Army and Royal Australian Air Force) as they exist in similar cultural domains, and in many cases, members of all three services are in fact working together. This study was representative of the gender mix within the RAN, and participants came from a diverse training background. This study was able to recruit a large number of participants; moreover, over 80% completed the intervention they were randomized to attend. This study also successfully completed 12-month follow-up of over 80% of participants which in the context of the study participants being dispersed across the breadth of Australia and at times with limited availability due to deployments this is evidence participants recognized the value of the study.

Limitations

From the outset, the trial was powered based on unpublished data, which had not undergone rigorous statistical analysis. As such the size of the study may have been under-powered, but effects were not close to achieving statistical significance. The study participants were not able to be blinded as this is an educational intervention and as such there may be a chance that a Hawthorne effect exists as the trainees were living and working together. The study took place in a single site and was limited to one service, specifically the RAN. There is a possibility the primary outcome measure and the use of the AUDIT tool may not have been the most sensitive measure of change in this population.

CONCLUSION

Participation in the P.A.R.T.Y. program, whether delivered on-base or in a hospital setting, did not affect the proportion of naval trainee participants screening positive for risky drinking on the AUDIT. New interventions to reduce hazardous and harmful alcohol use among naval personnel need to be developed and tested.

ACKNOWLEDGMENTS

The authors acknowledge the co-investigators of this study: CDRE Elizabeth Rushbrook RAN, CAPT Michael Oborn RAN, and Ms. Jennifer Thompson for their earlier contributions to this study. The authors would also like to acknowledge the participants of the study, along with their instructors and supervisors who enabled their participation. We thank the command team of HMAS Cerberus for their support of this program. We also thank the P.A.R.T.Y. program team and the team at the NTRI for their contributions to the program. Special thanks to Pam Simpson, statistician School of Public Health and Preventive Medicine, Monash University, for her advice and review of the data analysis for this project and the manuscript.

FUNDING

This project was funded by a Defence Health Foundation Booster grant. B.G. was supported by an Australian Research Council Future Fellowship (FT170100048) during the preparation of this manuscript. P.D. was supported by an NHMRC Fellowship (1136908).

CONFLICT OF INTEREST STATEMENT

J.R.W., B.G., and J.V.R. declare that they have no competing interests. P.D. has received investigator-initiated funding from Gilead Sciences and an untied educational grant from Indivior for work unrelated to this study.

REGISTRATION

The trial is registered in the Australian New Zealand Clinical Trials Registry (ANZCTR) ACTRN12614001332617.

PROTOCOL

The protocol for this study[16] has been published and is available at: https://bmcpublichealth.biomedcentral.com/articles/10.1186/s12889-017-4330-8.

REFERENCES

1. Global status report on alcohol and health 2018. Geneva: World Health Organization; 2018.
2. Huckle T, Pledger M, Casswell S: Trends in alcohol-related harms and offences in a liberalized alcohol environment. Addiction 2006; 101(2): 232–40.
3. Manning M, Smith C, Mazerolle P: The societal costs of alcohol misuse in Australia. Trends Issues Crime Crim Justice 2013; (454): 1–6.
4. Rehm J, Mathers C, Popova S, Thavorncharoensap M, Teerawattananon Y, Patra J: Global burden of disease and injury and economic cost attributable to alcohol use and alcohol-use disorders. Lancet 2009; 373(9682): 2223–33.
5. Roche AM, Lee NK, Battams S, Fischer JA, Cameron J, McEntee A: Alcohol use among workers in male-dominated industries: a systematic review of risk factors. Saf Sci 2015; 78: 124–41.
6. Hamilton M: The use of alcohol in the Australian Defence Force. Report of the independant advisory panel on alcohol. Commonwealth of Australia; 2011.
7. Fuehrlein BS, Mota N, Arias AJ, et al: The burden of alcohol use disorders in US military veterans: results from the National Health and Resilience in Veterans Study. Addiction 2016; 111(10): 1786–94.
8. Teachman J, Anderson C, Tedrow LM: Military service and alcohol use in the United States. Armed Forces Soc 2014; 41(3): 460–76.
9. Derefinko KJ, Klesges RC, Bursac Z, Little MA, Hryshko-Mullen A, Talcott GW: Alcohol issues prior to training in the United States Air Force. Addict Behav 2016; 58: 142–8.
10. Pedersen ER, Parast L, Marshall GN, Schell TL, Neighbors C: A randomized controlled trial of a web-based, personalized normative feedback alcohol intervention for young-adult veterans. J Consult Clin Psychol 2017; 85(5): 459–70.
11. Watterson JR, Gabbe B, Rosenfeld JV, Ball H, Romero L, Dietze P: Workplace intervention programmes for decreasing decreasing alcohol use in military personnel: a systematic review. BMJ Mil Health 2021; 167(3): 192–200.
12. Spooner C, Hall W: Public policy and the prevention of substance-use disorders. Curr Opin Psychiatry 2002; 15(3): 235–9.
13. Botvin GJ: Preventing drug abuse in schools: social and competence enhancement approaches targeting individual-level etiologic factors. Addict Behav 2000; 25(6): 887–97.
14. Banfield JM, Gomez M, Kiss A, Redelmeier DA, Brenneman F: Effectiveness of the P.A.R.T.Y. (Prevent Alcohol and Risk-related Trauma in Youth) program in preventing traumatic injuries: a 10-year analysis. J Trauma Inj Infect Crit Care 2011; 70(3): 732–5.
15. Ho KM, Litton E, Geelhoed E, et al: Effect of an injury awareness education program on risk-taking behaviors and injuries in juvenile justice offenders: a retrospective cohort study. PLoS One 2012; 7(2): e31776.
16. Watterson J, Gabbe B, Dietze P, Thompson J, Oborn M, Rosenfeld JV: Measuring the effectiveness of in-hospital and on-base Prevent Alcohol and Risk-related Trauma in Youth (P.A.R.T.Y.) programs on reducing alcohol related harms in naval trainees: P.A.R.T.Y. Defence study protocol. BMC Public Health 2017; 17(1): 380.
17. Babor T, Higgins-Biddle J, Saunders J, Monteiro M: *The Alcohol Use Disorders Identification Test: Guidelines for Use in Primary Care*. 2nd ed., World Health Organization, Department of Mental Health and Substance Dependence; 2001.
18. Saunders JB, Aasland OG, Babor TF, De La Fuente JR, Grant M: *Development of the Alcohol Use Disorders Identification Test (AUDIT): WHO Collaborative Project on Early Detection of Persons with Harmful Alcohol Consumption-II*. p 88. Blackwell Publishing Ltd; 1993.
19. Schmidt A, Barry KL, Fleming MF: Detection of problem drinkers: the Alcohol Use Disorders Identification Test (AUDIT). South Med J 1995; 88(1): 52–9.
20. Cox WM, Klinger E: A motivational model of alcohol use. J Abnorm Psychol 1988; 97(2): 168–80.
21. FARE: *Annual Alcohol Poll 2017: Attitudes and Behaviours*. Foundations for Alcohol Research & Education; 2017.
22. Zou G: A modified Poisson regression approach to prospective studies with binary data. Am J Epidemiol 2004; 159(7): 702–6.
23. StataCorp: *Stata: Release 13. Statistical Software*. StataCorp LP; 2013.
24. van Dijk PC, Jager KJ, Zwinderman AH, Zoccali C, Dekker FW: The analysis of survival data in nephrology basic concepts and methods of Cox regression. Kidney Int 2008; 74: 705–9.
25. Cambridge MH, Franklin K, Kunz JF, et al: Reducing drinking among junior enlisted Air Force members in five communities: early findings of the EUDL program's influence on self-reported drinking behaviors. J Stud Alcohol Drugs 2010; 71(3): 373+.
26. Fernandez WG, Hartman R, Olshaker J: Brief interventions to reduce harmful alcohol use among military personnel: lessons learned from the civilian experience. Mil Med 2006; 171(6): 538–43.

4.3 Chapter Summary

In this chapter, the findings of the RCT regarding the effectiveness of the P.A.R.T.Y. program in a military setting have been presented. While the participants' AUDIT scores in the in-hospital and on-base P.A.R.T.Y. intervention arms had been reduced at 12 months, a reduction was also evident in the control arm such that there was no statistically significant differences between the AUDIT scores of the participants in each arm of the trial at 12 months. As the results of this study and this intervention indicated that the intervention had not affected the outcomes of interest, there was little evidence to support the widespread rollout of the P.A.R.T.Y. program in the ADF. Given the findings of this RCT, greater understanding of the attitudes and motivations for drinking in the military is required through improved screening of trainees and personnel.

Chapter 5
Systematic Review

5.1 Overview

Typically, a systematic review would provide an initial framework for a thesis; however, due to the nature of the population under examination in this study, adherence to the traditional framework was not possible. At the beginning of this program of work, there were only four peer-reviewed and published studies that existed relating to alcohol and workplace-based interventions.[37,38,40,42] This paucity of evidence in the field of workplace-based intervention programs that relate to alcohol consumption and associated harm reduction measures in the military required the systematic review in this area to be a delayed part of this program of work. Even now, the completed systematic review was only able to include a total of seven published studies of an experimental or quasi-experimental nature that related to workplace-based interventions for reducing alcohol use in military settings internationally.

5.2 Journal Article

The following paper, *Workplace intervention programmes for decreasing alcohol use in military personnel: A systematic review*, was published in the *BMJ Military Health* journal in 2020.

Workplace intervention programmes for decreasing alcohol use in military personnel: a systematic review

Jason R Watterson [1,2] B Gabbe,[1] J V Rosenfeld,[3,4] H Ball,[5] L Romero,[6] P Dietze[1,7]

► Additional material is published online only. To view please visit the journal online (http://dx.doi.org/10.1136/bmjmilitary-2020-001584).

[1]Department of Epidemiology and Preventive Medicine, School of Public Health and Preventive Medicine, Monash University, Melbourne, Victoria, Australia
[2]Department of Intensive Care and Hyperbaric Medicine, Alfred Health, Melbourne, Victoria, Australia
[3]Department of Neurosurgery, Alfred Health, Melbourne, Victoria, Australia
[4]Department of Surgery, F. Edward Hebert School of Medicine, Uniformed Services University of the Health Sciences, Bethesda, Maryland, USA
[5]National Trauma Research Institute, Alfred Health, Melbourne, Victoria, Australia
[6]Library Services, Alfred Health, Melbourne, Victoria, Australia
[7]Centre for Population Health, Burnet Institute, Melbourne, Victoria, Australia

Correspondence to
Jason R Watterson, Department of Epidemiology and Preventive Medicine, Monash University, Melbourne, VIC 3181, Australia; jason.watterson@monash.edu

Received 29 June 2020
Revised 11 November 2020
Accepted 15 November 2020

To cite: Watterson JR, Gabbe B, Rosenfeld JV, *et al*. *BMJ Mil Health* Epub ahead of print: [*please include* Day Month Year]. doi:10.1136/bmjmilitary-2020-001584

ABSTRACT

Introduction Harmful or risky-single occasion drinking (RSOD) alcohol use in the military is a significant problem. However, most studies of interventions have focused on veterans, representing a missed opportunity for intervention with active military personnel. Using the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) framework, the aim of this systematic review was to analyse and synthesise the evidence related to workplace-based interventions for reducing alcohol use in active-duty military personnel.

Methods Four electronic databases and reference lists of relevant articles were searched from database inception until 20 January 2020. This review focused on experimental and quasi-experimental studies of active-duty military personnel. Data extraction and methodological quality assessment were independently performed by two reviewers using a standardised checklist. A third reviewer was used to arbitrate the disputed studies for final selection.

Results The search yielded seven studies from an initial 1582 records identified. A range of interventions were used in these studies (four randomised controlled trials, two non-randomised trials and one before and after cohort study), including web-based approaches, telephone-delivered interventions and individual and group-based face-to-face interventions. Seven studies found decreased drinking, measured using a range of outcomes, following the intervention. However, this was not sustained in the longer term in any of the studies.

Conclusions The low methodological rigour of most studies limited the capacity to demonstrate the efficacy of the interventions studied. Given the importance of reducing harmful or RSOD use of alcohol in the military, future studies would benefit from improved methodological rigour including ensuring adequate study power, randomisation, selection of validated outcome measures, including measures other than consumption (eg, attitudinal measures), and longer-term follow-up. There is also a need to develop methods that ensure participant loss to follow-up is minimised.

Key messages

- Harmful or risky single-occasion drinking alcohol use in the military is a significant problem.
- Future studies would benefit from improved methodological rigour including ensuring adequate study power, randomisation, selection of validated outcome measures, including measures other than consumption.
- There is also a need to develop methods that ensure participant loss to follow-up is minimised in military studies.
- Military personnel tend to avoid interventions which may place them in a position of being seen as weak by peers or worse jeopardise their careers.

INTRODUCTION

There is a high prevalence of harmful alcohol use, including so-called 'binge' or 'risky single-occasion drinking (RSOD)' in the military.[1 2] Alcohol has long played a part in many military traditions and ceremonies, some of which remain current.[3–6] Hamilton *et al* (2011) highlighted the pressure on young recruits in particular to conform with peers; this is never more evident than in the relationship young military personnel have with alcohol and social gatherings.[6] However, much of the literature on alcohol use in the military is focused on the veteran population and these studies have not exclusively examined alcohol harm reduction. Instead, these studies have typically investigated alcohol use in the context of alcohol use disorders related to post-traumatic stress disorder and other mental health conditions. What is clear from studies of military populations is, like the general population, males generally consume more alcohol at higher frequency than females and, as such, are over-represented in both the short-term and longer-term adverse outcomes resulting from alcohol consumption.[7–10]

A range of interventions is available to reduce alcohol-related harms. In the military setting, most interventions for problematic alcohol consumption have been focused on veterans, after they have left the military workplace which represents a missed opportunity for earlier intervention while on active duty. Workplace alcohol interventions generally take the form of universal prevention activities or screening and brief intervention programmes, and these have been examined in a range of different workplaces and cultures. Studies show interventions such as implementing workplace alcohol policies can provide an important opportunity to prevent, identify and manage the health problems of employees.[11] Policies introduced in the workplace may influence perceptions of acceptable employee behaviour. These policies are likely to include written policies, counselling and assistance and alcohol and drug testing.[11] Reviews of screening and brief intervention in workplaces have shown promising results in reducing hazardous and harmful drinking.[12] Screening and brief interventions for alcohol have

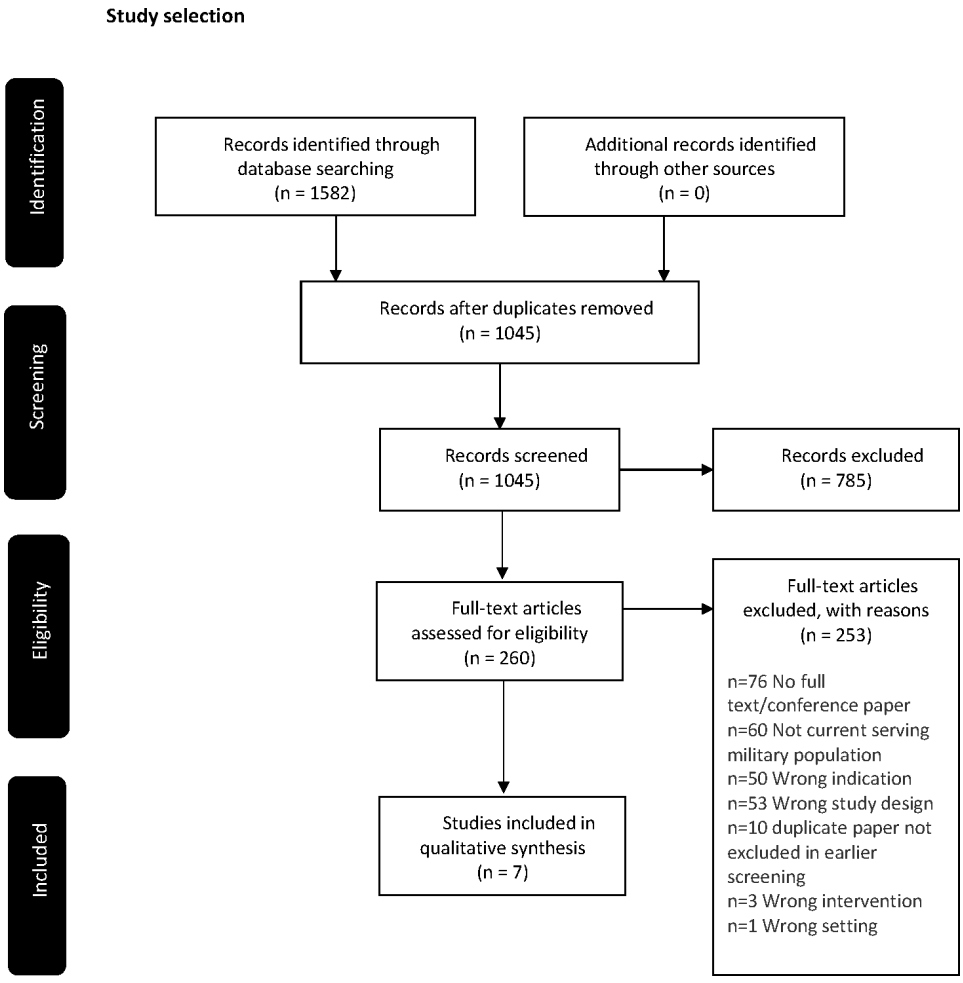


Figure 1 Literature review flow diagram.

emerged as a cost-effective preventative approach.[13] There has been a number of studies of alcohol interventions for active-duty personnel, but these have not been systematically reviewed. To address this gap, we conducted a systematic review of workplace interventions with an experimental or quasi-experimental design for reducing harmful or RSOD alcohol use in active-duty military personnel.

Rationale

A number of systematic reviews have explored interventions related to the use of alcohol such as motivational interviewing (MI) and brief interventions with the general population in varied settings.[13 14] Although a number of similar reviews have been undertaken of studies of service veterans,[8 12] only one has examined active-duty military populations.[15] The objective of this study was to systematically review and synthesise the evidence related to workplace-based interventions for reducing harmful or RSOD alcohol use in active-duty military personnel.

METHODS

Protocol and registration

This systematic review was conducted using methods prescribed by the Cochrane Collaboration, and this included the use of Covidence software for the review of screening and review of all studies identified in searches. Covidence software includes the ability to label the reasons for exclusion of studies as described in Figure 1.[16] The results are reported using the Preferred Reporting Items for Systematic Reviews and Meta-analyses (PRISMA) guidelines.[17] The review was registered with the International Prospective Register of Systematic Reviews, review ID CRD42017076155. Protocol available is at https://www.crd.york.ac.uk/prospero.

Information sources and search strategy

Four electronic databases (Ovid Medline, Ovid Embase, OVID EBM Reviews Cochrane Central Register of Controlled Trials and Ovid PsycINFO) were searched systematically from database inception to 20 January 2020. An initial search for studies was conducted in Medline and Embase, and an analysis of text words and subject terms was then used by to develop the search. Subject classification systems for each database were also investigated. Search terms for concept 1, alcohol use, included "alcohol drinking", "alcohol related disorders" and a combination of terms related to excessive, or binge or problematic drinking. Search terms for concept 2, military personnel, included "military personnel", military medicine", "naval medicine" and a combination of terms related to individual personnel such as air force, armed forces, navy, marines and soldiers. Search terms for concept c, intervention programmes, included "behaviour therapy", "cognitive therapy", "group therapy" and a combination of education and prevention terms. The final searches of all four electronic databases were executed using the appropriate specifications of each database. The comprehensive search

strategy used for the databases is shown in the online supplemental appendices 1–4.

Two reviewers (JRW and HB) independently screened the titles and abstracts of the yield to determine each article's eligibility for inclusion. The full texts of the potentially eligible articles were reviewed independently by two reviewers (JRW and HB) to confirm eligibility. Any discordance in selection of abstracts and titles and then full text manuscripts was resolved through consensus and arbitrated by a third reviewer (BG), if required. The reference lists of all included full-text studies and any systematic reviews identified were manually screened by the reviewers. Citation screening and selection were documented and summarised in a PRISMA-compliant flow chart (Figure 1).

Inclusion/exclusion criteria

Papers were eligible if they were peer-reviewed quantitative studies (randomised and non-randomised trials, cohort studies or case–control studies) reporting on interventions used in military workplaces with active-duty military personnel and exploring the capacity of the intervention for reducing harmful alcohol use or RSOD or associated harms. This reporting took the form of alcohol use prevalence, changes in incidence rates or changes in screening scores measured preintervention and postintervention. For this review, interventions had to take place in the workplace or within healthcare facilities linked to the workplace. Workplace in the military setting has a broad definition. For this review, we defined workplace as any environment traditionally defined as a military base. We also included clinical facilities such as primary healthcare facilities and inpatient hospital facilities which either served solely or jointly for military personnel such is commonly the case for many militaries (eg, in the USA and UK). Papers were excluded if they reported on qualitative studies, were not peer-reviewed and were not in English. Consistent with the recommendation of Kazemi *et al*, we included only experimental or quasi-experimental designs in this systematic review. The heterogeneity of the population and in relation to the analysis within this systematic review will also be examined.

Study selection

A total of 1582 papers were retrieved (Figure 1); 537 duplicates and 785 papers that were not relevant to the aim of the review were excluded after initial review. A total of 260 papers were selected for full text review, of which seven met the inclusion criteria (Table 1).

Data extraction

The following information was extracted for each study: lead author, study country, study design, participants, procedures, analysis, primary and secondary outcomes and inclusion and exclusion criteria.

Risk of bias

The quality of the included studies was assessed using the Effective Public Health Practice Project (EPHPP) Quality Assessment Tool for Quantitative Studies, developed at McMaster University, Canada.[18] Due to the nature of public health and health promotion studies, it can be difficult to assess quality of many studies, especially studies using methods other than randomised controlled trials (RCTs).[19] The Quality Assessment Tool for Quantitative Studies has been demonstrated to be suitable for the use in systematic reviews although with limitations to its use in the assessment of studies of community-level interventions.[20]

RESULTS

Settings and demographics

Seven papers were included in this review: two studies were conducted in Switzerland, one in Sweden, one in Ireland and three in the USA. The Swiss and Swedish studies recruited volunteer army conscripts,[21–23] while the Irish study involved navy recruits.[24] Of the three studies conducted in the USA, one recruited soldiers from a single army installation,[25] one recruited airmen from a single air force base[26] and the third recruited participants from all four branches of the US military (Army, Navy, Marines and Air Force) across eight military installations.[27] Given the two Swiss studies[21 22] and the Swedish[23] study recruited army conscripts, the findings of these studies may not be generalisable to other military populations including those detailed in this review which drew participants from volunteers to military service. Nonetheless, the results of the studies provide insights into interventions that may be of benefit to active-duty military populations regardless of the nature of their service. Across the seven included studies, all participants were active-duty military with an age range of 18 to 34 years (Table 1).

Interventions and study design

As detailed in Table 1, the interventions examined varied between the included studies. Five[21 22 25–27] described the use of MI or brief motivational interviews (BMI) as the interventions. All these MI/BMI involved an adaptation of MI in which an individual is delivered a single, short counselling session typically lasting 15–45 min. Of note, both Daeppen and colleagues, and Gaume and colleagues have stated in the general population few researchers have used BMI as a primary prevention strategy with low-risk drinkers. In addition, these authors believed most research using BMI had been in college students who, in comparison to many military populations, would be described as homogeneous in nature.[21 22] One study[23] used a risk reduction programme, which was described as widely used but the evaluation of its outcomes has not been peer-reviewed. The programme delivered in this study was a 2-day Swedish version of the risk reduction course that involved baseline screening for alcohol use, attitudes and knowledge of alcohol-related harm followed by facilitated exercises exploring these areas. The curriculum for the course was guided by an instruction manual to maximise internal consistency. One of the BMI studies[26] used a brief alcohol intervention (BAI) in the setting of policy changes and administrative action in the form of random breath testing (RBT) of all underage members. The study was specifically tailored to the technical training cohort involved and for delivery in a large group format. In this way, the intervention took the components of BAIs identified as effective from the general literature and combined them with the RBT—a proven population level deterrent for drink-driving.[26] One study[24] used a brief cognitive–behavioural therapy (CBT) intervention. CBT typically focuses on challenging and changing thoughts, beliefs, attitudes and behaviours to enable individuals to develop new or improved coping strategies.[28]

The studies conducted by Daeppen and colleagues and Gaume *et al* drew participants from the same French-speaking Swiss army conscript population between January 2007 and September 2008. Both employed an RCT design with baseline assessment, implementation of a BMI in one study for participants screened as positive for binge drinking,[21] and in the other study for all who volunteered[22] and 6-month follow-up. McCarthy and O'Sullivan and Walker *et al*[25] also used an RCT design. McCarthy *et al* used a 4-week (1.5-hour session once

Table 1 Military studies included

Author and year	Sample	Design/outcome measures	Intervention	Main outcome	Strengths and limitations
Daeppen *et al*[21]	Swiss military French-speaking men (20 years). Voluntary conscripts (n=418): control (n=219); final n=371	RCT intervention group received baseline assessment+BMI+6-month follow-up. Control group received baseline assessment+6-month follow-up. Binge drinking was defined as consuming 60 g pure alcohol per drinking episode at least once per month.	BMI mean length=15.8 min (SD=5.5) session with trained counsellor offered a menu of strategies with topics or areas of conversation.	Baseline to 6 month follow-up: In the binge drinker group, significant difference between groups for drinks per week (p=0.04) BMI group drank 1.5 drinks less; control group drank 0.8 drinks more. In non-binge drinkers, there was no significant difference between groups from baseline to 6-month follow-up. BMI demonstrated a protective effect for binge drinkers (p=0.03) on weekly alcohol consumption.	Strengths ► Confidential ► RCT ► Feasibility of offering intervention to large number of individuals ► Supports voluntary BMI participation rather than traditional treatment model ► Demonstrates need for more accessible alcohol intervention Limitations ► Low number of currently active military in sample ► BMI short at baseline only with no booster component
Gaume *et al*[22]	Swiss military French-speaking men (20 years). Voluntary conscripts (n=727): control (n=276); final n=572	RCT intervention group received baseline assessment+BMI+6-month follow-up CATI. Control group received baseline assessment+6-month follow-up+wait-listed for BMI CATI. AUDIT cut-offs of 8 (hazardous use).	BMI mean length=21.8 min (SD=8.5) session with trained counsellor offered a menu of strategies with topics or areas of conversation.	Baseline to 6-month follow-up: significant differences between the two groups (p=0.04). BMI group drank 0.4 drinks more; control group drank 1.7 drinks more. BMI demonstrated a protective effect for non-heavy users (p<0.05). Heavy users showed no difference from baseline to 6 months between the two groups on all variables. Intervention effective with low-risk drinking, but not for heavy episodic users.	Strengths ► Confidential ► RCT ► Feasibility of offering intervention to large number of individuals ► Supports voluntary BMI participation rather than traditional treatment model ► Demonstrates need for more accessible alcohol intervention Limitations ► BMI short at baseline only with no booster component
Hallgren *et al*[23]	Swedish military personnel (n=1371); men (mean=19.6 years); control (n=669); intervention (n=702); final n=917 at 5 months; final n=872 at 20 months	Controlled trial/quasi-experimental. Change in alcohol consumption, knowledge and attitudes over 20 months; assessments at baseline, 5 months and 20 months. Alcohol consumption baseline measured with AUDIT.	Adapted from the US version of PFL. Translated into Swedish; minor modifications to be consistent with Swedish cultural norms. Two-day course taught by trained instructors. Interactive presentations and small group discussions.	Small significant drop in binge drinking from baseline (mean=1.7, SD=0.79) to 5 months (mean=1.62, SD=0.75); scores increased at 20 months (mean=1.66, SD=0.83; Cohen's d=0.01). Positive attitudes increased from baseline to 5 months but declined between 5 and 20 months. Alcohol consumption: significant effect of time, no interaction of group by time, F (1, 552)=1.36, p<0.24.	Strengths ► Adapted from US intervention model ► First peer-reviewed evaluation of PFL ► Grounded in social learning theory and reasoned action theory Limitations ► Significant loss of participants between baseline and 20 months ► Non-randomised groups
Klesges *et al*[26]	All new recruits during 8.5 weeks of BMT and airmen remaining for technical training (approximately one-third of BMT numbers) n=5678; age mean=20.4 years	Quasi-experimental (pretest-post-test). AMPP consisting of BMI and random alcohol breathalyser testing. Alcohol consumption and dependence at baseline measure anonymously with AUDIT and Daily Drinking Questionnaire.	Intervention (fiscal year 2011): BAI+random alcohol breathalyser testing. BAI designed to include components identified in the literature, together with military-specific components. Control: (fiscal year 2010)	BAI+random alcohol breathalyser testing associated with significant reduction in the odds of airmen receiving an ARI (OR=0.555, 95% CI=0.380 to 0.811; p=0.0023). This result was consistently observed within each quarter despite the reduced group sizes within each quarter.	Strengths ► First group-based BAI to demonstrate efficacy ► Group BAIs compatible with military populations ► BAI efficacy measured with reductions in official, objective, independent sanctions. Limitations ► No randomisation ► Short length of follow-up (3 months) ► Generalisability beyond single site of study ► Unable to analyse ARI rates by age group due to anonymity

Continued

Table 1 Continued

Author and year	Sample	Design/outcome measures	Intervention	Main outcome	Strengths and limitations
McCarthy and O'Sullivan[24]	Irish Navy recruits undergoing BRT; men=24, ages 18–26 years; n=26; CBT (n=13); control (n=13)	A treatment and control pretest, post-test and follow-up RCT. Follow-up postintervention week 6 and week 14. Baseline and follow-up measures AUDIT, DEP and Readiness Ruler. Customer Satisfaction Rating Scale, intervention group only postintervention.	CBT (1.5 hours x four sessions): Protocol adapted from a similar treatment protocol used in Australia with a civilian population. Programme conducted over 4 weeks, 1 week after baseline measurements.	TG: No significant effect between groups on all measures from baseline to follow-up at weeks 6 and 14. Post hoc analysis indicated significantly lower self-reported binge drinking frequency scores in the TG compared with CG at week 14, TG: (f=1.31); CG: (f=1.77)	Strengths ► RCT ► First evaluation of a CBT in a military setting ► Pre-enlistment self-reporting of drinking could enhance retention of recruits Limitations ► Reliance on self-report ► Small sample size ► Short follow-up period ► Primarily male sample
Pemberton *et al*[27]	Eight military installations (two from each branch); men=855, ages 21–34 years; n=3070; DCU (n=1470); AS (n=686); no treatment (n=914)	Controlled trial/quasi-experimental. Two web-based treatment conditions: AS and DCU. Change in alcohol consumption assessments from baseline to 1 month and 5 months.	DCU (56 min): web-based BMI; directive counselling, aimed at resolving ambivalence toward changing drinking habits; modified for military use. AS (45 min): Universal, primary prevention programme aimed at adults in the workplace; narrated multimedia programme; content modified to fit military setting.	DCU: From baseline to 1 month, significant effects for average drinks (Cohen's d=0.019), frequent heavy episodic drinking status and peak bold alcohol content (Cohen's d=0.015); also reduced heavy episodic drinking status relative to controls at 1 month (Cohen's d=0.054). AS: No significant programme effects from baseline to 1 month to 6 months for any of the conditions; over time, the programme groups were no different from the control groups.	Strengths ► Covered all four branches of the US military ► DCU condition had significant reductions from baseline to 1 month relative to controls ► First evaluation of Web-based interventions for military personnel Limitations ► Non-randomised groups ► Significant rates of attrition ► Voluntary convenience sample ► No significant programme effect from 1-month to 6-month follow-up
Walker *et al*[25]	Self-referred participants at a single army installation. Men=223, age mean=28 years (SD=6.3); n=242; MIF (n=122); education (control) (n=122)	RCT intervention group received MIF (45–60 min) adapted for Army personnel, with the control group receiving educational information with a matching dose (45–60 min). All primary outcome measures were completed at baseline and repeated at 3-month and 6-month follow-ups. The measures used were DDQ including the HDE, SCID for psychoactive substance use, consequences of substance use and the treatment-seeking behaviours measure.	Both intervention and control conditions were delivered via telephone by one of four master's level qualified clinicians. All participants received generic information on alcohol and BAC, participants could then select one or two additional modules including marijuana, cocaine and inhalants. Participants in the intervention group chose to receive their individual feedback either via email or mail. All participants were financially compensated for participation.	No significant effects on all primary measures between groups were established. There was a significant reduction over the three time periods in the number of drinks per week consumer by all participants.	Strengths ► RCT ► Efficacy for telephone-delivered MIF for untreated soldiers with AUD Limitations ► Use of incentives for participants ► Lack of no-treatment control ► May not be generalisable to other military settings or civilian populations

AMPP, Alcohol Misconduct Prevention Program; AS, Alcohol Savvy; AUD, alcohol use disorder; AUDIT, Alcohol Use Disorders identification Test; BAC, blood alcohol concentration; BAI, brief alcohol intervention; BMI, brief motivational intervention; BMT, basic military training; BRT, basic recruit training; CATI, computer-assisted telephone interview; CBT, cognitive–behavioural therapy; CG, control group; DCU, Drinker's Check-Up; DDQ, Daily Drinking Questionnaire; DEP, Drinking Expectancy Profile; HDE, heavy drinking episodes; MIF, motivational interviewing with feedback; PFL, PRIME for life; RCT, randomised controlled trial; SCID, Structured Clinical Interview for DSM-IV; TG, treatment group.

per week×4) intervention based on brief cognitive–behavioural therapy (BCBT) within a small cohort of 26 participants, not screened prior to the intervention for alcohol misuse. Half of the participants on the study (n=13) were randomised to receive the BCBT programme, while the other half (n=13) were allocated to a control arm.[25] Walker *et al* used an RCT design to assign their cohort of Army personnel to either the intervention of a group MI with feedback or a control group that received educational information only. Both the intervention and the control group had their respective conditions delivered by telephone by one of four masters-level trained clinicians.

The three remaining included studies all used a quasi-experimental design. Hallgren Mats *et al*[23] and Pemberton *et al*[27] both used a control comparison group, while Klesges *et al*[26] used a pretest and post-test design. Hallgren *et al*[23] used the 'Prime for Life program' as their intervention. This programme was developed in the USA and is described as a risk reduction programme. The programme was designed to challenge common beliefs and attitudes that directly contribute to high-risk alcohol and drug use. Pemberton *et al*[27] used a three-arm design with two interventions and a control arm. One arm involved the 'Alcohol Savvy' (AS) programme described as an alcohol-misuse prevention programme delivered in entirety as a fully narrated, multimedia programme which incorporated video and audio with interactive components. The second arm involved the 'Drinkers Check-Up' (DCU) programme, described as a BMI for high-risk drinkers, adapted for online delivery from a face-to-face intervention.[27]

Outcome measures and follow-up periods

Outcome measures varied between studies. Alcohol consumption, including quantity and frequency of consumption, was measured using several tools (table 1). Three of the seven studies used the WHO version of the Alcohol Use Disorders Identification Test (AUDIT),[29] as the primary measurement tool.[22–24 26] One study used the Swedish version of the AUDIT.[23] The AUDIT has been widely used and validated in military populations.[30] Follow-up periods also differed between studies and ranged from 14 weeks[24] to 20 months postintervention.[23]

Klesges *et al*[26] used an anonymous AUDIT and Daily Drinking Questionnaire (DDQ) at baseline to measure participant alcohol consumption prior to the intervention. This study had the shortest length of follow-up of the studies considered at 3 months postintervention.

Gaume *et al*[22] used the AUDIT with a cut-off score of 8 (hazardous use) as the primary outcome measure. This study also used the AUDIT-C, a validated abbreviated version of the AUDIT which uses the first three questions of the full 10-item AUDIT tool related to the level of alcohol consumption of the participants. These measures were collected at baseline and at 6-month follow-up.

The primary outcomes in the Hallgren *et al*[23] study were alcohol consumption including RSOD which they achieved by using the AUDIT 10-item questionnaire or its subsets. They further explored knowledge of alcohol and attitudes using a self-developed questionnaire.[23] This study undertook follow-up at 5 months and 20 months postintervention.

McCarthy and O'Sullivan used the Drinking Expectancy Profile (DEP), which explores an individual's cognitive constructs associated with the development of alcohol problems. The DEP is a two-part questionnaire: the first part is the Drinking Expectancy Questionnaire, developed in 1988 by Young and Knight which improved on the previously used Alcohol Expectancies Questionnaire by including both positive and negative expectancies of alcohol use.[31] The second part of the DEP is the Drinking Refusal Self-Efficacy Questionnaire Revised which is a 19-item questionnaire that looks at the participant's ability to refuse alcohol in certain situations. These measures were all used at the three time points from baseline to follow-up on week 6 and week 14.

Walker *et al*[25] used the DDQ. The DDQ includes the Heavy Drinking Episodes questionnaire and the Structured Clinical Interview for Diagnostic and Statistical Manual of Mental Disorders, fourth edition. The primary outcomes included alcohol consumption per week, substance use disorder, diagnosis and consequences and treatment-seeking behaviours. Their study completed baseline measures and then repeated the measures at 3-month and 6-month follow-ups.

Daeppen *et al*[21] used an outcome measure of RSOD defined as consuming 60 g pure alcohol per drinking episode. This study completed baseline measures with follow-up and repeat measures at 6 months postintervention.

As Pemberton *et al*[27] study used two distinct programmes, they chose multiple outcome measures to assess the effects of the programme. These authors used measures previously used by the Department of Defence in a survey of Health-Related Behaviours study. The measures taken from this previous study examined each participant's daily drinks consumed, average drinks per drinking occasion, number of heavy episodic drinking days, number of days perceived drunk per week and estimated peak blood alcohol concentration. They used follow-up time frames for their groups at 1-month and 5-month postintervention.

The studies conducted by Hallgren *et al*[23] and Pemberton *et al*[27] were the only two studies included that described significant loss to follow-up (LTFU). These two studies described LTFU between 30% and 40%, compared with the other five studies who outlined LTFU of less than 20%.

Efficacy of interventions

All included studies acknowledged the military environment presented specific challenges in implementing and evaluating interventions related to alcohol use reduction.[21–27]

Daeppen *et al*[21] found that the number of drinks per week consumed in the binge drinker group of the intervention arm was significantly lower than in the control group. In contrast, Gaume *et al*[22] found their BMI had a protective effect for lighter drinkers but not for heavy episodic users.

Hallgren *et al*[23] demonstrated a significant decrease in RSOD and an increase in positive attitudes from baseline to 5-month follow-up. However, this difference did not persist at the 20-month postintervention follow-up.

Klesges *et al*[26] demonstrated a significant reduction in the odds of a participant receiving an alcoholrelated injury following the implementation of a BAI and random alcohol breathalyser testing.

McCarthy and Sullivan did not find a significant difference between groups on all of their measures. However, post hoc analysis indicated significantly lower self-reported RSOD frequency scores in the treatment group compared with the control group at the 14-week follow-up period.

Pemberton *et al*[27] compared two interventions, the DCU and the AS programmes and found significant effects for lowering average drinks, and frequent heavy episodic drinking status, and peak blood alcohol content from baseline to 1-month follow-up in the DCU group compared with the AS intervention. There was no difference from baseline to 1-month follow-up in the AS group. At 6-month follow-up, there was no difference between

the intervention and control groups for either the DCU or AS for any of the outcomes measured.

Walker *et al*[25] observed a significant reduction over the three time periods in the number of drinks per week consumed by participants in the intervention compared with the control group. However, they did not demonstrate a significant effect on any of the primary outcome measures, between groups.

Risk of bias

The included studies were assessed for quality using the EPHPP tool. Three studies achieved a global rating of moderate bias: moderate on the component rating of selection bias and weak on the component rating blinding.[21 22 25] The remaining papers were rated as weak on the global rating.[23 24 26] Hallgren *et al*[23] rated as weak in three of the areas: study design (no randomisation of participants), confounders and intervention blinding. Similarly, Klesges *et al* (2013) and McCarthy and O'Sullivan (2010) scored a moderate rating for study design but received a weak rating for withdrawal and dropout rate of participants. Pemberton *et al*[2727] also received a week global rating as they scored weak on four of the six components: study design, blinding, data collection method, and withdrawal and dropout rate (Table 2).

DISCUSSION

Our search yielded seven studies which employed many types of interventions to reduce harmful or RSOD alcohol use in the military setting, including web-based approaches, telephone-delivered interventions and individual-based and group-based face-to-face interventions. All studies used interventions based on well-defined and researched tools such as BMI and CBT. Furthermore, several of the interventions outlined in the studies included in this review have been previously demonstrated to be effective in general populations, such as the 'PRIME for Life' programme and a web-based version of the 'Drinker's Check-Up' which have been shown to reduce alcohol consumption and improve treatment engagement among participants.[23 25] Most of the studies included in this review were able to demonstrate significant effects of the interventions when comparing baseline measures to early follow-up (up to 6 months) but many were not randomised and therefore assessed as at risk of bias.[23 24 26 27] These effects at 6 months may nonetheless be important. Intervention to reduce impacts in the short term may prevent alcohol-related problems important to military policy and the absence of longer-term effects may simply reflect regression to the mean seen in wider studies of alcohol consumption.[32] Only Hallgren *et al*'s study failed to find significant effects. However, their intervention had no prior peer-reviewed studies examining its efficacy, despite widespread use.

The six studies that demonstrated a positive effect on the outcomes measured all used MI/BMI-based interventions which have been demonstrated effective in similar age groups in the general population. Of note, the samples included in the studies were either all male or mostly comprised males. This means that little is known about whether even the positive initial effects would translate to females in the military. Indeed, it is possible that females may begin to drink more like males after joining the military in response to cultural pressures and norms that have been shown to underpin the gender convergence in drinking behaviours noted in the general population.[33–35] Any need for gender-specific interventions around drinking in the military is unknown. The findings from the included studies are consistent with the findings using similar interventions, such as BMI or CBT, in the general population.[13 14]

Table 2 Quality assessment ratings for included studies

Study	Study design	Global rating	Selection bias	Study design	Confounders	Blinding	Data collection	Withdrawal and dropouts	Intervention integrity: Exposure	Intervention integrity: Consistency	Intervention integrity: Contamination	Analysis: Unit of allocation/analysis	Analysis: Statistical methods appropriate	ITT
Daeppen *et al*[21]	RCT	++	++	+++	+++	+	+++	+++	80%–100%	Yes	No	Individual	Yes	NR
Gaume *et al*[22]	RCT	++	++	+++	+++	+	+++	+++	Unclear	Yes	Unclear	Individual	Yes	NR
Hallgren *et al*[23]	NRCCT	+	+	+	+	+	+++	++	80%–100%	Yes	Unclear	Individual	Yes	Yes
Klesges *et al*[26]	UBA	+	++	++	+	+	+++	+	80%–100%	Unclear	Unclear	Individual	Yes	NR
McCarthy and O'Sullivan[24]	RCT	+	+++	++	+	+	+++	+	80%–100%	Yes	Unclear	Individual	Yes	NR
Pemberton *et al*[27]	NRCCT	+	++	+	+++	+	+	+	80%–100%	Yes	Unclear	Individual	Yes	Yes
Walker *et al*[25]	RCT	++	++	+++	+++	+	+++	+++	80%–100%	Yes	No	Individual	Yes	Yes

+++, strong; ++, moderate; +, weak; ITT, intention-to-treat analysis; NR, not reported; NRCCT, non-randomised controlled clinical trial; RCT, randomised controlled trial; UBA, uncontrolled before and after study.

Most studies focused on outcomes related to alcohol consumption. Only three of the seven studies included in the review specifically examined changes in individual and group attitudes and behaviours within the primary or secondary outcomes measured.[23 24 27] Attitudinal change may play an important part in changing military drinking cultures which may play an overall role in changing problematic consumption that would not be captured in individual-level measurements implemented in this study. Future research examining changes in outcomes other than consumption measures may inform understanding of how best to reduce problematic alcohol consumption in the military, with recognition of the prevailing drinking cultures in the countries in which studies are implemented.[36]

Most of the included papers used the AUDIT tool as an outcome measure, but there was inconsistency in the cut-off scores used across the studies. The AUDIT was also commonly used as a secondary measure of alcohol use, despite it being one of the few tools validated for use in military populations. Similarly, there was wide variability in the definitions of RSOD used in the studies. Definitions varied from five drinks for men and four for women in a 2-hour time period,[27] to the consumption of six drinks on one occasion,[23] to the consumption of six 'standard' drinks or more on a single occasion at least once per month or more.[21 22]

The studies in this review also point toward a general tendency for military personnel to avoid interventions which may place them in a position of being seen as weak by their peers or worse jeopardise their careers through administrative action.[25]

CONCLUSION

Seven studies investigated the effect of alcohol harm reduction interventions to reduce harmful or RSOD alcohol use among military populations. While many were able to demonstrate significant changes in some or all outcomes measured, these changes were not sustained over longer term follow-up, or the longer-term impact was not assessed. The methodological rigour of these studies was moderate, and the findings provide no clear evidence of the effectiveness of the interventions studied in active-duty military personnel beyond short-term effects that may nonetheless be important. Given the importance of reducing harmful or RSOD use of alcohol in the military, future studies would benefit from improved methodological rigour including ensuring adequate study power, randomisation, selection of validated outcome measures, including measures other than consumption, for example, attitudinal measures and longer-term follow-up. There is also a need to develop methods that ensure participant LTFU is minimised.

Twitter Jason R Watterson @jasonwatto

Contributors JRW, BG, JVR and PD planned the study and developed the protocol. JRW, BG, JVR, HB, LR and PD all reviewed and approved the final protocol. JRW and LR developed the search strategy and conducted the search. JRW, HB and BG undertook the review process. JRW wrote the first draft of the manuscript. JRW, BG, JVR, HB, LR and PD reviewed the first and all subsequent drafts and approved the final version of the manuscript.

Funding The authors have not declared a specific grant for this research from any funding agency in the public, commercial or not-for-profit sectors.

Competing interests None declared.

Patient consent for publication Not required.

Provenance and peer review Not commissioned; externally peer reviewed.

Data availability statement No data are available. N/A.

ORCID iD

Jason R Watterson http://orcid.org/0000-0003-4208-652X

REFERENCES

1 Bray RM, Brown JM, Williams J. Trends in binge and heavy drinking, alcohol-related problems, and combat exposure in the U.S. military. *Subst Use Misuse* 2013;48:799–810.
2 Fear NT, Iversen A, Meltzer H, *et al*. Patterns of drinking in the UK armed forces. *Addiction* 2007;102:1749–59.
3 Pack AJ. *Nelson's blood: The story of naval rum*. Hampshire, UK: Kenneth Mason, 1982.
4 Aguirre M, Greenberg N, Sharpley J, *et al*. Alcohol consumption in the UK armed forces: are we drinking too much? *J R Army Med Corps* 2014;160:72–3.
5 Ames G, Cunradi C. Alcohol use and preventing alcohol-related problems among young adults in the military. *Alcohol Research & Health* 2005.
6 Hamilton M. The use of alcohol in the Australian defence force. Report of the independant Advisory panel on alcohol. *Commonwealth of Australia* 2011.
7 Back SE, Killeen TK, Teer AP, *et al*. Substance use disorders and PTSD: an exploratory study of treatment preferences among military veterans. *Addict Behav* 2014;39:369–73.
8 Kelsall HL, Wijesinghe MSD, Creamer MC, *et al*. Alcohol use and substance use disorders in Gulf War, Afghanistan, and Iraq war veterans compared with nondeployed military personnel. *Epidemiol Rev* 2015;37:38–54.
9 Thandi G, Sundin J, Ng-Knight T, *et al*. Alcohol misuse in the United Kingdom armed forces: a longitudinal study. *Drug Alcohol Depend* 2015;156:78–83.
10 Pedersen ER, Parast L, Marshall GN, *et al*. A randomized controlled trial of a web-based, personalized normative feedback alcohol intervention for young-adult veterans. *J Consult Clin Psychol* 2017;85:459–70.
11 Pidd K, Kostadinov V, Roche A. Do workplace policies work? an examination of the relationship between alcohol and other drug policies and workers' substance use. *Int J Drug Policy* 2016;28:48–54.
12 Doherty AM, Mason C, Fear NT, *et al*. Are brief alcohol interventions targeting alcohol use efficacious in military and veteran populations? A meta-analysis. *Drug Alcohol Depend* 2017;178:571–8.
13 O'Donnell A, Anderson P, Newbury-Birch D, *et al*. The impact of brief alcohol interventions in primary healthcare: a systematic review of reviews. *Alcohol Alcohol* 2014;49:66–78.
14 Tanner-Smith EE, Lipsey MW. Brief alcohol interventions for adolescents and young adults: a systematic review and meta-analysis. *J Subst Abuse Treat* 2015;51:1–18.
15 Kazemi DM, Berry-Cabán CS, Becker C, *et al*. Review of interventions designed to address drinking among soldiers. *Military Psychology* 2013;25:365–80.
16 Collaboration TC. Effective practice and organisation of care (EPOC) EPOC taxonomy, 2015. Available: https://epoc.cochrane.org/epoc-taxonomy
17 Moher D, Liberati A, Tetzlaff J, *et al*. Preferred reporting items for systematic reviews and meta-analyses: the PRISMA statement. *PLoS Med* 2009;6:e1000097.
18 Project EPHP. Quality assessment tool for quantitative studies, 2009. Available: http://www.ephpp.ca/PDF/QATool_Dec_2009.pdf
19 Jackson N, Waters E, tGfSRoH P, Guidelines for Systematic Reviews of Health Promotion and Public Health Interventions Taskforce. The challenges of systematically reviewing public health interventions. *J Public Health* 2004;26:303–7.
20 Jones L, Hughes K, Atkinson AM, *et al*. Reducing harm in drinking environments: a systematic review of effective approaches. *Health Place* 2011;17:508–18.
21 Daeppen J-B, Bertholet N, Gaume J, *et al*. Efficacy of brief motivational intervention in reducing binge drinking in young men: a randomized controlled trial. *Drug Alcohol Depend* 2011;113:69–75.
22 Gaume J, Gmel G, Faouzi M, *et al*. Is brief motivational intervention effective in reducing alcohol use among young men voluntarily receiving it? A randomized controlled trial. *Alcoholism: Clinical and Experimental Research* 2011;35:1822–30.
23 Hallgren Mats Å., Källmén H, Leifman H, *et al*. Evaluation of an alcohol risk reduction program (prime for life) in young Swedish military conscripts. *Health Educ* 2009;109:155–68.
24 McCarthy PM, O'Sullivan D. Efficacy of a brief cognitive behavioral therapy program to reduce excessive drinking behavior among new recruits entering the Irish navy: a pilot evaluation. *Mil Med* 2010;175:841–6.
25 Walker DD, Walton TO, Neighbors C, *et al*. Randomized trial of motivational interviewing plus feedback for soldiers with untreated alcohol abuse. *J Consult Clin Psychol* 2017;85:99–110.
26 Klesges RC, Talcott W, Ebbert JO, *et al*. Effect of the alcohol misconduct prevention program (AMPP) in air force technical training. *Mil Med* 2013;178:445–51.

27 Pemberton MR, Williams J, Herman-Stahl M, *et al*. Evaluation of two web-based alcohol interventions in the U.S. military. *J Stud Alcohol Drugs* 2011;72:480–9.
28 Benjamin CL, Puleo CM, Settipani CA, *et al*. History of cognitive-behavioral therapy in youth. *Child Adolesc Psychiatr Clin N Am* 2011;20:179–89.
29 Babor T, Higgins-Biddle J, Saunders J, *et al*. *The Alcohol Use Disorders Identification Test: guidelines for use in primary care*. 2nd edn. Geneva: World Health Organization, Department of Mental Health and Substance Dependence, 2001.
30 Watterson J, Gabbe B, Dietze P, *et al*. Comparing short versions of the Alcohol Use Disorders Identification Test (AUDIT) in a military cohort. *J R Army Med Corps* 2019;165:312–6.
31 Young RM, Knight RG. The drinking expectancy questionnaire: a revised measure of alcohol-related beliefs. *J Psychopathol Behav Assess* 1989;11:99–112.
32 McCambridge J, Kypri K, McElduff P. Regression to the mean and alcohol consumption: a cohort study exploring implications for the interpretation of change in control groups in brief intervention trials. *Drug Alcohol Depend* 2014;135:156–9.
33 Bratberg GH, C Wilsnack S, Wilsnack R, *et al*. Gender differences and gender convergence in alcohol use over the past three decades (1984-2008), the HUNT study, Norway. *BMC Public Health* 2016;16:723.
34 Livingston M, Callinan S, Dietze P, *et al*. Is there gender convergence in risky drinking when taking birth cohorts into account? Evidence from an Australian national survey 2001-13. *Addiction* 2018;113:2019–28.
35 McPherson M, Casswell S, Pledger M. Gender convergence in alcohol consumption and related problems: issues and outcomes from comparisons of new Zealand survey data. *Addiction* 2004;99:738–48.
36 Sobell LC, Sobell MB, Connors GJ, *et al*. Assessing drinking outcomes in alcohol treatment efficacy studies: selecting a yardstick of success. *Alcoholism: Clinical & Experimental Research* 2003;27:1661–6.

5.3 Chapter Summary

Chapter 5 has demonstrated that there has been a diversity of intervention types that have been used to reduce harmful alcohol use or risky single-occasion drinking (RSOD), commonly referred to as binge drinking in the military setting. All these previous studies had been focused on armed forces external to Australia, thereby affirming the need for the RCT described in Chapter 4 and for future experimental studies of early intervention and prevention in the ADF. Many of the interventions examined and the outcomes measured in the included studies for this systematic review indicated that a significant reduction in alcohol consumption and related harms had occurred. However, all the studies that had demonstrated significant effects, discussed the limitations or the non-sustainable reductions that transpired over the follow–up period. An overall conclusion regarding the value of the studies collectively was not possible due to the varied nature of the interventions, the outcome measures used, and the duration of the follow–up period.

This indicates that there was no clear evidence of effective strategies for interventions in the ADF. Consequently, a return to best-practice principles is required in order to determine the nature and extent of the problem.

In the next chapter, the findings of a study that was designed to investigate the reliability of shortened versions of the AUDIT tool (both established and novel versions) to predict hazardous or harmful alcohol use are described. The performance of these abridged versions to the full version of the AUDIT are compared. The implementation of tools such as those described in this chapter were supported by Hamilton et al,[7] who identified screening as an important component in reducing alcohol-related harms in the ADF.

Chapter 6

Alcohol Use Disorders Identification Test (AUDIT)

6.1 Overview

In Chapter 5 the results of a systematic review of the literature are outlined. This chapter examines both established and shortened versions of the AUDIT (see Appendix D) in screening for hazardous and harmful alcohol use in a military population, based on the data gather at baseline from the RCT described in chapter 4. My colleagues and I applied to this military cohort a previously tested and published methodology that had been used in a civilian cohort for testing the suitability of shortened AUDIT variations.[65] We also found that shortened versions of the AUDIT tool could be suitable for screening for hazardous or harmful alcohol consumption.

6.2 Journal Article

The following paper, *Comparing short versions of the Alcohol Use Disorders Identification Test (AUDIT) in a military cohort* was published in the *Journal of the Royal Army Medical Corps* in 2018.

Comparing short versions of the Alcohol Use Disorders Identification Test (AUDIT) in a military cohort

Jason Watterson,[1,2,3,4] B Gabbe,[1] P Dietze,[1,5] A Bowring,[5,6] J V Rosenfeld[7,8,9]

► Additional material is published online only. To view please visit the journal online (http://dx.doi.org/10.1136/jramc-2018-001024)

[1]Department of Epidemiology and Preventive Medicine, School of Public Health and Preventive Medicine, Monash University, Melbourne, Australia
[2]National Trauma Research Institute, Alfred Health, Melbourne, Australia
[3]Royal Australian Navy, Canberra, Australia
[4]Department of Intensive Care and Hyperbaric Medicine, Alfred Health, Melbourne, Australia
[5]Behaviours and Health Risks Programs, Burnet Institute, Melbourne, Australia
[6]Department of Epidemiology, John Hopkins Bloomberg School of Public Health, Baltimore, Maryland, USA
[7]Department of Neurosurgery, Alfred Hospital, Melbourne, Australia
[8]Australian Army, Canberra, Australia
[9]Department of Surgery, F. Edward Hebert School of Medicine, Uniformed Services University of Health Sciences, Bethesda, Maryland, USA

Correspondence to
Jason Watterson, Alfred Hospital, Melbourne 3004, Victoria, Australia; jason.watterson@monash.edu

Received 18 July 2018
Revised 15 September 2018
Accepted 17 September 2018

To cite: Watterson J, Gabbe B, Dietze P, *et al*. *J R Army Med Corps* Epub ahead of print: [*please include* Day Month Year]. doi:10.1136/jramc-2018-001024

ABSTRACT

Background The Alcohol Use Disorders Identification Test (AUDIT) is widely used for monitoring harmful alcohol consumption among high-risk populations. A number of short versions of AUDIT have been developed for use in time-constrained settings. In military populations, a range of AUDIT variations have been used, but the optimal combination of AUDIT items has not been determined.

Methods A total of 952 participants (80% male), recruited as part of a wider study, completed the AUDIT-10. We systematically assessed all possible combinations of three or four AUDIT items and established AUDIT variations using the following statistics: Cronbach's alpha (internal consistency), variance explained (R^2) and Pearson's correlation coefficient (concurrent validity).

Results Median AUDIT-10 score was 7 for males and 6 for females, and 380 (40%) participants were classified as having a score indicative of harmful or hazardous alcohol use (≥8) according to WHO classifications.

A novel four-item AUDIT variation (3, 4, 8 and 9) performed consistently higher than established variations across statistical measures; it explained 85% of variance in AUDIT-10, had a Pearson's correlation of 0.92 and Cronbach's alpha was 0.63. The FAST, an established shortened AUDIT variant, together with several other four-item novel variants of AUDIT-10 performed similarly. The AUDIT-C performed consistently low on all measures, but with a satisfactory level of internal consistency (75%).

Conclusion Shortened AUDIT variations may be suitable alternatives to the full AUDIT for screening hazardous alcohol consumption in military populations. Four-item AUDIT variations focused on short-term risky drinking and its consequences performed better than three item versions.

Trial registration number ACTRN12614001332617.

Key messages

- The 10-item Alcohol Use Disorders Identification Test (AUDIT) is widely used for monitoring harmful alcohol consumption among high-risk populations.
- Short versions of AUDIT have been developed for time-constrained settings, but the optimal combination of AUDIT items is unstudied in military populations.
- We systematically assessed all possible combinations of three or four item AUDIT variations.
- Each of the established and novel variations was systematically assessed using Cronbach's alpha (internal consistency), variance explained (R^2) and Pearson's correlation coefficient (concurrent validity).
- Shortened AUDIT variations may be suitable alternatives to the full AUDIT for screening for hazardous alcohol consumption in military populations.

Hazardous or harmful alcohol consumption is a major public health issue in the Australian population, including in the Australian Defence Force (ADF).[1] As a consequence, some ADF members experience elevated incidence of accidents, physical injury and other short-term harms as well as long-term health conditions and alcohol dependence.[2–4] Therefore, monitoring alcohol consumption is important to identify those at risk of harm along with consumption trends. This information is needed to inform, target and evaluate harm reduction strategies.[5]

The Alcohol Use Disorders Identification Test (AUDIT) was developed as a simple alcohol screening tool for the early identification of hazardous and harmful drinking, rather than identification of people who meet the criteria for alcohol dependence.[6] The AUDIT has been widely used, including in military populations.[7–9] The full AUDIT (AUDIT-10) comprises 10 items that span alcohol consumption, harms and dependence domains. However, a number of short versions of AUDIT have been developed for use in time-constrained settings,[5] including the AUDIT-C (three items) and the FAST (four items). Of the shortened version, previously only the AUDIT-C has been used in the military setting, and this was primarily in the veteran community.[10–20] These, and other variants, have been shown to provide comparable information to the full AUDIT. For example, Bowring and colleagues, found that a four-item variant captured sufficient information about the consumption, dependence and harms domains to be suitable for routine screening of young people.[5]

The purpose of this study was to see if similar shortened versions of the AUDIT could prove useful in the screening of military personnel; minimising the number of items used will increase efficiency and allow measurement of other health behaviours which may be particularly important at the time of entry into military service. Items of the AUDIT used to develop a shortened version are likely to be population-specific, therefore we sought to

identify the optimal combination of three to four AUDIT items for screening hazardous or harmful alcohol consumption in a sample of military recruits.

METHODS

Setting and participants

Initial Entry Trainees, aged 18–30 years, were recruited at the Royal Australian Navy's (RAN) key training establishment in Victoria, Australia between March 2014 and May 2016 as part of a randomised controlled trial (RCT), the protocol for which is published elsewhere.[21] Once trainees complete basic training, they go on to complete their specialist training within one of several training schools of the ADF. Trainees were eligible to participate if their specialist training was for a minimum period of 13 weeks. During the enrolment period for this RCT, 2163 trainees were assessed for eligibility, 1211 did not meet the criteria and two trainees declined to participate. The remaining 952 trainees completed the baseline screening which included the AUDIT-10 prior to randomisation. Participation in the study was voluntary, and written informed consent was obtained from all participants.

Registration

The trial was registered with the Australian and New Zealand Clinical Trials Registry (ANZCTR): ACTRN12614001332617, date of registration: 18/12/2014 'retrospectively registered'.

Questionnaires administered

Each participant was asked to complete a baseline screening questionnaire which included demographic information (age, gender, faculty) and the AUDIT-10. Responses to the AUDIT-10 were based on the preceding 12 months for each participant. The questions of the AUDIT-10 can be divided into three domains: alcohol use (Q1–3), alcohol dependence (Q4–6) and adverse consequences of alcohol use (Q7–10) (table 1). The AUDIT is scored on a scale from 0 to 40.[22]

Analysis

Data were entered into a REDCap database and statistical analysis was conducted using Stata V.12.[23] The AUDIT-10 and established shortened versions of the AUDIT were scored (table 1). The AUDIT-10 scores were further classified and indicator variables were created to describe hazardous drinking (≥8), high level of alcohol problems (≥16) and possible alcohol dependence (≥20) categories according to WHO recommended thresholds.[22]

We assessed all possible combinations of three and four item AUDIT scales. Following a similar method to Bowring and colleagues, we required the tested shortened versions to cover all three domains of the AUDIT-10 (alcohol consumption, C; alcohol dependence, D and harmful alcohol use, H) and include item 9 on alcohol related injury or be a recognised AUDIT variation with a maximum four items (AUDIT-3, AUDIT-C, FAST, AUDIT-4).[5] Inclusion of item 9 was considered reasonable as military recruits are typically younger males[24] and this item, focused on alcohol-related injury, has been shown to be important in previous studies of young people.[25]

The novel and established shortened versions of the AUDIT-10 used in the analysis are outlined in online supplementary appendix table.

Three measures were used to assess each three and four item combinations of the AUDIT, and the previously developed AUDIT variations. These measures were:

1. Cronbach's alpha: calculated to measure internal consistency of each AUDIT version, with a value of 0.7 or greater taken to indicate satisfactory reliability.[6]
2. R^2 statistic: calculated from linear regression between individual items or novel combinations and the total AUDIT score to measure the total variance explained in the overall AUDIT-10 score by each individual item and novel combination of items.
3. Pearson's correlation coefficient: to examine the concurrent validity between each abbreviated AUDIT version.

Table 1 The AUDIT-10 questions and item inclusion in common established shortened AUDIT versions

Item no.	The AUDIT question	AUDIT domain*	Established AUDIT Variations				
			AUDIT-10	AUDIT- C	AUDIT-3	FAST	AUDIT-4
1	How often do you have a drink containing alcohol?	C	▪	▪			▪
2	How many drinks containing alcohol do you have on a typical day when you are drinking?	C	▪	▪			▪
3	How often do you have six or more drinks on one occasion?	C	▪	▪	▪	▪	▪
4	How often during the last year have you found that you were not able to stop drinking once you had started?	D	▪				
5	How often during the last year have you failed to do what was expected of you because of alcohol?	D	▪			▪	
6	How often during the last year have you needed a first drink in the morning to get yourself going after a heavy drinking session?	D	▪				
7	How often during the last year have you had a feeling of guilt and remorse after drinking?	H	▪				
8	How often during the last year have you been unable to remember what happened the night before because of your drinking?	H	▪			▪	
9	Have you or someone else been injured because of your drinking?	H	▪				
10	Has a relative, friend, doctor or other healthcare worker been concerned about your drinking or suggested you cut down?	H	▪			▪	▪
		Score range:	0–40	1–12	0–4	0–16	1–16

*AUDIT domains are: C, alcohol consumption; D, alcohol dependence; H, harmful alcohol use.[5]

Table 2 Statistical scores for novel and established shortened AUDIT variations, ordered from highest to lowest overall rank

Overall rank	Selected novel and established combinations	AUDIT Domain*	Explained variance of total AUDIT-10 score (R^2)	Cronbach's alpha	Pearson's correlations (r)
1	3, 4, 8 and 9	C, D, H	0.85	0.63	0.92
2	3, 5, 8 and 9	C, D, H	0.84	0.63	0.92
3	2, 3, 4 and 9	C, D, H	0.84	0.62	0.92
4	FAST (3, 5, 8 and 10)	C, D, H	0.83	0.61	0.91
5	2, 3 ,5 and 9	C, D, H	0.83	0.61	0.91
6	2, 4, 8 and 9	C, D, H	0.82	0.61	0.91
7	3, 4, 7 and 9	C, D, H	0.83	0.60	0.91
8	3, 6, 8 and 9	C, D, H	0.81	0.63	0.90
9	2, 5, 8 and 9	C, D, H	0.82	0.60	0.91
10	2, 3, 6 and 9	C, D, H	0.81	0.60	0.90
18	AUDIT-4 (1, 2, 3 and 10)	C, H	0.74	0.66	0.86
30	AUDIT-C (1, 2 and 3)	C	0.65	0.75	0.80
37	3, 5 and 9	C, D, H	0.75	0.50	0.90
40	3, 4 and 9	C, D, H	0.77	0.48	0.89
41	2, 4 and 9	C, D, H	0.75	0.45	0.91
47	2, 5 and 9	C, D, H	0.74	0.44	0.90
50	2, 6 and 9	C, D, H	0.70	0.41	0.90
52	1, 4 and 9	C, D, H	0.70	0.38	0.92
53	1, 5 and 9	C, D, H	0.66	0.42	0.90
54	1, 6 and 9	C, D, H	0.61	0.41	0.92
55	AUDIT- 3 (3)	C	0.54	0.44	0.73

*AUDIT domains are: C, alcohol consumption; D, alcohol dependence; H, harmful alcohol use.[5]

Performance on each of these statistics was ranked from highest to lowest. The sum of the ranks of three statistics was then calculated and the abbreviated AUDIT versions were re-ranked based on the sum of all ranks.[5]

RESULTS

Demographic profile

There were 952 participants; the median (IQR) age was 20.4 (19.1–22.9) years and 80% were male. The median (IQR) AUDIT-10 score for males was 7 (5-9) and 6 (4-9) for females. Of the total sample, 36% (n=343) were classified as hazardous drinkers (score≥8), 2% (n=21) had high-level alcohol problems (score ≥16) and 1.7% (n=16) were possibly alcohol dependent (score ≥20). The distribution of drinking behaviours did not differ by gender (p=0.11).

There were 330 possible three-item or four-item combinations. Only 51 (15%) combinations met the specified criteria of representing three domains and containing item 9. The rankings of all 51 combinations, and the existing AUDIT variations, are shown in the (online supplementary appendix table). The 20 highest-ranked three-item and four-item novel combinations as well as the results for the four pre-existing variations, are shown in table 2. The highest ranked overall across all three analyses was the novel combination of 3, 4, 8 and 9. In addition to the injury item, this combination includes information on items largely related to the practice and consequences of short-term risky drinking.

Cronbach's alpha (internal consistency)

The internal consistency of the AUDIT-10 in our sample was 0.80. The highest internal consistency of the three-item combinations was obtained with the AUDIT-C (0.75), followed by the novel combination of items 3, 5 and 9 (0.5) (table 2). This finding is not surprising given that the three-items of the AUDIT-C all come from the same (consumption) domain; inclusion of the key injury item reduced internal consistency considerably. The highest internal consistency of the four-item combinations was obtained with two of the novel combinations 3, 4, 8 and 9 and 3, 5, 8 and 9 (0.63). The FAST (0.61) ranked fourth overall and was the highest ranked of the established four-item combinations.

Variance explained

Of the three-item combinations the AUDIT-C explained the most variance (65%) in the AUDIT-10 score, followed by the combination of items 1, 6 and 9 which explained 61% (table 2). This finding is consistent with previous research showing that consumption explains a large proportion of the variance in AUDIT scores in general population studies. Of all four-item combinations, the combination of items 3, 4, 8 and 9 explained the most variance (85%) in the AUDIT-10 score while the combination of items 2, 3, 6 and 9 explained 81% and the AUDIT-4 explained 74% of the variance in AUDIT-10 score. The novel combination of 2, 3, 6 and 9 includes item 6 clearly related to dependence and a marker of risky drinking for long term harm.

Pearson's correlation coefficient (concurrent validity)

Most of the combinations shown in table 2 demonstrated high levels of concurrent validity with 17/20 correlating with the AUDIT-10 at 0.90 or above. Correlation with the AUDIT-10 was highest with the four-item combinations (each 0.92): 3, 4, 8 and 9; 3, 5, 8 and 9 and 2, 3, 4 and 9. All remaining novel four-item and three-item combinations also demonstrated correlations of at least 0.90. The FAST demonstrated the highest correlation with the AUDIT-10 (ρ=0.91) of the established short versions. The correlations between the AUDIT-10 and AUDIT-4 (ρ=0.86), and the AUDIT-C (ρ=0.80) were lower.

DISCUSSION

We assessed combinations of AUDIT items to determine an optimal shortened version of the questionnaire for use in screening military recruits. Our results align with previous work with different populations showing that much of the information available from the full AUDIT scale can be captured using just a few items of the AUDIT-10.[5 26 27] We found that the novel combinations 3, 4, 8 and 9; 3, 5, 8 and 9 and 2, 3, 4 and 9 out-ranked the FAST, which was the highest ranked four-item combination in previous work with young people.[5] However, we included item 9 on alcohol-related injury as a key AUDIT item for young populations such as active military personnel. Given these novel combinations outperform the FAST and include alcohol-related injury, we suggest that they are appropriate for use with military personnel. However, it should be noted that the differences in the key statistics were relatively small across the top-10 ranked combinations meaning that all of these could be considered for screening purposes. This means that screeners can select from combinations on the basis of specific items of interest. For example, in contexts where the consequences of long-term risky drinking are of most interest, then a combination including the dependence item 6 may be important to include, while item 4 may be most important where the consequences of risky drinking for short term harm are the focus.

Importantly, the AUDIT consumption items included in all of the top 10 combinations related to frequency of short-term risky drinking and/or quantity typically drunk rather than frequency of drinking (item 1), and the top three combinations all included the frequency of short-term risky drinking item. This finding suggests the focus of screening and intervention with military recruits is best directed towards this short-term risky drinking pattern, consistent with previous reviews and work in the area.[10 18 24]

In previous studies of military populations, the AUDIT-C has been the most commonly used AUDIT-10 variant. While the AUDIT-C was the only abbreviated variant demonstrating satisfactory internal consistency, this result stems from the fact that all three items come from a single domain. As the AUDIT-C performed below other variants on other measures, we argue that preferentially including questions from other domains of harm and dependence provides a more reliable measure as a replacement for the full AUDIT-10 when screening for alcohol consumption and harm in military populations.

There are a number of limitations to this study and these should be considered when interpreting the findings. As noted in similar studies exploring shortened AUDIT versions, we did not include a gold standard or comparative clinical diagnosis of harmful/hazardous alcohol use or alcohol-related problems, such as the DSM-IV, precluding assessment of predictive validity.[5 26 27] Consequently, we were only able to determine the performance of the novel AUDIT variations in comparison with the AUDIT-10, which itself has not been validated in this military population. Further, the shortened AUDIT models were not independent of the AUDIT-10, and thus our comparison violated the assumption of an independence for assessing linear regression (variance explained). While this method has been used in previous related studies, our findings should still be interpreted with appropriate caution.[5 28] Finally, our study involved a large sample of largely young naval recruits and the appropriateness of direct extrapolation of the findings to age groups and other military settings should be considered.

CONCLUSION

Among a sample of young military personnel, novel four-item combinations that included items largely related to short-term risky drinking and its consequences showed the highest internal consistency, variance and concurrent validity when compared with the full AUDIT-10. Our findings suggest these novel combinations could be viable alternatives for screening for alcohol misuse in large military populations. While three of the novel combinations tested ranked the highest across the three statistics measured, any of the variations within the top 10 appear to be as effective as the AUDIT-10 at screening for hazardous or harmful alcohol consumption in this population, allowing fine-grained selection of combinations to suit different contexts. Further testing of these novel versions against an independent measure of hazardous alcohol consumption, such as captured using the DSM-IV, is required to establish the best shortened version for use in the military setting.

Acknowledgements The authors would like to acknowledge the participants of the study, along with their instructors and supervisors who enabled their participation. We thank the command team of HMAS Cerberus for their support of this programme. We also thank the P.A.R.T.Y. programme team and the team at the NTRI for their contributions to the programme.

Contributors JW, BG, PD and AB designed the study. JW wrote the first draft of this paper. BG and PD revised the first draft and all authors contributed to successive drafts. All authors read and approved the final manuscript.

Funding This project was funded by a Defence Health Foundation grant. BG was supported by a National Health and Medical Research Council of Australia Career Development Fellowship (GNT1048731) during the preparation of this manuscript.

Declarations of competing interest JW, BG, AB and JVR declare that they have no competing interests. PD has received an untied educational grant from Reckitt Benckinser and an investigator-driven grant from Gilead Sciences for work unrelated to this paper.

Ethics approval Departments of Defence and Veterans' Affairs HREC, Alfred Health HREC and Monash University HREC.

Provenance and peer review Not commissioned; externally peer reviewed.

REFERENCES

1 Australian Defence Force. 2014. Australian Defence Force Alcohol Management Strategy and Plan 2014-2017. Canberra: Commonwealth of Australia.
2 Bonomo YA, Bowes G, Coffey C, *et al*. Teenage drinking and the onset of alcohol dependence: a cohort study over seven years. *Addiction* 2004;99:1520–8.
3 Livingston M, Room R. Variations by age and sex in alcohol-related problematic behaviour per drinking volume and heavier drinking occasion. *Drug Alcohol Depend* 2009;101:169–75.
4 NHMRC. *Australian Guidelines to reduce health risks from Drinking Alcohol*. Canberra: Department of Health and Ageing, 2009.
5 Bowring AL, Gouillou M, Hellard M, *et al*. Comparing short versions of the AUDIT in a community-based survey of young people. *BMC Public Health* 2013;13:301.
6 Saunders JB, Aasland OG, Babor TF, *et al*. Development of the alcohol use disorders identification test (AUDIT): WHO collaborative project on early detection of persons with harmful alcohol consumption--II. *Addiction* 1993;88:791–804.
7 Kelsall HL, Wijesinghe MS, Creamer MC, *et al*. Alcohol use and substance use disorders in Gulf War, Afghanistan, and Iraq War veterans compared with nondeployed military personnel. *Epidemiol Rev* 2015;37:38–54.
8 McFarlane A, Hodson S,Van Hooff M. 2010. Mental health in the Australian defence force: 2010 ADF mental health and wellbeing study: full report. Canberra: Commonwealth of Australia.
9 Waller M, McGuire AC, Dobson AJ. Alcohol use in the military: associations with health and wellbeing. *Subst Abuse Treat Prev Policy* 2015;10:27.
10 Aguirre M, Greenberg N, Sharpley J, *et al*. Alcohol consumption in the UK armed forces: are we drinking too much? *J R Army Med Corps* 2014;160:72–3.
11 Bradley KA, Lapham GT, Hawkins EJ, *et al*. Quality concerns with routine alcohol screening in VA clinical settings. *J Gen Intern Med* 2011;26:299–306.
12 Bradley KA, Williams EC, Achtmeyer CE, *et al*. Implementation of evidence-based alcohol screening in the Veterans Health Administration. *Am J Manag Care* 2006;12:597–606.
13 Bradley KA, Rubinsky AD, Lapham GT, *et al*. Predictive validity of clinical AUDIT-C alcohol screening scores and changes in scores for three objective

alcohol-related outcomes in a Veterans Affairs population. *Addiction* 2016;111:1975–84.
14 Calhoun PS, Wagner HR, Wagner HR. The prevalence of binge drinking and receipt of provider drinking advice among US veterans with military service in Iraq or Afghanistan. *Am J Drug Alcohol Abuse* 2015;50:1–10.
15 Delaney KE, Lee AK, Lapham GT, *et al*. Inconsistencies between alcohol screening results based on AUDIT-C scores and reported drinking on the AUDIT-C questions: prevalence in two US national samples. *Addict Sci Clin Pract* 2014;9:2.
16 Fuehrlein BS, Mota N, Arias AJ, *et al*. The burden of alcohol use disorders in US military veterans: results from the National Health and Resilience in Veterans Study. *Addiction* 2016;111:1786–94.
17 Harris AH, Lembke A, Henderson P, *et al*. Risk of future trauma based on alcohol screening scores: a two-year prospective cohort study among US veterans. *Addict Sci Clin Pract* 2012;7:6.
18 Harbertson J, Hale BR, Watkins EY, *et al*. Pre-deployment alcohol misuse among shipboard active-duty u.s. military personnel. *Am J Prev Med* 2016;51:185–94.
19 Possemato K, Funderburk J, Spinola S, *et al*. Reliability and Validity of a treatment barriers scale for individuals with alcohol use disorder. *Subst Use Misuse* 2016;51:383–94.
20 Williams EC, Frasco MA, Jacobson IG, *et al*. Risk factors for relapse to problem drinking among current and former US military personnel: a prospective study of the Millennium Cohort. *Drug Alcohol Depend* 2015;148:93–101.
21 Watterson J, Gabbe B, Dietze P, *et al*. Measuring the effectiveness of in-hospital and on-base Prevent Alcohol and Risk-related Trauma in Youth (P.A.R.T.Y.) programs on reducing alcohol related harms in naval trainees: P.A.R.T.Y. Defence study protocol. *BMC Public Health* 2017;17.
22 Babor T, Higgins-Biddle J, Saunders J, *et al*. *The alcohol use disorders identification test: guidelines for use in primary care*. 2nd edn. Geneva: World Health Organization, Department of Mental Health and Substance Dependence, 2001.
23 StataCorp. *Stata Statistical Software: Release 12*. College Station, TX: StataCorp LP, 2012.
24 Hamilton M. *The Use of Alcohol in the Australian Defence Force. Report of the independant advisory panel on alcohol*. Canberra: Commonwealth of Australia, 2011.
25 Chikritzhs TN, Pascal R. *Trends in Youth Alcohol Consumption and Related Harms in Australian Jurisdictions, 1990–2002, National Alcohol Indicators: Bulletin No 6*. Perth, Australia: National Drug Research Institute, 2004.
26 Aalto M, Alho H, Halme JT, *et al*. AUDIT and its abbreviated versions in detecting heavy and binge drinking in a general population survey. *Drug Alcohol Depend* 2009;103(1-2):25–9.
27 Cortés-Tomás M-T, Giménez-Costa J-A, Motos-Sellés P. Different versions of the alcohol use disorders identification test (audit) as screening instruments for underage binge drinking. *Drug Alcohol Depend* 2016;158:52–9.
28 McCambridge J, Thomas BA. Short forms of the AUDIT in a Web-based study of young drinkers. *Drug Alcohol Rev* 2009;28:18–24.

6.3 Chapter Summary

In this chapter the primary screening tool used in the RCT, the main study of this thesis, was discussed. Shortened AUDIT variations could be suitable alternatives to the full AUDIT tool for screening for hazardous alcohol consumption in military populations. Four-item AUDIT variations performed better than three-item versions. The use of a novel four-item AUDIT variation (3, 4, 8 & 9) of the AUDIT-10 may be more effective and efficient at measuring hazardous and harmful alcohol consumption in this population than established shortened variations that have previously been used.

Chapter 7
Discussion and Conclusions

7.1 Introduction

In this chapter, the key findings are summarised and the strengths and limitations of this program of doctoral research studies are outlined. Based on the key findings, recommendations have been made for early screening, in particular the use of the AUDIT tool, and for future use of the P.A.R.T.Y. program within the military. Finally, recommendations for future research have been made.

The overall aim of this doctoral research program was to examine alcohol use and a alcohol harm reduction intervention for young naval trainees from the Royal Australian Navy. This issue is important for several reasons. Harmful and risky single-occasion drinking (RSOD) of alcohol in the ADF and international military is a significant problem.[7,48,66] Much of the literature related to harmful and RSOD alcohol use in the military has focused on veteran populations and little is known regarding its impact on active-duty military personnel. Currently in the ADF, there are no substantial prevention or harm reduction programs; the focus has been on simple awareness training and interventions targeted at individuals who have identified alcohol dependence.

To begin this program of research, a pilot study was first undertaken. The findings of this pilot study (Chapter 2) informed the aims and methods used in a subsequent RCT.

7.2 Key Findings

This program of doctoral research studies sought to address the following four key objectives:

1. *Determine the feasibility of implementing the P.A.R.T.Y. program as an intervention in a military population*

The findings from the pilot study presented in Chapter 2[64] demonstrate that the relationship between *HMAS Cerberus*, as the RAN's largest training base, and the Alfred Hospital was capable of delivering the P.A.R.T.Y. program in an in-hospital format to a military cohort. The decision to implement the P.A.R.T.Y. program as an additional harm reduction program for RAN trainees was made by the Commanding Officer (CO) of the facility in consultation with the P.A.R.T.Y. program team at the Alfred. As a result, the program was delivered and measured using existing participant evaluation tools that had been widely used by most P.A.R.T.Y program sites across Australia and

internationally.[67] The findings from the limited number of studies evaluating P.A.R.T.Y. have been positive[63,68]; however, the limitation of these studies was their retrospectivity.

The results of the pilot study in a military setting strengthened the need for an RCT. The results demonstrated the strength in testing the effectiveness of the P.A.R.T.Y. program with trainees without prior alcohol-related issues. The results of the pilot study did not support the inclusion of trainees with reported alcohol-related incidents prior to participation given that this group had a slightly higher post-program rate of incidents. Overall, the pilot study, despite being limited by its small sample size and observational nature, received positive response from the participants.

2. *Examine the effectiveness of the P.A.R.T.Y. Defence programs in reducing alcohol-related harms in a military trainee population in a randomised controlled trial*

Several distinct populations have been identified as being at high risk from harmful drinking, and one of those populations includes military or defence force personnel.[69] Unpublished data from the ADF suggested that 26% of ADF members have reported consuming alcohol at hazardous or harmful levels[7]; consequently, this alarming statistic galvanised the ADF to examine effective interventions that it could institute for its population.

One of the findings of this RCT study was that there was no reported difference between the primary (risk of reporting and AUDIT score of 8 or above) and the secondary (reported alcohol incident) outcomes for either of the intervention groups and the control group, or between the intervention groups, at 12 months post intervention. Consequently, there is a need for further work on early screening and targeted intervention within the ADF based on the results of this RCT.

Finally, there is no documented literature on the P.A.R.T.Y. program that relates to the theoretical framework that it is based on. In contrast, other interventions discussed in the literature have clearly defined and tested theoretical frameworks upon which they have been evaluated.

3. *Review available evidence on workplace-based interventions in military populations for reducing harmful alcohol use.*

The findings from the systematic review found that only a small number of studies had examined the effectiveness of workplace-based interventions in reducing harmful or RSOD alcohol use in active-duty military populations. The studies appraised in the systematic review included various intervention methods and a variety of tools that had been used to measure outcomes. However, none

of these reviewed studies was able to demonstrate a sustainable effect on the outcomes measured. Low methodological rigour impaired the capacity of most studies to demonstrate effectiveness. Furthermore, inconsistency in outcomes measured impaired the possibility of completing a meta-analysis of the combined data from the included studies.

The studies included in the systematic review also indicated that there was a tendency for military personnel to eschew interventions given the general belief of participants that they would be perceived as being weak by their peers. Participants included in these studies also describe a perceived risk to their careers, which could be jeopardised through administrative actions, rather than appreciating the educational value of the programs for building resilience and life skills for them to make better informed choices.

4. *Examine the nature and extent of hazardous/harmful drinking and explore and describe screening using a validated alcohol screening tool, the AUDIT of a cohort of military personnel.*

As described in Key Finding 1, the selection of screening tools following the pilot study for the RCT was pivotal in ensuring the rigour of the methodology. The AUDIT, as the tool selected to measure the primary outcome of the RCT, was more closely examined in the paper published and described in Chapter 6 of this thesis.[70] The purpose of this study was to examine the AUDIT in more detail, including comparing both the established and novel shortened versions of it in a military cohort. It was also completed in part with a view to inform the ADF and other militaries of the possible benefits of a shortened version of the AUDIT for military populations that could still provide a tool that was capable of identifying risky alcohol-related behaviour

In adopting a proven methodology from a previously published study that examined shortened versions in the general population, a novel four-item version of the AUDIT was developed that performed consistently higher than established variations in the military context.

Summary of the key findings

- It was feasible to deliver a full-day intervention to a military cohort of the RAN.
- The existing outcome measures and tools used in the pilot study required strengthening to improve outcome reporting and comparability with other Australian and international studies.

- The screening of RAN personnel early in their training using the full 10-item AUDIT tool was possible and provided a comprehensive understanding of the drinking habits of newly recruited sailors.
- A novel shortened version of the AUDIT tool was identified as providing consistent outcomes for harmful alcohol use in the cohort examined compared to the full 10-item version.
- A 12-month follow-up of participants in all three arms of the RCT demonstrated a non-statistically significant reduction in harmful drinking as indicated by the percentage of participants with AUDIT scores < 8.
- A need for military intervention studies to increase their methodology rigour by including adequate study power, randomisation, the selection of validated outcome measures, and longer-term follow-up.

7.3 Strengths and Limitations of the Research

The strengths and limitations of each discrete study have been discussed in the manuscripts presented in Chapters 2 to 6. In this section, the broad strengths and limitations of this program of doctoral research are discussed.

This research program had three main strengths. First, the RCT was the first of its kind in Australia and internationally to measure the effectiveness of the P.A.R.T.Y. program. The study generated new knowledge regarding the feasibility of the P.A.R.T.Y. program as a harm reduction and a risk reduction educational intervention. The RCT had been preceded by a pilot study and had been influenced by several observational studies of the intervention,[63,67,68] allowing optimisation of the study design. Second, at the time, this was the first study of its type that had used a harm reduction intervention with a cohort of active-duty ADF personnel. As such, it demonstrated not only the ability of the ADF to participate in such interventions but also that it was able to engage with external collaborators in the development and evaluation of such interventions. Third, the research had demonstrated that it was possible to undertake blanket screening using a validated screening tool recommended by its own prior review. This was an undertaking that would likely prove to be beneficial in the early detection and intervention of at-risk individuals and groups. Furthermore, the comparative study of the AUDIT tool within this program of research had provided possible novel

shortened variants of the tool, which would make widespread screening within the ADF much more efficient whilst maintaining the effectiveness of the tool and its outcomes.

The findings of this thesis should be interpreted with the following limitations in mind: the studies were limited to a single ADF site and a single service, the RAN. The ADF comprises many personnel spread across a wide geographical spectrum. Consequently, the many different influences of the various locations where ADF personnel live, and work will have an influence on the consumption of alcohol and its associated risks. The cohort examined in the included studies were also of a demographic that was more likely to use alcohol in a harmful way, particularly RSOD. As such, the results of this program of research may not be generalisable beyond the age group included in this body of work.

7.4 Recommendations Arising From the Research

Several recommendations arose from the key findings of this research. Recommendations for screening of military personnel are presented first, followed by recommendations regarding the P.A.R.T.Y program, and then recommendations for further research.

7.4.1 Recommendations for Screening of Military Personnel

1. Incorporate screening into induction for all new recruits

As demonstrated in Chapter 6, it is feasible to undertake the screening of new recruits to obtain baseline scores for alcohol use in the early stage of their training. There is a growing number of countries using the AUDIT as screening tool in the general population. Use of the AUDIT tool is also becoming established across international militaries as indicated by the studies included in the systematic review described in Chapter 5.

Furthermore, the ease of introducing a screening process, such as the use of the AUDIT tool, could be improved using a shortened version of the AUDIT as outlined in Chapter 6 of this thesis. This would further simplify the process and the time burden whilst maintaining the validity of the results gained through whole of population screening.

7.4.2 Recommendations Regarding the P.A.R.T.Y. Program

1. Theoretical framework for P.A.R.T.Y.

One of the identified challenges for this program of research was the use of the P.A.R.T.Y. program as the intervention of choice. At the commencement of the pilot study, *HMAS Cerberus* had already committed to the use of the PA.R.T.Y. program. The initial decision to develop this intervention for use in a military setting had been made based on convenience and accessibility. Limited consideration had been given to the theoretical underpinnings of P.A.R.T.Y. However, the timing enabled the development of this program of research to explore its future implementation and effectiveness. Through this process, a concerted effort was made to ensure that the evaluation of the program was as rigorous as possible in order to accurately evaluate its effectiveness in the population. It was acknowledged from the outset of the pilot study described in Chapter 2, and again in describing the RCT protocol and results in Chapters 4 and 5 respectively, that the program, which had been running in over 80 sites internationally, had had limited evaluation of its effectiveness and was not principally based on an accepted theoretical framework. Indeed, the fundamental tenets of the program are inconsistent with review evidence of AOD primary prevention programs. [71] This lack of a defined theoretical framework has left the program open to criticism from experts in the field of drug and alcohol harm reduction.

2. In-hospital versus on-base

In consultation with RAN representatives early in the development of this program of research, and particularly the RCT, they advised that any future program would be more beneficial if it could be implemented on the base and be available for larger numbers of participants. In consultation with the PA.R.T.Y. program staff, work was undertaken to develop a program that could be implemented on the base for up to 100 participants. This on-base P.A.R.T.Y. program was based on an existing outreach model of the program. The importance of introducing this variation of the intervention at this stage meant it could be included as a third arm of the RCT and be evaluated not only against a control but also against the traditional in-hospital intervention for its effectiveness.

3. *Augmentation of the P.A.R.T.Y Program*

In view of recommendations one and two it may also be prudent for the NTRI to consider reviewing the P.A.R.T.Y. program and augmenting it with evidence-based techniques such as motivational enhancement or social norms interventions, or other such methods as described in the systematic review in chapter 5

7.4.3 Recommendations for Further Research

As the pilot and RCT studies had only been conducted at one base and for a single service (RAN), the results may not be generalisable across all three services of the ADF.[64,72] Indeed, both studies also only recruited sailors and not junior officers. Therefore, implementation of the program and interventions to included initial training facilities used by the Army, RAAF and the tri-service officer training facility at the Australian Defence Force Academy (ADFA) also needs to be investigated.

Screening of all newly recruited ADF personnel, together with ongoing periodic screening of all ADF personnel, may also provide a better understanding of the needs of such interventional programs for harm reduction. This would also allow for an organisation-wide approach to the collection and analysis of alcohol consumption data, using tools such as AUDIT for a broader group, rather than the collection of data for the purpose of managing an individual's incident as is the current practice.

Based on the finding of the systematic review the ADF could consider either further research examining the efficacy of interventions with an evidence-base, or as outlined earlier the augmentation of evidence-based interventions into the P.A.R.T.Y program. This would then enable further research of this newly developed form of P.A.R.T.Y as the collaboration has continued to be fostered.

This program of research has demonstrated that one arm of the ADF is able to work collaboratively with external experts alongside ADF health professionals to provide interventions and coordinate the collection of data to better inform policy and guide program implementation for the reduction of harm related to alcohol and other drugs.

7.5 Translation Into Practice

Despite the findings from this doctoral research program, the RAN and the P.A.R.T.Y. program at the Alfred have continued to deliver both in-hospital and on-base interventions for trainees posted to *HMAS Cerberus*. The P.A.R.T.Y program team continues to work with *HMAS Cerberus* in developing a more robust theoretical framework for the program. There continues to be discussion regarding the screening and evaluation tools used for the program based on the findings from these doctoral research studies.

Based on the implementation of the program on this single site, there is the possibility of developing similar programs for the other two ADF services and implementing them with the assistance of local health providers to reach trainees beyond the RAN. Indeed, there is also a possibility of implementing this program at the ADFA in Canberra, which would then enable young ADF officers to also have access to the same program as enlisted members.

If future use of this program is considered for continuation locally or more broadly across the ADF, there is a need for further consultation to improve the theoretical underpinnings of the program and to modify the program to include validated outcome measures that could be compared across defence sites and to the general population.

The aspect of this program of research that showed the most promise was the early screening – in this case, using the AUDIT tool with RAN trainees. This could be extended to regular screening of all ADF members as was recommended in the Hamilton et al (2011) report. With early and potentially regular screening, the possibility of then introducing interventions, such as brief interventions as outlined in Chapter 5, could then be measured more effectively.

7.6 Concluding Remarks

The aim of this research program was to examine alcohol use and an alcohol harm reduction intervention for young naval trainees of the RAN. Currently, there are no alcohol harm reduction and education programs being used as early interventions within the ADF. This thesis has assisted in closing the knowledge gap identified by the 2011 Review into the Use of Alcohol in the ADF by Hamilton et al. This thesis also has examined the effectiveness of an intervention that has widely been used throughout Australia and internationally. It has directly addressed the needs that were identified by the 2011 Review into the Use of Alcohol in ADF report for engaging with external collaborators in the field of harm reduction and for introducing a model of intervention that is ideally suited to members of a population who are, by virtue of the roles they fill within the ADF, risk-takers.

The findings of this program of research have identified focus points for the improvement of early screening measures for alcohol use and the examination of one harm minimisation program that have been designed to meet the needs of the population.

References

1. Department of Health. National Alcohol Strategy 2019–2028 [Internet]. Canberra: Australian Government; 2019 [cited 2020 Jan 28]. 44 p. Available from: https://www.health.gov.au/sites/default/files/documents/2020/11/national-alcohol-strategy-2019-2028.pdf

2. Rehm J, Mathers C, Popova S, Thavorncharoensap M, Teerawattananon Y, Patra J. Global burden of disease and injury and economic cost attributable to alcohol use and alcohol-use disorders. Lancet [Internet]. 2009 Jun 27 [cited 2019 Jan 21];373(9682):2223_33. Available from: https://doi.org/10.1016/S0140-6736(09)60746-7

3. Foundation for Alcohol Research & Education [Internet]. Deakin ACT: FARE; 2021. Annual alcohol poll 2016: attitudes and behaviours; 2016 May 18 [cited 2019 Jan 21]. Available from: https://fare.org.au/annual-alcohol-poll-2016-attitudes-and-behaviours/.

4. Laslett AM, Catalano P, Chickritzhs Y, Dale C, Doran C, Ferris J, et al. The range and magnitude of alcohol's harm to others [Internet]. Fitzroy, Victoria: AER Centre for Alcohol Policy Research, Turning Point Alcohol and Drug Centre, Eastern Health; 2010 [cited 2019 Jan 21]. Available from: https://fare.org.au/wp-content/uploads/The-Range-and-Magnitude-of-Alcohols-Harm-to-Others.pdf

5. Manning M, Smith C, Mazerolle P. The societal costs of alcohol misuse in Australia [Internet]. Canberra: Australian Institute of Criminology; 2013 Apr [cited 2019 Jan 21]. 6 p. Trends & Issues in Crime & Criminal Justice No. 454. Available from: https://www.aic.gov.au/sites/default/files/2020-05/tandi454.pdf

6. Collins DJ, Lapsley HM. The costs of tobacco, alcohol and illicit drug abuse to Australian Society in 2004/05 [Internet]. Canberra: Department of Health and Ageing; 2008 [cited 2019 Jan 21]. 143 p. Available from: http://tobacco.cleartheair.org.hk/wp-content/uploads/2012/06/mono64.pdf

7. Hamilton M, Allsop S, Wiggers J, Alexander P. The use of alcohol in the Australian Defence Force: report of the Independent Advisory Panel on Alcohol [Internet]. Canberra: Department of Defence; 2011 [cited 2019 Jan 21]. 162 p. Available from: file:///C:/Users/PC/Downloads/ReviewoftheUseofAlcoholintheADFfullreport%20(1).pdf

8. Keane H. Intoxication, harm and pleasure: an analysis of the Australian National Alcohol Strategy. Crit Public Health [Internet]. 2009 Jun 29 [cited 2019 Jan 21];19(2):135–42. Available from: https://doi.org/10.1080/09581590802350957

9. Fry M-L. Seeking the pleasure zone: understanding young adults' intoxication culture. Australasian Marketing Journal [Internet]. 2011 Feb 01 [cited 2019 Jan 21];19(1):65–70. Available from: https://doi.org/10.1016/j.ausmj.2010.11.009

10. World Health Organization. Global strategy to reduce the harmful use of alcohol [Internet]. Geneva: WHO; 2010 [cited 2019 Jan 21]. 44 p. Available from: https://www.who.int/substance_abuse/alcstratenglishfinal.pdf

11. Martiniuk ALC, Chen H-Y, Glozier N, Patton G, Senserrick T, Williamson A, et al. High alcohol use a strong and significant risk factor for repetitive self-harm in female and male youth: a prospective cohort study. Am J Drug Alcohol Abuse [Internet]. 2015 Aug 05 [cited 2019 Jan 21];41(5):465–73. Available from: https://doi.org/10.3109/00952990.2015.1062023

12. Mundt MP, Zakletskaia LI, Brown DD, Fleming MF. Alcohol-induced memory blackouts as an indicator of injury risk among college drinkers. Inj Prev [Internet]. 2012 Jan 19 [cited 2019 jan 21];18(1):44–9. Available from: http://dx.doi.org/10.1136/ip.2011.031724

13. World Health Organization. Global status report on alcohol and health 2018 [Internet]. Geneva: WHO; 2018 [2021 Oct 31]. 472 p. Available from: https://apps.who.int/iris/bitstream/handle/10665/274603/9789241565639-eng.pdf

14. Griswold MG, Fullman N, Hawley C, Arian N, Zimsen SRM, Tymeson HD, et al. Alcohol use and burden for 195 countries and territories, 1990 to 2016: a systematic analysis for the Global Burden of Disease Study 2016. Lancet [Internet]. 2018 Sep 22 [cited 2020 Aug 16];392(10152):1015–35. Available from: https://doi.org/10.1016/S0140-6736(18)31310-2

15. Australian Institute of Health and Welfare. National drug strategy household survey 2019 [Internet]. Canberra: AIHW; 2020 [cited 2021 Nov 03]. 104 p. Drug Statistics Series No. 32. PHE 270. Available from: https://www.aihw.gov.au/getmedia/77dbea6e-f071-495c-b71e-3a632237269d/aihw-phe-270.pdf.aspx?inline=true

16. National Health and Medical Research Council. Australian guidelines to reduce health risks from drinking alcohol [Internet]. Canberra: NHMRC; 2020 [cited 2021 Oct 03]. 106 p. Available from: file:///C:/Users/PC/Downloads/Australian%20guidelines%20to%20reduce%20health%20risks%20from%20drinking%20alcohol.pdf

17. Australian Institute of Health and Welfare. National drug strategy household survey detailed report 2013 [Internet]. Canberra: AIHW; 2014 [cited 2019 Jan 21]. 162 p. Drug Statistics Series No. 28. Cat. No. PHE 183. Available from: https://www.aihw.gov.au/getmedia/c2e94ca2-7ce8-496f-a765-94c55c774d2b/16835_1.pdf.aspx?inline=true

18. Monteiro MG, Rehm J, Shield KD, Stockwell T. Alcohol consumption: an overview of international trends. In Quah SR, editor. International Encyclopedia of Public Health. 2nd ed. [Internet]. Cambridge (MA): Academic Press; 2017. p. 45–57. Available from: https://doi.org/10.1016/B978-0-12-803678-5.00012-6

19. Edwards G, Hensman C, Peto J. A comparison of female and male motivation for drinking. Int J Addict [Internet]. 1973 [cited 2019 Jan 21];8(4):577–87. Available from: https://doi.org/10.3109/10826087309057485

20. Jung J. Drinking motives and behavior in social drinkers. J Stud Alcohol Drugs [Internet]. 1977 [cited 2019 Jan 21];38(5):944–52. Available from: https://doi.org/10.15288/jsa.1977.38.944

21. Riley JW Jr, Marden CF, Lifshitz M. The motivational pattern of drinking based on the verbal responses of a cross-section sample of users of alcoholic beverages. Q J Stud Alcohol [Internet]. 1948 Dec [cited 2019 Jan 21];9(3):353–62. PMID: 18098849.

22. Cronin C. Reasons for drinking versus outcome expectancies in the prediction of college student drinking. Subst Use Misuse [Internet]. 1997 [cited 2019 Jan 21];32(10):1287–311. Available from: https://doi.org/10.3109/10826089709039379

23. Werner MJ, Walker LS, Greene JW. Alcohol expectancies, problem drinking, and adverse health consequences. J Adolesc Health [Internet]. 1993 Sep 01 [cited 2019 Jan 21];14(6):446–52. Available from: https://doi.org/10.1016/1054-139X(93)90116-7

24. Leigh BC, Stacy AW. Alcohol outcome expectancies: scale construction and predictive utility in higher-order confirmatory models. Psychol Assess [Internet]. 1993 [cited 2019 Jan 21];5(2):216–29. Available from: https://doi.org/10.1037/1040-3590.5.2.216

25. Lyvers M, Hasking P, Hani R, Rhodes M, Trew E. Drinking motives, drinking restraint and drinking behaviour among young adults. Addict Behav [Internet]. 2010 Feb [cited 2019 Jan 21];35(2):116–22. Available from: https://doi.org/10.1016/j.addbeh.2009.09.011

26. Cox MW, Klinger E. A motivational model of alcohol use. J Abnorm Psychol [Internet]. 1988 Jun [cited 2019 Jan 21];97(2):168–80. Available from: https://doi.org/10.1037/0021-843X.97.2.168

27. Cooper ML. Motivations for alcohol use among adolescents: development and validation of a four-factor model. Psychol Assess [Internet]. 1994 Jun [cited 2019 Jan 21];6(2):117–28. Available from: https://doi.org/10.1037/1040-3590.6.2.117

28. Temmen CD, Crockett LJ. Adolescent predictors of social and coping drinking motives in early adulthood. J Adolesc [Internet]. 2018 Jul [cited 2021 Oct 26];66:1–8. Available from: https://doi.org/10.1016/j.adolescence.2018.03.018

29. Kuntsche E, Knibbe R, Gmel G, Engels R. Why do young people drink? A review of drinking motives. Clin Psychol Rev [Internet]. 2005 Nov [cited 2021 Oct 26];25(7):841–61. Available from: https://doi.org/10.1016/j.cpr.2005.06.002

30. Stockings E, Hall WD, Lynskey M, Morley KI, Reavley N, Strang J, et al. Prevention, early intervention, harm reduction, and treatment of substance use in young people. Lancet Psychiatry [Internet]. 2016 Mar 01 [cited 2021 Oct 26];3(3):280–96. Available from: https://doi.org/10.1016/S2215-0366(16)00002-X

31. Degenhardt L, Stockings E, Patton G, Hall WD, Lynskey M. The increasing global health priority of substance use in young people. Lancet Psychiatry [Internet]. 2016 Mar 01 [cited 2021 Oct 26];3(3):251–64. Available from: https://doi.org/10.1016/S2215-0366(15)00508-8

32. Richer I, Lee JE, Born J. Patterns of alcohol use among Canadian military personnel and their associations with health and well-being. Health Psychol [Internet]. 2016 Apr 07 [cited 2019 Jan 21];35(7):685–94. Available from: https://doi.org/10.1037/hea0000328

33. Back SE, Killeen TK, Teer AP, Hartwell EE, Federline A, Beylotte F, et al. Substance use disorders and PTSD: an exploratory study of treatment preferences among military veterans. Addict Behav [Internet]. 2014 Feb [cited 2019 Jan 21];39(2):369–73. Available from: https://doi.org/10.1016/j.addbeh.2013.09.017

34. Kelsall HL, Wijesinghe MS, Creamer MC, McKenzie DP, Forbes AB, Page MJ, et al. Alcohol use and substance use disorders in Gulf War, Afghanistan, and Iraq War veterans compared with nondeployed military personnel. Epidemiol Rev [Internet]. 2015 Jan 14 [cited 2019 Jan 21];37(1):38–54. Available from: https://doi.org/10.1093/epirev/mxu014

35. Pedersen ER, Parast L, Marshall GN, Schell TL, Neighbors C. A randomized controlled trial of a web-based, personalized normative feedback alcohol intervention for young-adult veterans. J Consult Clin Psychol [Internet]. 2017 May 01 [cited 2020 Aug 16];85(5):459–70. Available from: https://doi.org/10.1037/ccp0000187

36. Thandi G, Sundin J, Ng-Knight T, Jones M, Hull L, Jones N, et al. Alcohol misuse in the United Kingdom Armed Forces: A longitudinal study. Drug Alcohol Depend [Internet]. 2015 Nov 01 [cited 2021 Oct 31];156:78–83. Available from: https://doi.org/10.1016/j.drugalcdep.2015.08.033

37. McCarthy PM, O'Sullivan D. Efficacy of a brief cognitive behavioral therapy program to reduce excessive drinking behavior among new recruits entering the Irish Navy: a pilot evaluation. Mil Med [Internet]. 2010 Nov [cited 2019 Jan 21];175(11):841–6. Available from: https://doi.org/10.7205/MILMED-D-09-00251

38. Pemberton MR, Williams J, Herman-Stahl M, Calvin SL, Bradshaw MR, Bray RM, et al. Evaluation of two web-based alcohol interventions in the U.S. military. J Stud Alcohol Drugs [Internet]. 2011 May [cited 2019 Jan 21];72(3):480–9. Available from: https://doi.org/10.15288/jsad.2011.72.480

39. Walker DD, Walton TO, Neighbors C, Kaysen D, Mbilinyi L, Darnell J, et al. Randomized trial of motivational interviewing plus feedback for soldiers with untreated alcohol abuse. J Consult Clin Psychol [Internet]. 2017 Feb 01 [cited 2019 Jan 21];85(2):99–110. Available from: https://doi.org/10.1037/ccp0000148

40. Daeppen J-B, Bertholet N, Gaume J, Fortini C, Faouzi M, Gmel G. Efficacy of brief motivational intervention in reducing binge drinking in young men: a randomized controlled trial. Drug Alcohol Depend [Internet]. 2011 Jan 01 [cited 2019 Jan 21];113(1):69–75. Available from: https://doi.org/10.1016/j.drugalcdep.2010.07.009

41. Gaume J, Gmel G, Faouzi M, Bertholet N, Daeppen J-B. Is brief motivational intervention effective in reducing alcohol use among young men voluntarily receiving it? A randomized controlled trial. Alcohol Clin Exp Res [Internet]. 2011 Oct [cited 2019 Jan 21];35(10):1822–30. Available from: https://doi.org/10.1111/j.1530-0277.2011.01526.x

42. Hallgren MA, Kallmen H, Leifman H, Sjolund T, Andreasson S. Evaluation of an alcohol risk reduction program (prime for life) in young Swedish military conscripts. Health Educ [Internet]. 2009 Feb 20 [cited 2019 Jan 21];109(2):155–68. Available from: https://doi.org/10.1108/09654280910936602

43. Klesges RC, Talcott W, Ebbert JO, Murphy JG, McDevitt-Murphy ME, Thomas F, et al. Effect of the Alcohol Misconduct Prevention Program (AMPP) in air force technical training. Mil Med [Internet]. 2013 Apr [cited 2019 Jan 21];178(4):445–51. Available from: https://doi.org/10.7205/MILMED-D-12-00400

44. Pedersen ER, Parast L, Marshall GN, Schell TL, Neighbors C. A randomized controlled trial of a web-based, personalized normative feedback alcohol intervention for young-adult veterans. J Consult Clin Psychol [Internet]. 2017 May 01 [cited 2019 Jan 21];85(5):459–70. Available from: https://doi.org/10.1037/ccp0000187

45. Watterson J, Gabbe B, Rosenfeld J. V. Ball H. Romero L. Dietze P. Workplace intervention programmes for decreasing alcohol use in military personnel: A systematic review of the literature. BMJ Military Health [Internet]. 2021 [cited 2021 Sept 04];*167*(3): 192–200. Available from: http://dx.doi.org/10.1136/bmjmilitary-2020-001584

46. Hollis B, Kelley ML, Bravo AJ. Pre-military abuse, mental health, and hazardous alcohol use among military personnel. J Subst Use [Internet]. 2017 [cited 2020 Jan 28];22(2):187–91. Available from: https://doi.org/10.1080/14659891.2016.1177613

47. Theriault FL, Gabler K, Naicker K. Health and Lifestyle Information Survey of Canadian Armed Forces Personnel 2013/2014 – regular force report [Internet]. Ottawa: Department of National Defence; 2016 Sep [cited 2021 Oct 26]. 274 p. Available from: https://www.canada.ca/content/dam/dnd-mdn/documents/health/health-and-lifestyle-survey-2013-2014.pdf

48. Bray RM, Brown JM, Williams J. Trends in binge and heavy drinking, alcohol-related problems, and combat exposure in the U.S. military. Subst Use Misuse [Internet]. 2013 Jul [cited 2021 Nov 03];48(10):799–810. Available from: https://doi.org/10.3109/10826084.2013.796990

49. Henderson A, Langston V, Greenberg N. Alcohol misuse in the Royal Navy. Occup Med [Internet]. 2009 Jan [cited 2019 Jan 21];59(1):25–31. Available from: https://doi.org/10.1093/occmed/kqn152

50. Jones E, Fear NT. Alcohol use and misuse within the military: a review. Int Rev Psychiatry [Internet]. 2011 Apr [cited 2019 Jan 21];23(2):166–72. Available from: https://doi.org/10.3109/09540261.2010.550868

51. Aguirre M, Greenberg N, Sharpley J, Simpson R, Wall C. Alcohol consumption in the UK armed forces: are we drinking too much? J R Army Med Corps [Internet]. 2014 Mar [cited 2019 Jan 21];160(1):72–3. Available from: http://dx.doi.org/10.1136/jramc-2013-000059

52. Ames G, Cunradi C. Alcohol use and preventing alcohol-related problems among young adults in the military. Alcohol Res Health. 2005 Jan [cited 2019 Jan 21];28(4):252–7. Available from: https://pubs.niaaa.nih.gov/publications/arh284/252-257.pdf

53. Pack AJ. Nelson's blood: the story of naval rum. Hampshire, UK: Kenneth Mason; 1982. 200 p.

54. Teachman J, Anderson C, Tedrow LM. Military service and alcohol use in the United States. Armed Forces Soc [Internet]. 2014 Jul 31 [cited 2019 Jan 21];41(3):460–76. Available from: https://doi.org/10.1177/0095327X14543848

55. Ministerial Council on Drug Strategy. The National Drug Strategy 2010–2015: a framework for action on alcohol, tobacco, and other drugs. Canberra: Australian Government; 2011 [cited 2019 Jan 21]. 42 p. Available from: http://fileserver.idpc.net/library/National%20Drug%20Strategy%202010-2015.pdf

56. Department of Health. National Drug Strategy 2017–2026 [Internet]. Canberra: Australian Government; 2017 [cited 2020 Aug 16]. 56 p. Available from: https://www.health.gov.au/sites/default/files/national-drug-strategy-2017-2026.pdf

57. Van Hooff M, McFarlane AC, Davies CE, Searle AK, Fairweather-Schmidt AK, Verhagen A, et al. The Australian Defence Force Mental Health Prevalence and Wellbeing Study: design and methods. Eur J Psychotraumatol [Internet]. 2014 Aug [cited 2019 Jan 21];5(1):Article 23950. Available from: https://doi.org/10.3402/ejpt.v5.23950

58. Waller M, McGuire AC, Dobson AJ. Alcohol use in the military: associations with health and wellbeing. Subst Abuse Treat Prev Policy [Internet]. 2015 Jul 28 [cited 2019 Jan 21];10: Article 27. Available from: https://doi.org/10.1186/s13011-015-0023-4

59. Selman J, Rogers R, Molloy S. Negative Alcohol and Tobacco Consumption Behaviors in an Australian Army Combat Brigade. Mil Med 2019;185(5-6):e686-e93.

60. McFarlane AC, Hodson SE, Van Hooff M, Davies C. Mental health in the Australian Defence Force: 2010 ADF Mental Health and Wellbeing Study: full report [Internet]. Canberra: Department of Defence; 2011 [cited 2019 Jan 21]. 380 p. Available from: file:///C:/Users/PC/Downloads/26%20DAR%202015-16_17%20Feb%2017_JSCFADT%20QoN%20No%2026-Mental%20Health%20Prevalence_Wellbeing%20Study%20(D15b).pdf

61. Department of Defence. Australian Defence Force Alcohol Management Strategy and Plan 2014–2017 [Internet]. Canberra: Australian Government; 2014 [cited 2019 Jan 21]. 19 p. Available from: file:///C:/Users/PC/Downloads/AlcoholManagementStrategyandPlan.pdf

62. Tanner-Smith EE, Lipsey MW. Brief alcohol interventions for adolescents and young adults: a systematic review and meta-analysis. J Subst Abuse Treat [Internet]. 2015 Apr 01 [cited 2019 Jan 21];51:1–18. Available from: https://doi.org/10.1016/j.jsat.2014.09.001

63. Ho KM, Litton E, Geelhoed E, Gope M, Burrell M, Coribel J, et al. Effect of an injury awareness education program on risk-taking behaviors and injuries in juvenile justice offenders: a retrospective cohort study. PLoS ONE [Internet]. 2012 Feb 15 [cited 2019 jan 21];7(2):e31776. Available from: https://doi.org/10.1371/journal.pone.0031776

64. Watterson J, Gabbe B, Dietze P, Thompson J, Oborn M, Rosenfeld JV. Piloting an injury awareness and education program for reducing alcohol-related harm in navy trainees. J Subst Use [Internet]. 2018 [cited 2019 Jan 21];23(1):74–8. Available from: https://doi.org/10.1080/14659891.2017.1348556

65. Bowring AL, Gouillou M, Hellard M, Dietze P. Comparing short versions of the AUDIT in a community-based survey of young people. BMC Public Health [Internet]. 2013 Apr 04 [cited 2019 Jan 21];13:Article 301. Available from: https://doi.org/10.1186/1471-2458-13-301

66. Fear NT, Iverson A, Meltzer H, Workman L, Hull L, Greenberg N, et al. Patterns of drinking in the UK armed forces. Addiction [Internet]. 2007 Nov [cited 2019 Jan 21];102(11):1749–59. Available from: https://doi.org/10.1111/j.1360-0443.2007.01978.x

67. Watterson J, Gabbe B, Dietze P, Thompson J, Oborn M, Rosenfeld JV. Measuring the effectiveness of in-hospital and on-base Prevent Alcohol- and Risk-Related Trauma in Youth (P.A.R.T.Y.) programs on reducing alcohol-related harms in naval trainees: P.A.R.T.Y. Defence study protocol. BMC Public Health [Internet]. 2017 May 02 [cited 2019 Jan 21];17:Article 380. Available from: https://doi.org/10.1186/s12889-017-4330-8 .

68. Banfield JM, Gomez M, Kiss A, Redelmeier DA, Brenneman F. Effectiveness of the P.A.R.T.Y. (Prevent Alcohol and Risk-related Trauma in Youth) program in preventing traumatic injuries: a 10-year analysis. J Trauma Inj Infect Crit Care [Internet]. 2011 Mar [cited 2019 Jan 21];70(3):732-5. Available from: https://doi.org/10.1097/ta.0b013e31820783a3

69. Roche AM, Lee NK, Battams S, Fischer JA, Cameron J, McEntee A. Alcohol use among workers in male-dominated industries: A systematic review of risk factors. Saf Sci [Internet]. 2015 Oct [cited 2019 Jan 21];78:124–41. Available from: https://doi.org/10.1016/j.ssci.2015.04.007

70. Watterson J, Gabbe B, Dietze P, Bowring A, Rosenfeld JV. Comparing short versions of the Alcohol Use Disorders Identification Test (AUDIT) in a military cohort. J R Army Med Corps [Internet]. 2018 [cited 2019 Jan 21];165(5):312-6. Available from: https://doi.org/10.1136/jramc-2018-001024

71. Foxcroft D, Ireland D, Lowe G, Breen R. Primary prevention for alcohol misuse in young people. Cochrane Database of Systematic Reviews [Internet]. 2002 (cited 2021 Nov 13);3:CD003024. Available from: https://doi.org//10.1002/14651858.CD003024

72. Watterson J, Gabbe B, Dietze P, Rosenfeld J. V. A randomised controlled trial of the Prevent Alcohol and Risk-Related Trauma in Youth (P.A.R.T.Y.) program in reducing alcohol-related harms in young naval trainees. Mil Med [Internet]. 2021 [cited 2021 Nov 13]; Online ahead of print. Available from: http://dx.doi.org/10.1093/milmed/usab444*

Appendices

Appendix A – Australian Defence Human Research Ethics Committee Approval

JOINT HEALTH COMMAND

ADHREC, CP3-6-036, Campbell Park Offices, PO Box 7911, Canberra BC ACT 2610

2013/1009190
ADHREC/OUT/2013/R14059627

Professor Russell Gruen
Captain Katherine Richards
Commander Michael O'Born
Professor Jeffery Rosenfeld
Ms Jennifer Thompson

Dear Researchers

AUSTRALIAN DEFENCE HUMAN RESEARCH ETHICS COMMITTEE (ADHREC) PROTOCOL 694-13 - REDUCING ALCOHOL-RELATED INCIDENTS OVER 12 MONTHS IN AT-RISK NAVY TRAINEES POST PARTICIPATION IN THE IN-HOSPITAL TRAUMA PREVENTION PROGRAM, P.A.R.T.Y. (PREVENT ALCOHOL AND RISK-RELATED TRAUMA IN YOUTH); A COMPARATIVE PILOT STUDY.

ADHREC has considered your protocol amendments and has cleared your project to proceed, subject to the return of signed Researcher's Agreements from all Chief Investigators.

Please note that ethical clearance from ADHREC does not automatically confer access to Australian Defence Force (ADF) personnel; this will have to be sought from the relevant military commanders. Similarly, ADHREC approval is not to be interpreted as endorsement by the wider Defence organisation.

The Researcher's Agreement attached, is to be signed by **all** Chief Investigators, formatted in PDF and returned to ADHREC **before the project commences**.

Your protocol has been allocated **ADHREC Protocol Number 694-13** and this number should be quoted in all correspondence. Your protocol has been approved for a period of three years. If your research is to continue over the three year approval time, ADHREC approval for an extension is to be sought in writing.

ADHREC requires you to provide six-monthly progress reports. The first report is due on **18 September 2013**. As part of your report would you please include:

- A narrative describing the progress to date;
- Any events of significance occurring in the conduct of the protocol, in particular any adverse outcomes;
- Outcome in the case of completed research;
- Maintenance and security of your records;
- Compliance with the approved protocol;

- Any amendments or modifications to the protocol; and

- Compliance with any other special conditions that ADHREC may have required.

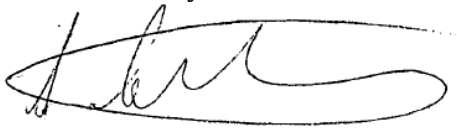
If your protocol requires any modification, ADHREC approval must be sought in writing, detailing all modifications required.

For Clinical trials, ADHREC is to be notified in writing of all Serious Adverse Events (SAE) within 72 hours of the event occurring.

I have attached ADHREC's *Guidelines for Volunteers*, a copy of which is to be given to each study participant.

The Committee wishes you well with your research. Please contact me if I can be of any assistance.

Yours sincerely



Sarah Blackledge
Deputy Director
ADHREC

Tel (02) 6266 3807
E-mail: ADHREC@defence.gov.au

21 March 2013

Attachments:
A. ADHREC *Researchers Agreement*
B. ADHREC *Guidelines for Volunteers*

Australian Government
Department of Defence

RESEARCHER'S AGREEMENT

The Australian Defence Human Research Ethics Committee (ADHREC) requires your agreement to the following conditions in order to secure its endorsement of your project.

Please Initial		
☐	**1**	**You must quote your ADHREC number and title of your protocol in all correspondence:** **ADHREC PROTOCOL 694-13 - REDUCING ALCOHOL-RELATED INCIDENTS OVER 12 MONTHS IN AT-RISK NAVY TRAINEES POST PARTICIPATION IN THE IN-HOSPITAL TRAUMA PREVENTION PROGRAM, P.A.R.T.Y. (PREVENT ALCOHOL AND RISK-RELATED TRAUMA IN YOUTH); A COMPARATIVE PILOT STUDY.**
☐	**2**	If you do not commence data collection within twelve months of this approval, the protocol will need to be resubmitted.
☐	**3**	The approval of your protocol is for a period of three years. If your research is to continue beyond the three-year approval time, an extension is to be sought in writing.
☐	**4**	You are required to submit six-monthly progress reports, the first of which is due **18 September 2013.**
☐	**5**	The Committee requires confirmation that your project has begun, or notification that it has been delayed or abandoned.
☐	**6**	The Committee requires that a copy of the ADHREC *Guidelines for Volunteers* be given to every participant when they are recruited for the protocol.
☐	**7**	Committee approval **must** be sought before any modifications to the protocol are instituted.
☐	**8**	The Committee **must** be informed of any deviations from the approved protocol and immediately informed of any protocol deviations with real or potential ethical implications.
☐	**9**	The Committee **must** be informed immediately of unforeseen event that might affect the continued ethical acceptability of this project.
☐	**10**	The Committee **must** be informed immediately of any untoward effects with respect to the medical, personal or administrative management of participants, or which may have ethical and / or publicity implications.
☐	**11**	ADHREC gives it ethical approval subject to your explicit agreement to an *intention to publish*. Publication should be in a refereed journal or other source open to public audit. It would be appropriate to include in your submission for publication the phrase "Ethical clearance for this project was provided by the Australian Defence Human Research Ethics Committee". Should a security classification make publish in an open source inappropriate, ADHREC is to be notified in writing.

☐ **12** ADHREC requires a comprehensive **Final Report** which details the conduct of the project and its findings. This report is to be submitted as soon as possible after the project has finished.

☐ **13** The ADHREC Secretariat requires that you provide notification of any change in your contact details. Point of Contact is the Executive Secretary at ADHREC@defence.gov.au.

For Clinical Trials Only

☐ **14** ADHREC requires that the nominal roll of participants, for the purpose of future tracing, is to be kept for the requisite time by you, according to the NHMRC *National Statement on Ethical Conduct in Human Research.*

☐ **15** The Committee must be informed of any 'adverse events' and immediately informed of any 'serious adverse events' (SAE) which are considered by the Principal Investigator (PI) to be possibly drug related **within 72 hours of their occurrence.**

☐ **16** You must retain records of your volunteers' details, any who withdraw, the reasons for that withdrawal (if known) and provide such on request.

I agree to abide by the conditions above:

Signature ……

Surname…….

First Name……

Position/Rank ……...

Contact No Work:……Work Mobile……

Email……

Date……

Executive Secretary
Australian Defence Human Research Ethics Committee
CP3-6-036
PO Box 7911
CANBERRA BC ACT 2610
AUSTRALIA

Tel (02) 6266 3807

E-mail: ADHREC@defence.gov.au

Useful Information
Useful information may be obtained from the following website:

http://www.defence.gov.au/health/research/adhrec/i-adhrec.htm

AUSTRALIAN DEFENCE HUMAN RESEARCH ETHICS COMMITTEE— GUIDELINES FOR VOLUNTEERS

Thank you for taking part in Defence Research. Your involvement is much appreciated. This pamphlet explains your rights as a volunteer.

What is the Australian Defence Human Research Ethics Committee?

•ADHREC is the Australian Defence Human Research Ethics Committee. It was established in 1988, to make sure that Defence complied with accepted guidelines for research involving human beings.

•After World War II (WWII), there was concern around the world about human experimentation. The Declaration of Helsinki was made in 1964, which provided the basic principles to be followed wherever humans were used in research projects.

•The National Health and Medical Research Council (NHMRC) in Australia has published the *National Statement on Ethical Conduct in Human Research* (NHMRC 2007). This *Statement* describes how human research should be carried out.

•ADHREC follows both the *Declaration of Helsinki* and the NHMRC *Statement*.

What Australian Defence Human Research Ethics Committee approval means

•If you are told that the project has ADHREC approval, what that means is that ADHREC has reviewed the research proposal and has agreed that the research is ethical.

•ADHREC approval does not imply any obligation on commanders to order or encourage their Service personnel to participate, or to release personnel from their usual workplace to participate. Obviously, the use of any particular personnel must have clearance from their commanders but commanders should not use ADHREC approval to pressure personnel into volunteering.

Voluntary participation

•As you are a volunteer for this research project, you are under **no obligation** to participate or continue to participate. You may withdraw from the project **at any time** without detriment to your military career or to your medical care.

•At no time must you feel pressured to participate or to continue if you do not wish to do so.

•If you do not wish to continue, it would be useful to the researcher to know why, but you are under no obligation to give reasons for not wanting to continue.

Informed consent

•Before commencing the project you will have been given an information sheet which explains the project, your role in it and any risks to which you may be exposed.

•You must be sure that you understand the information given to you and that you ask the researchers about anything of which you are not sure.

•Before you participate in the project you should also have been given a consent form to sign. You must be happy that the consent form is easy to understand and spells out what you are agreeing to. Again, you should keep a copy of the signed consent form.

Clinical trials.

The NHMRC requires that the researcher provide a nominal roll of study participants where the study is a clinical trial (eg when the researchers are trialling a new treatment or device). For trials conducted by large Defence institutions like the Defence Science and Technology

Organisation, the Submarine and Underwater Medicine Unit, the Army Malaria Institute, the Institute of Aviation Medicine or the Centre for Military and Veterans' Health, this roll is kept by them on ADHREC's behalf. These records will not be used to consider your medical employment standard or for compensation purposes.

All ADHREC protocol files are secured in a locked filing cabinet and only the Secretariat has access to these. ADHREC will not pass your contact information to a third party without your permission.

Complaints

•If at any time during your participation in the project you are worried about how the project is being run or how you are being treated, then you should speak to the researchers.

•If you don't feel comfortable doing this, you can contact the Executive Secretary of ADHREC. Contact details are:

Executive Secretary
Australian Defence Human Research Ethics Committee

CP3-6-036
PO Box 7911
CANBERRA BC ACT 2610
AUSTRALIA

Tel (02) 6266 3807

E-mail: ADHREC@defence.gov.au

More information

•If you would like to read more about ADHREC, visit the ADHREC website at:

http://www.defence.gov.au/health/research/adhrec/i-adhrec.htm

JOINT HEALTH COMMAND

ADHREC, CP3-3-036, Campbell Park Offices, PO Box 7912, Canberra BC ACT 2610

2013/1221836
ADHREC/OUT/2014/R17578478

Mr Jason Watterson
National Trauma Research Institute - The Alfred
Level 4, Burnet Building
89 Commercial Road
Melbourne VIC 3004

Dear Mr Watterson,

AUSTRALIAN DEFENCE HUMAN RESEARCH ETHICS COMMITTEE (ADHREC) AMENDMENTS TO PROTOCOL 739-13 – MEASURING THE EFFECTIVENESS OF THE IN-HOSPITAL AND NEW ON-BASE P.A.R.T.Y. PROGRAMS (PREVENT ALCOHOL AND RISK-RELATED TRAUMA IN YOUTH) IN REDUCING ALCOHOL-RELATED HARMS IN YOUNG NAVAL TRAINEES

1. Thank you for submitting your protocol modification to ADHREC for approval. ADHREC have considered and approved the use of the Modified Drinking Motives Questionnaire – Revised at their meeting on 17 March 2014.

2. Your protocol meets the requirements of the National Health and Medical Research Council's *National Statement on Ethical Conduct in Human Research,* and the Committee wishes you well in continuing with your research.

3. As previously advised, your next progress report is due on 1 June 2014.

4. If you have any further queries or concerns, please contact the ADHREC Secretariat.

Yours sincerely,

Donna Brennan
A/Deputy Director
ADHREC

Tel (02) 6266 3807
E-mail: ADHREC@defence.gov.au

26 March 2014

Appendix B – Alfred Health Human Research Ethics Committee Approval

ETHICS COMMITTEE CERTIFICATE OF APPROVAL

This is to certify that

Project No: 155/16

Project Title: Measuring the effectiveness of the in-hospital and new on-base P.A.R.T.Y. programs (Prevent Alcohol and Risk-related Trauma in Youth) in reducing alcohol-related harms in young naval trainees

Principal Researchers: Professor Russell Gruen, Professor Belinda Gabbe & Professor Jeffrey Rosenfeld

Protocol (as per Australian Defence HREC application form Version 2 dated: 17-Jan-2014; Defence Health Foundation Grant Application signed 8-Aug-2013; and Alfred-specific Form signed 3-Feb-2016)

Participant Information and Consent Form (Study 1) Version 2 **dated:** 17-Jan-2014
Participant Information and Consent Form (Study 2) Version 2 **dated:** 17-Jan-2014

*was reviewed by the cross-approval process and considered by the Ethics Committee on **31-Mar-2016**, meets the requirements of the National Statement on Ethical Conduct in Human Research (2007) and was **APPROVED** on **6-Apr-2016***

It is the Principal Researcher's responsibility to ensure that all researchers associated with this project are aware of the conditions of approval and which documents have been approved.

The Principal Researcher is required to notify the Secretary of the Ethics Committee, via amendment or progress report, of

- Any significant change to the project and the reason for that change, including an indication of ethical implications (if any);
- Serious adverse effects on participants and the action taken to address those effects;
- Any other unforeseen events or unexpected developments that merit notification;
- The inability of the Principal Researcher to continue in that role, or any other change in research personnel involved in the project;
- Any expiry of the insurance coverage provided with respect to sponsored clinical trials and proof of re-insurance;
- A delay of more than 12 months in the commencement of the project; and,
- Termination or closure of the project.

Additionally, the Principal Researcher is required to submit

- A Progress Report on the anniversary of approval and on completion of the project *(forms to be provided)*;

The Ethics Committee may conduct an audit at any time.

All research subject to the Alfred Hospital Ethics Committee review must be conducted in accordance with the National Statement on Ethical Conduct in Human Research (2007).

The Alfred Hospital Ethics Committee is a properly constituted Human Research Ethics Committee in accordance with the National Statement on Ethical Conduct in Human Research (2007).

SPECIAL CONDITIONS

None

SIGNED:

Professor John J. McNeil
Chair, Ethics Committee

Please quote project number and title in all correspondence

TheAlfred

Ethics Committee

Certificate of Approval of Amendments

This is to certify that amendments to

Project: **206/09 P.A.R.T.Y. Project Evaluation**

Principal Researcher: **Ms Jennifer Thompson**

Amendment: **Modify PARTY evaluation for use at HMAS Cerberus for the Defence Department of Australian Government**
Participant Information & Consent Form **Version 110213** dated: **11/2/2013**

have been approved in accordance with your amendment application dated **25/3/2013** on the understanding that you observe the National Statement on Ethical Conduct in Human Research.

It is now your responsibility to ensure that all people associated with this particular research project are made aware of what has actually been approved and any caveats specified in correspondence with the Ethics Committee. Any further change to the application which is likely to have a significant impact on the ethical considerations of this project will require approval from the Ethics Committee.

Chair, Ethics Committee (or delegate) Date: **3/4/2013**

R Frew
Secretary, Ethics Committee

All research subject to Alfred Hospital Ethics Committee review must be conducted in accordance with the National Statement on Ethical Conduct in Human Research (2007).

The Alfred Ethics Committee is a properly constituted Human Research Ethics Committee operating in accordance with the National Statement on Ethical Conduct in Human Research (2007).

Appendix C – Monash University Human Research Ethics Committee Approval

MONASH University

Monash University Human Research Ethics Committee (MUHREC)
Research Office

Human Ethics Certificate of Approval

This is to certify that the project below was considered by the Chair of the Monash University Human Research Ethics Committee. The Chair was satisfied that the proposal meets the requirements of the *National Statement on Ethical Conduct in Human Research* and has granted approval.

Project Number:	CF14/1667 - 2014000783
Project Title:	Does the P.A.R.T.Y. program reduce alcohol-related harms in naval trainees?
Chief Investigator:	Prof Jeffrey Victor Rosenfeld
Approved:	**From:** 2 June 2014 **To:** 2 June 2019

Terms of approval - ***Failure to comply with the terms below is in breach of your approval and the Australian Code for the Responsible Conduct of Research.***

1. Approval is only valid whilst you hold a position at Monash University and approval at the primary HREC is current.
2. **Future correspondence:** Please quote the project number and project title above in any further correspondence.
3. **Final report:** A Final Report should be provided at the conclusion of the project. MUHREC should be notified if the project is discontinued before the expected date of completion.
4. **Retention and storage of data:** The Chief Investigator is responsible for the storage and retention of original data pertaining to a project for a minimum period of five years.

Professor Nip Thomson
Chair, MUHREC

cc: Prof Russell Gruen, Prof Belinda Gabbe, Commodore Elizabeth Rushbrook, Commander Michael Oborn, Lieutenant Jason Watterson, Ms Jennifer Thompson

Postal – Monash University, Vic 3800, Australia
Building 3E, Room 111, Clayton Campus, Wellington Road, Clayton
Telephone +61 3 9905 5490 Facsimile +61 3 9905 3831
Email muhrec@monash.edu http://www.monash.edu.au/researchoffice/human/
ABN 12 377 614 012 CRICOS Provider #00008C

Appendix D – Alcohol Use Disorders Identification Test (AUDIT)

Alcohol Use Disorders Identification Test (AUDIT)

Because alcohol use can affect health and interfere with certain medications and treatments, it is important that we ask you some questions about your use of alcohol. Your answers will remain confidential, so please be as accurate as possible. Try to answer the questions in terms of **'standard drinks'**. Please ask for clarification if required.

Place an X in one box that best describes your answer to each question.

Questions	0	1	2	3	4	
1. How often do you have a drink containing alcohol?	Never	Monthly or less	2-4 times a month	2-3 times a week	4 or more times a week	
2. How many standard drinks do you have on a typical day when you are drinking?	1 or 2	3 or 4	5 or 6	7 to 9	10 or more	
3. How often do you have 6 or more drinks on one occasion?	Never	Less than monthly	Monthly	Weekly	Daily or almost daily	
4. How often during the last year have you found that you were not able to stop drinking once you had started?	Never	Less than monthly	Monthly	Weekly	Daily or almost daily	
5. How often during the last year have you failed to do what was normally expected from you because of drinking?	Never	Less than monthly	Monthly	Weekly	Daily or almost daily	
6. How often during the last year have you needed a first drink in the morning to get yourself going after a heavy drinking session?	Never	Less than monthly	Monthly	Weekly	Daily or almost daily	
7. How often during the last year have you had a feeling of guilt or remorse after drinking?	Never	Less than monthly	Monthly	Weekly	Daily or almost daily	
8. How often during the last year have you been unable to remember what happened the night before because you had been drinking?	Never	Less than monthly	Monthly	Weekly	Daily or almost daily	
9. Have you or someone else been injured as a result of your drinking?	No		Yes, but not in the last year		Yes, during the last year	
10. Has a relative, friend, doctor or other health worker been concerned about your drinking or suggested you cut down?	No		Yes, but not in the last year		Yes, during the last year	
					Total	