Health characteristics and self-identified health promotion needs of Army personnel in Perth Western Australia

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Introduction

Australian Defence Force (ADF) personnel require high levels of health and fitness to cope with the inherently stressful situations that occur as part of military life. However, several health and lifestyle issues among ADF personnel have been identified relating to mental health and alcohol use[1], tobacco smoking in deployed personnel[2] and increased body mass index (BMI).[3] Mental disorders among service personnel have been of increasing concern,[1,4] and recent recognition of issues around alcohol use has led to a focus for ADF culture change.[5,6] While cardiovascular risk factors such as smoking have long been associated with the military, and ongoing efforts to reduce smoking are required,[2,7] overweight and obesity have become more prevalent[8,9] and costly[10] in recent years. This is despite such diseases historically being reported at lower rates than in civilian populations, probably due to a 'healthy worker effect'.[3] This effect has been attributed to ADF applicant screening processes whereby individuals with specified health problems are declined entry, resulting in a healthier workforce.[3] It has been suggested the increasing prevalence of overweight and obesity among service personnel may in part be related to changes made to ADF entry restrictions in 2005, which allow acceptance of applicants with a BMI of up to 33kg/m2, in the absence of hypertension, elevated blood cholesterol, or evidence of cardiovascular or other metabolic disease.[3,10] At local levels, an important step in addressing many of these identified health risk factors is collaboration with personnel and identification of their health promotion needs.

This preliminary study sought to identify baseline cardiovascular and mental health characteristics of a cohort of Army personnel in Perth Western Australia, along with their self-identified needs related to health promotion activities, with a view to guiding future workplace health promotion initiatives. Through the application of needs assessment principles, stakeholder voices were incorporated to identify direction in program planning,[11] and to foster the community ownership and action required for successful health promotion.[12] In this study, the workplace provides an opportune setting, and engagement with the target group early in the health promotion evaluation cycle can encourage empowerment, self-help, social support and participation, which are essential requirements for health behaviour change.[13]

Materials and Methods

Study design and participants

This descriptive study used a cross sectional survey designed to collect anthropometric and self-reported data concerning health behaviours, risk factors and health related interests among personnel serving in an Australian Army Brigade between July 2011 and July 2012. The Brigade consisted of actively serving armoured, infantry, artillery, engineering, signals, logistic, and headquarters personnel who had completed initial military training, were located within one Perth barracks, and were on duty at the time of data collection. Potential participants included 83 full-time (FT) and 385 part-time (PT) personnel who were recruited by the principal researcher during one information session. No enticements or incentives were provided and potential participants were advised that participation was voluntary and they were free to leave the study at any stage. The study was delimited to Brigade personnel who expressed interest in participating, and who were provided with an information and consent form, questionnaire to be completed anonymously, and contact information for mental health support. Ethics approval was granted by the Curtin University Human Research Ethics Committee and the Australian Defence Human Research Ethics Committee.

Instrument

A questionnaire was developed using validated surveys which included the 2007 National Drug Strategy Household Survey,[14] World Health Organization's Alcohol Use Disorders Identification Test,[15] Brief Lifestyle and Mood Assessment Tool,[16]

and Brief Physical Activity Assessment tool.[17] In addition to this, face validity was confirmed through questionnaire review by military health personnel. The final survey included 15 questions designed to collect categorical data on health behaviours, health promotion interests, and the desire to participate in workplace health promotion. Each health behaviour item was accompanied by a 'readiness to change' question that asked respondents if they felt a need to change their health behaviour, if they wanted help to make a change, and when they wanted help; either now or in the future. Participants also provided demographic data including gender, age, service type, rank, and education level.

Measures

Anthropometric and clinical measurements were collected by the principal researcher at the time of survey completion and included height, weight, BMI, waist circumference (WC), resting radial pulse rate (PR), and blood pressure (BP). All respondents were provided with a copy of their clinical measurements, and those with measurements that fell within ranges of increased-risk were referred to their General Practitioner. Height was measured to the nearest mm using a stadiometer with the participant standing bare foot and their head positioned in the horizontal plane. Weight was measured to the nearest 100g using a new Soehnle digital scale[18,19] with the participant wearing standard issue uniform pants and shirt, and no shoes. Weight of the uniform ranged from 1.9 to 2.1kg according to size and was subtracted from the observed reading to obtain a final weight. WC was measured to the nearest 5mm with the participant standing upright, using a flexible tape measure positioned flat against the skin at the level midway between the lowest rib margin and iliac crest, roughly in line with the umbilicus.[20] Resting PR was measured with the participant in a seated position, by palpating the radial pulse, and where the pulse was noted to be regular, counting for 60 seconds. No irregular pulse rates were identified. BP was measured using a calibrated and regularly maintained MAC aneroid sphygmomanometer, which has been found to be reliable and accurate.[21] BP was obtained according to the Heart Foundation guidelines for measuring BP and validation of BP measurement devices.[22] BP and PR were measured after the participant had been sitting comfortably for five minutes, and had not consumed caffeine, participated in physical activity or smoked in the 30 minutes prior. For the purpose of the study, each participant's blood pressure was only measured once and was rounded to the nearest 5mmHg. Intra-test reliability for the single researcher collecting data on each measurement was determined by comparing two recordings taken in each position within approximately five minutes of each other. In the case of BP measurement, the cuff was removed and then re-applied at the same position before the next measurement was taken. A series of dual measurements were undertaken with 10 participants. Intra class correlations for the 10 individuals were 1.0 for height and weight, 0.998 for PR and BP, and 0.993 for WC.

Data Analysis

Descriptive categorical data, including demographic characteristics, health behaviours, anthropometric measurements and perceptions regarding health promotion opportunities were analysed using frequencies and percentages. Tests of association were conducted only to determine target group and focus areas for health promotion within the cohort studied, rather than to generalise to the greater military population. All variables of interest were categorised and Pearson's chi-square test was used to analyse two-way associations among cardiovascular, mental health, and demographic variables. Hierarchical log-linear regression analysis was used to determine there were no significant higher order interactions.[23,24] Odds ratios are reported only as an indication of the strength of reported associations and should be interpreted with caution where variables of interest are common.[25] Analysis was conducted using the Statistical Package for the Social Sciences (SPSS) version 19® for windows[26] and p values <.05 were considered significant. Categories measuring parameters of BP, PR, WC and BMI were created according to accepted reference ranges. Reference ranges used to interpret PR were: 60-100 beats per minute (bpm) (normal)[27]; BP: <120/80mmHg (normal), 120-139/80-89mmHg (high normal), 140–59/90-99mmHg (mild hypertensive);[22] BMI: <18.5kg/m2 (underweight), 18.5-24.9kg/m2 (healthy weight), 25.0-29.9kg/m2 (overweight), >30.0kg/m2 (obese);[28] and WC: >94cm for men, >80cm for women (increased risk).[28] The Australian guideline of no more than two standard drinks on any day to reduce lifetime risk of alcohol related harm[29] was used to determine alcohol consumption at levels of increased risk.

Results

The participation rate amongst FT and PT personnel was 53.7% (n=44) and 58.7% (n=266) respectively. Two hundred and thirty eight respondents (88.1%) were male, 32 (11.9%) were female, 48 (17.8%) were Commissioned Officers and 220 (81.5%) held ranks of Private to Warrant Officer. Eighty six respondents (31.9%) were aged from 18-25 years, 76 (28.1%) from 26-35 years, 57 (21.1%) from 36-45

years, and 51 (18.9%) were aged 46 years and over. Approximately equal numbers of secondary school (n=90, 33.3%), trade/diploma (n=84, 31.1%), and university qualification (n=94, 34.8%) were identified as the highest level of education completed. Rates of university education were higher in PT (n=87, 38.8%) than FT (n=7, 15.9%) respondents.

Most respondents (n=269, 99.6%) had a resting PR in the normal range, almost half (n=133, 49.3%) had a BP in the high normal range, and 18.1% (n=49) had a BP in the mild hypertensive range. Just over half (n=153, 56.6%) had a BMI in the overweight or obese range, and one third (n=97, 35.9%) had a WC of increased risk. The majority of respondents (n=195, 72.2%) reported participation in at least 30 minutes of moderate physical activity five or more times per week, and were non-smokers (n=224, 83%). The prevalence of smoking was higher in FT (n=14, 31.8%) than PT (n=32, 14.2%) respondents. Only 28 respondents (10.4%) consumed at least two servings of fruit and five servings of vegetables daily. Table 1 shows significant associations between covariates and BMI, WC and smoking. There was no significant association between smoking and gender (women n=5, 15.6%; men n=41, 17.2%).

More than half the study sample (n=147, 54.4%)

Table 1. Significant associations between covariates and BMI, WC, smoking, mental health, stress and alcohol consumption.

	n(%)	Chi square	p value	Odds Ratio (95%CI)
	BMI >25 kg/m2			
Sex (Male)	141(59.2)	x2(1)=5.431	<.05	2.42(1.14-5.19)
Age >35 years	88(81.5)	x2(1)=45.138	<.001	6.57(3.68-11.71)
BP >139/89 mmHg	40(81.6)	x2(1)=15.196	<.001	4.25(1.97-9.17)
WC >94 cm (male) / >80 cm (female)	95(97.9)	x2(1)=105.012	<.001	94.18(22.41-395.75)*
	WC >94 cm (male) / >80 cm (female)			
Age >35 years	70(64.8)	x2(1)=65.26	<.001	9.21(5.20-16.31)
BP >139/89 mmHg	29(59.2)	x2 (1)=14.067	<.001	3.26(1.72-6.17)
	Smoking <daily			
Service Type (FT)	14(31.8)	x2 (1)=8.125	<.01	2.83(1.35-5.91)
Highest Education (School/Trade)	36(20.7)	x2 (1)=4.337	<.05	2.19(1.03-4.65)
	Mental Health Concern			
Service Type (FT)	18(40.9)	x2(1)=6.898	<.05	2.44(1.24-4.80)
	Stress			
Mental Health Concern	64(94.1)	x2(1)=57.679	<.001	22.94(8.04-65.44)*
	3 or More Standard Drinks of Alcohol			
Age 18-35 years	104(68.9)	x2(1)=28.484	<.001	4.12(2.42-7.01)
WC <94 cm (male) or <80 cm (female)	98(60.5)	x2(1)=5.225	<.05	1.82(1.09-3.06)
Physical Activity >5 x 30 mins/week	114(62.3)	x2(1)=13.631	<.001	2.86(1.62-5.05)
Stress	87(61.3)	x2(1)=4.923	<.05	1.76(1.07-2.91)

*common

reported stress from one or more sources was adversely impacting their daily life and activities. The most frequently identified sources of stress were work (n=73, 27%), relationships (n=44, 16.3%), and money (n=42, 15.6%). One quarter (n=68, 25.2%) of the sample, and more FT (n=18, 40.9%) than PT (n=50, 22.1%) respondents had experienced a mental health concern *(felt down, depressed, hopeless; been bothered by having little interest or pleasure in doing things; or worrying a lot about everyday problems)* in the past month. The majority of respondents consumed alcohol (n=256, 94.8%), with the most frequent consumption being 2-3 days per week (n=92, 34.1%). Just over half the respondents reported drinking alcohol at levels of increased risk, with 51.9% (n=140) consuming three or more standard drinks, and 20% (n=54) consuming five or more standard drinks on a typical day. Table 1 shows significant associations between covariates and mental health, stress and alcohol consumption. There was no significant association between alcohol use at levels of increased risk and gender (women n=12, 38.7%; men n=128, 57.4%).

Table 2 shows the self-identified need of respondents to improve their health and/or change their lifestyle behaviours, and their desire for help to achieve this. Almost three quarters of respondents (n=197, 73%) felt a need to improve their level of physical activity, while more than half (n=158, 58.5%) felt a need to improve their nutrition. Two thirds of current smokers wanted to cut down or stop smoking (n=31, 67.4%), and of those who drank alcohol, 13.3% (n=34) felt a need to reduce their intake and/or frequency. Of the respondents who reported mental health concerns, all wanted to improve their mental health and nine (13.2%) wanted help to achieve this.

Table 2. Readiness to improve health or change lifestyle behaviours, and desire for help.

Self-identified Need to Change?	Want Help?	Physical Activity n(%)	Nutrition n(%)	Smoking n(%)	Alcohol n(%)	Mental Health n(%)
Yes	Don't want help	125(46.3)	101(37.4)	14(30.4)	28(10.9)	59(86.8)
	Want future help	23(8.5)	14(5.2)	11(23.9)	4(1.6)	6(8.8)
	Want help now	49(18.1)	43(15.9)	6(13.0)	2(0.8)	3(4.4)
No		73(27.0)	112(41.5)	15(32.6)	221(86.0)	202(74.8)
Missing					2(0.8)	

Most respondents (n=207, 76.7%) indicated they would like to engage with health promotion activities in one or more areas of interest. The most frequently identified interests were age and fitness level appropriate physical activity (n=141, 52.2%), nutrition (n=107, 39.6%), and weight loss (n=53, 19.6%).

Discussion

The characteristics of the study sample suggest the results can be generalised to the study population, and may be useful in guiding further research. In terms of distribution of sex and age, the sample was representative of the Brigade, wider Army and ADF.[30] In relation to service type, the study sample was similar to this and other PT Brigades, with more PT than FT personnel. In the wider Army[30] these proportions are reversed with more FT than PT personnel, suggesting further research is required to explore the health issues concerning FT members. Preventable risk factors for cardiovascular disease assessed in this study include hypertension, overweight, obesity, insufficient physical activity, poor nutrition and tobacco smoking.[3]

Overweight, obesity, nutrition and physical activity

The findings of overweight and obesity were not dissimilar to recent ADF statistics. In 2010 overweight and obesity were reported at 63.1% of men and 37.5% of women in the FT Army, and 67.8% of men and 38.7% of women in the PT Army.[9] In our sample, although an awareness of the importance of nutrition and weight management and a desire to improve nutrition was evident, the daily fruit and vegetable intake was well below Australian

recommendations.[28] Results also show high levels of participation in, and awareness of, the need for regular physical activity. However most respondents also felt a need to improve their level of physical activity, and this may be due to the requirements of military service and regular fitness testing. Despite ADF health and fitness standards, overweight and obesity was prevalent in our study, with more men than women affected and rates increasing with age, which is consistent with civilian[3] and ADF[9] trends. Our findings suggest that having information and knowledge does not necessarily positively influence individual health behaviours, and collaborative strategies to improve physical activity and nutrition through development of healthy policy, supportive environments, and personal skill are required for this cohort.

Smoking

It is has been established that smoking occurs at higher rates in those with lower levels of education in both civilian[31] and military populations,[2] and this is also reflected in our sample. While higher smoking rates among FT respondents may be related to lower levels of education, other factors such as deployment,[2,7] peer behaviour and role modelling[32] have also been found to promote smoking behaviour and may have been influential. A study of United States military recruits reported non-smokers were more likely to start smoking if they perceived the majority of their peers smoked, their leaders/instructors used tobacco products, and their roommate smoked.[32] A similar influence may exist for FT personnel who are professional soldiers required to work well in teams and exhibit high levels of discipline within a hierarchical chain of command and respect. FT members are more likely to deploy overseas, undergo intensive training for prolonged periods, forming close-knit groups, and be required to conform to team behaviours. Our findings suggest further research is required to explore the influence role modelling has on smoking behaviour in the FT Army and training environments, particularly as trainees are most vulnerable to role modelling by leaders in these settings. Considering smoking restrictions in training establishments have been found to be effective[7] and many smokers in our study wanted to cut down or stop smoking, workplace policy should be used to create supportive environments and strengthen community action, to support non-smokers, personnel wanting to become non-smokers, and a smoke free workplace.

Mental health and stress

In our study, both mental health concerns and stress affecting daily life were identified more frequently by FT personnel. This may be associated with some of the unique characteristics of FT service, which were not assessed in this study. Significantly, most personnel who reported experiencing mental health concerns indicated they did not want help to address these. Reluctance to seek assistance is of particular concern as it is thought to be associated with the under-reporting of mental health issues.[1,33] This may be a consequence of a military culture and barriers that encourage soldiers to hide health and wellbeing issues due to fear of administrative and disciplinary outcomes, adverse effects on career progression and employment, and stigma.[33] Internationally, stigma appears to be a significant barrier to seeking mental health care within Western military forces,[34] and in recent ADF mental health research, the highest rated stigmas associated with seeking help were 'being treated differently' (28%) and 'harm to career' (27%), with concern for 'reduced deployability' (37%) being the highest rated barrier to seeking help.[1]

Alcohol

Another focus area that is not unusual for military populations is the use of alcohol at levels of increased health risk.[35,36] In 2011, a review into the ADF's 'unhealthy drinking culture' was announced,[5] and in 2012 recommendations were released to address Defence culture and alcohol related harm.[6] Similar use of alcohol amongst personnel was also supported in our findings, with over half of those surveyed reporting alcohol consumption at levels of increased risk. A number of factors were identified in the 2012 review as having a potential to influence and perpetuate the ADF's 'unhealthy drinking culture'.[5] In our study, factors that may support drinking at levels of increased risk included the male dominated workplace, large population of young men, common understanding of the 'work hard play hard' colloquialism, and role modelling by leaders. Many young leaders are aged between 20-35 years, and these personnel hold positions of authority over junior and often younger personnel, which may result in leaders modelling alcohol consumption at levels of increased risk, thereby perpetuating similar behaviour in subordinates. While more than half the sample in our study consumed alcohol at levels of increased risk, most did not wish to reduce their intake. This indicates respondents were either unaware of the recommended limits to reduce alcohol related risk, or their behaviour was not influenced by the recommendations despite having an awareness. Another potential influencing factor could be the threat of disciplinary action, which may deter personnel from seeking help for alcohol related concerns.[37] Programs that strengthen community action and engage young leaders to model healthy

behaviour are needed to influence 'drinking culture' and create change in this area.

Men's and women's health

Our sample was predominantly male, which is reflective of the general military population. As a population, men are known to be a 'hard to reach group';[38-40] less likely to seek help for health concerns.[3] More specifically, the Army is stereotypically seen as a masculine environment and this has a significant potential to influence health. In a study of masculinity and health behaviors in Australian men, those identified as having higher traditional masculinity scores reported more health risk behaviours and less health promoting behaviours relating to nutrition, sun protection, stress and anger management, talking about concerns, expressing feelings, and consulting a health professional when feeling down or depressed for more than one month, or experiencing unfamiliar physical health symptoms.[41] Therefore, it was encouraging to find the majority of our predominantly male sample indicated a desire to participate in workplace health promotion, with their health interests being similar to the risk factors identified in the study. This shows the defence workplace setting can provide important health promotion opportunities to engage this community. However, there was an exception to this in relation to seeking help to resolve and prevent mental health problems. Our study highlights an ongoing need for mental health support and health promotion initiatives in areas that promote personal skill development and empowerment. Policy to create supportive environments where personnel feel able to seek help without adverse consequences or stigma is also needed.

Interestingly, this current study found no association between smoking and gender or alcohol use at levels of increased risk and gender, which differs from Australian trends where these risk factors are more prevalent in adult males.[3] The reasons for this are likely to be complex, relating to military culture, and conformity to social norms and traditional male behaviours, where female personnel are more likely to attempt to 'fit in' to the male dominated environment to gain acceptance[42] amongst their male counterparts. Further research is required to examine the influence of military culture on women's health behaviours to establish whether this or other reasons might be contributing factors, and to investigate the efficacy of potential health promotion interventions.

Limitations

This study has a number of limitations. Due to the relatively small numbers of personnel in this survey, self-reporting, potential for healthy volunteer bias, and either non-disclosure or under-reporting of increased risk health behaviours, generalisations of our findings to other groups of military personnel should be undertaken with caution. The low numbers of FT and female respondents in the sample also limit generalisability of the findings to these groups.

Conclusion

Substantial collaboration with Brigade unit commanders and personnel occurred during this study, representing an important step towards community engagement and successful future workplace health promotion. Personnel shared similar risk factors and health lifestyle behaviours relating to overweight and obesity with the Australian population, and expressed an interest in improving these. Health promotion programs and strategies that influence policy, strengthen community action, engage young leaders, and create supportive environments for cultural change are needed to address these issues. While mental health concerns were identified in this study, a reluctance to seek help was evident. The increased prevalence of mental health concern among FT compared with PT personnel indicated further research and tailored programs may be needed to specifically address the individual needs of each group. Programs that work toward creating a culture of acceptance and understanding around mental disorders are needed to encourage personnel to seek help, and reduce potential for under or non-reporting. This study has identified areas where more research is required, particularly into military culture and its influence on health and lifestyle behaviours. Future research should guide policy and ADF health promotion programs that can assist individuals and defence workplace communities to practise healthy behaviours. In addition, our study provides valuable information about this Brigade to inform health promotion development and resource distribution to address the needs of this unique workplace population.

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Disclosure

The principal researcher was an employee of the ADF at the time of the study.

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