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Prevalence and Correlates of Alcohol Use in a Military Setting in Sri Lanka

RMM Monaragala[1], SN Samage[2], DDRT Karunasena[3]

[1]Army Hospital, Colombo 5, Sri Lanka.
[2]Sri Lanka Army Preventive Medical Services, Sri Lanka
[3]Army Base Hospital, Minneriya, Sri Lanka

Correspondence:
RMM Monaragala
E mail: roshanmonaragala@gmail.com

https://orcid.org/0009-0006-1506-9088

ABSTRACT

Introduction: Operational readiness is an integral aspect of all military organizations and hence all personnel should achieve and maintain optimal physical and mental health. However, unique stressors in the military milieu can give rise to a myriad of mental health problems and the alcohol-related issue [High-risk drinking (HRD) and binge drinking (BD)] is one out of many. This study aims to explore the extent of alcohol consumption and the existing risk factors for HRD, BD or both in the Sri Lanka army.

Methodology: This was a cross-sectional descriptive survey, done among 147 officers (selected by systematic random sampling) and 3519 other ranks (ORs) (selected by multistage extension cluster sampling), in 2019 in the Army (Security Forces Head Quarters-East). A self-administered questionnaire was used, which included, questions on socio-demographic variables, WHO Alcohol Use Disorder Identification Test (AUDIT) for HRD and BD, 9-Item Patient Health Questionnaire (PHQ-9) for probable depression, PTSD Checklist Military Version (PCL- M) for PTSD, Chalder Fatigue Scale for fatigue, and questions ascertaining the degree of unit cohesion, aggression, cigarette smoking, cannabis use, family history of psychiatric disorders and exposure to childhood abuse. The psychosocial functioning was assessed by the tenth question of the PHQ-9.

Results: The mean age was 31.7 years (SD±6.686 years), ranging from 19 years to 57 years. Among the respondents, 56.7% were not GCE /OL qualified, 66.1% were married and 50.4% were exposed to battle. Current alcohol consumption was 76.5% and among them, 43% were in HRD [i.e., 35.2% hazardous, 5.5% harmful, and 2.3% dependent drinkers] and 15.5 % (95% CI 14.1 %- 16.7%) were in BD category. Among the correlates of HRD and BD were younger age, being single, employment in the Infantry and Elite, probable depression, fatigue, PTSD, smoking, cannabis use, exposure to childhood abuse, aggression, and psychosocial dysfunction.

Conclusions: Compared to the community, alcohol consumption was higher in the Army, which may be due to the unique military subculture and the role model effect. While younger age, being single, and exposure to childhood abuse were risk factors, probable depression, fatigue, lack of cohesion, smoking, and cannabis use were either risk factors or outcomes of HRD, BD, or both in the Army. Further, psychosocial dysfunction was observed as an outcome.

Keywords: *High-risk drinking, depression, fatigue, posttraumatic stress disorder, Military*

INTRODUCTION

The military should be ready to engage in operational duties when the need arises. Health is conceived as a major pillar of military readiness and mental fitness is an indispensable component of health. However, there are unique stressors inherent to military organizations, namely, poor service conditions, inability to avail leave at the required time, early retirement ages, frequent and long separation from family, inadequate family and social support, nonresponsive civil administration, communication gap with superiors, and enrolling in daunting as well as traumatic operational duties, [1], that may impede the mental health of service personnel. Moreover, the nature of the military milieus such as restricted autonomy, structural environment, hierarchical command structure, adherence to strict rules and regulations and the frequency of relocation may also act as an impediment to the mental health of its members [2]. These military-related stressors notwithstanding the common predisposing factors (genetic and environmental), contribute to a myriad of mental health problems, of which alcohol abuse is one [3, 4, 5, 6]. Scientific evidence shows that alcohol consumption in the armed forces is higher than in civilian communities and is attributed to military-related factors [7, 8, 9].

Alcohol, globally, is responsible for 3.7% of all deaths, and 4.4% of the global burden of disease, as measured in disability-adjusted life-years (DALYs) lost [10]. Nevertheless, in very small volumes, alcohol can cause less harm and this pattern of alcohol consumption is denoted as low-risk drinking (LRD) [11]. Harmful use (alcohol abuse) and dependence syndrome are two conditions classified under alcohol use disorders [12]. Harmful use is alcohol intake amounting to physical and mental health issues, whereas alcohol dependence is alcohol intake amounting to a collection of behavioural, cognitive, and physiological abnormalities [10]. In addition, if alcohol is consumed to a level that increases the risk of harm to the user or others, it is known as hazardous use of alcohol [10]. The pattern of consuming alcohol in excess on single occasions is defined as binge drinking (i.e. having more than five drinks on a single occasion), which is potentially detrimental to one's health [13].

There are numerous risk factors attributed to the heavy use of alcohol in the armed forces, out of which, younger age, lower educational attainment, and being single (i.e., never married, separated, divorced or widowed) are strongly associated with heavy use of alcohol including binge drinking (BD) [14, 15, 16, 17]. Studies also have revealed that depression, anxiety disorders, PTSD and fatigue increase the risk of excessive use of alcohol [18,19,20]. Furthermore, exposure to childhood abuse was shown as a significant risk factor for subsequent heavy use of alcohol [21]. It is also noteworthy, that the military culture itself is a risk factor for excessive consumption of alcohol [9, 22, 23]. It is noteworthy, that the male gender is a risk factor for heavy use of alcohol irrespective of being in the military [21].

As alcohol consumption is known to be high in the military [7] and its excessive use affects military readiness and causes significant morbidity, this study was implemented to explore the extent of alcohol consumption and the existing risk factors and outcomes of high-risk drinking (which includes hazardous, harmful and dependent use of alcohol), binge drinking, or both in the Sri Lanka army.

METHODOLOGY

Study setting and participants.

This survey was a descriptive cross-sectional study, which was conducted in 2019, at the Security Force Head Quarters East (SF HQ East). Since the male-to-female ratio of the study population was 1 into 0.009 (0.95% of the total population), gender was not considered as a variable. As inclusion criteria, personnel in the SF HQ East, with a minimum service period of two years in the Army and in the rank of Lt Col and below were considered, whereas all civilians serving in the SF HQ East and armed personnel served less than two years and those holding the rank above Colonel were considered as criteria of exclusion. A multistage extension of the cluster sampling method was adapted to select other ranks (ORs) from 71 clusters (Figure 1). Within each cluster, ORs were selected randomly. Officers were selected randomly from the officers' seniority list published in the Army in the year

2019.   The sample size was calculated by the formula described by Lwanga and Lemeshow (1991) [24], and accordingly, it amounted to 3343 (i.e., 140 officers and 3184 ORs was calculated.

Outcome measures

Alcohol consumption was described according to the score obtained in the WHO Alcohol Use Disorder Identification Test (AUDIT)(25), which is validated for Sri Lanka [26]. A score of 8 and above was defined as high-risk drinking (HRD) (which includes hazardous, harmful and probable dependent use of alcohol), and binge drinking (BD) was defined as 5 or more drinks consumed in a row [27].

With the permission of the authors, the socio-demographic data were gathered by adopting questions used by two previous local military studies [28, 29]. Information on the mental health correlates of HRD and BD were collected with locally validated screening tools, namely, 9-Item Patient Health Questionnaire (PHQ-9) for depression (caseness was defined with a score ≥ 10) [30], PTSD Checklist Military Version (PCL- M) for post-traumatic stress disorder (PTSD) (caseness was defined with a score ≥ 45.5) [28], and 13 items Chalder Fatigue Scale for fatigue (caseness was defined with a score ≥ 4) [29]. In addition, standard questions were used to ascertain the degree of unit cohesion, aggression, cigarette smoking, cannabis use, family history of psychiatric disorders and exposure to childhood abuse [31, 32, 33, 34]. As done with a previous military study, psychosocial functioning was assessed with the tenth question of the PHQ-9 [5].

Statistical analysis

SPSS-20 was used for statistical analysis. The significance of the associations between alcohol use (HRD and BD) and the socio-demographic and mental health correlates were sought with the Chi-square test. The Mann-Whitney U test was used to describe the significance of the association between unit cohesion and depression. Standard multiple logistic regression was applied to calculate the adjusted odds ratios (OR) with a 95%

confidence interval (95% CI), to determine the significance of the predictiveness of the socio-demographic and mental health correlates of HRD and BD. The significance of the probability was discerned with probability values ≥ 0.05.

Ethical approval

Ethical clearance was obtained from the Ethics Review Committee of the Faculty of Medicine, Kotalawala Defense University. Participation was voluntary and written informed consent was obtained from all participants. Measures were taken to avoid duress. The questionnaire did not identify the participants by name.

RESULTS

The total sample population was 3665 (146 officers and 3519 other ranks) with a 100% response rate. Among them, 1845 (50.4%) (75 officers and 1772 other ranks) had battle experience. The mean age was 31.78 years (SD 6. 686), 66.1% were married, 56.7 % had not passed GCE OL, 4% were officers, 20.5% had 5≥ years of service, and the majority (30.5%) were employed outside their battalions.

Within the sample, 76.5% (95% CI 75.1% - 77.9%) were current alcohol consumers, and among them, 43% (95% CI 41.3% - 44.8%) were in HRD [i.e., 35.2% hazardous, 5.5% harmful and 2.3% dependent drinkers] and 15.5 % (95% CI 14.1 %-16.7%) were in BD category. However, as a proportion of the total sample, 32.7 % (95% CI 31.2% - 34.4%) were in the HRD [i.e., 26.7% hazardous, 4.2% harmful and 1.8% dependent drinkers] and 11.7% (95% CI 10.7%-12.9%) were in the BD category.

Association of socio-demographic factors with HRD & BD

Younger age, being single, a shorter period of service and employment in the Infantry and Elite battalions were significantly associated with HRD, BD, or both (Tables 1 and 2). The level of education did not show a significant association with HRD, BD or Both. Having adjusted the ORs, except the period of service, all the above were significantly predictive of HRD, BD, or both (Tables 3 and 4).

Table 1: The association between HRD and sociodemographic and mental health correlates

Variable		X^2	df	P value
Sociodemographic factors				
Age	Proportion			
26≥	39.6%	29.689	4	0.000
27-29	34%			
30-33	30.2%			
34-38	30.8%			
39≤	27.6%			
Civil status (Remained single)		20.810	1	0.000
Level of education		3.489	1	0.062
Employed in elite & infantry battalions		10.671	1	0.001
Period of service (years)	Proportion			
≤ 5	38.2%	13.041	1	0.000
6≤	31.3%			
Mental health factors				
Fatigue		62.530	1	0.000
Probable depression		58.841	1	0.000
Currently smoking		240.732	1	0.000
Cannabis consumption		101.275	1	0.000
PTSD*		11.981	1	0.001
Other factors				
Exposed to childhood abuse		16.154	1	0.000
Expression				
Verbally		82.210	1	0.000
Physically		50.945	1	0.000
Vandalism		59.477	1	0.000
Absenteeism without leave (AWOL)		3.873	1	0.049
Psychosocial dysfunction		42.615	1	0.000
HRD	The mean rank of cohesion	Mann-Whitney U	Z	P
No	1867.95	1392857.500	-2.884	0.004
Yes	1761.21			

The Chi-square test was done only on respondents with combat-experience

Association of Mental Health Factors

Probable depression, fatigue, PTSD, smoking, and cannabis use were significantly associated with HRD and BD (Tables 1 and 2), and with adjusted ORs, all were predictive of HRD, BD, or both (Tables 3 and 4).

Association of other factors

Childhood exposure to abuse, aggression, absenteeism without leave (AWOL), admission for inward treatment, and psychosocial dysfunction were significantly associated with HRD, BD, or both (Tables 1 and 2). After adjusting the ORs, childhood exposure to abuse, aggression, and psychosocial dysfunction were significantly predictive of HRD, BD, or both (Tables 3 and 4).

Table 2. The association between BD and sociodemographic and mental health correlates

Variable		X²	df	P value
Sociodemographic factors				
Age	Proportion			
26≥	17.4%	49.333	4	0.000
27-29	13.1%			
30-33	11.0%			
34-38	8.9%			
39≤	6.7%			
Civil status		28.463	1	0.000
Level of education		0.044	1	0.834
Period of service (years)	Proportion			
≤ 5	16.2%	18.125	1	0.000
6≤	10.6%			
Mental health factors				
Fatigue		62.530	1	0.000
Probable depression		58.841	1	0.000
Currently smoking		240.732	1	0.000
Cannabis consumption		51.491	1	0.000
PTSD*		11.254	1	0.001
Other factors				
Expression				
Verbally		21.688	1	0.000
Physically		36.324	1	0.000
Vandalism		32.762	1	0.000
Psychosocial dysfunction		12.177	1	0.000
BD	**The mean rank of cohesion**	**Mann-Whitney U**	**Z**	**P**
No	1844.28	648109.000	-2.256	0.024
Yes	1722.73			

* *The Chi-square test was done only on respondents with combat-experience*

Table 3 factors that were predictive of HRD after adjusting the odds ratio with multiple logistic regression.

	Unadjusted OR (95% CI)	*Adjusted OR (95% CI)
Socio-demographic factors		
Age (Younger age)	1.388 (1.209-1.594)	1.209(1.018-1.437) *
Civil status (Being single)	1.397 (1.210-1.613	1.265(1.072-1.493) *
Type of employment (Infantry & Elite)	1.270 (1.100 - 1.466)	1.283(1.110-1.482) *
Period of service (Lesser service)	1.358 (1.150 - 1.604)	1.063(0.865-1.307) *

	Unadjusted OR (95% CI)	*Adjusted OR (95% CI)
Mental health factors		
Currently smoking	3.117 (2.692-3.608)	2.753(2.286-3.317) **
Fatigue	1.791 (1.549-2.072)	1.251(1.042-1.501) **
Probable depression	1.895 (1.607-2.234)	1.815(1.363-2.418) **
Cannabis use	2.940 (2.366-3.653)	1.843(1.358-2.501) **
Other factors		
Exposed to childhood abuse	1.338 (1.161-1.543)	1.196(1.033-1.384) ***
Aggression		
Verbally	2.055 (1.756-2.404)	
Physically	2.207 (1.768-2.754)	1.981(1.581-2.481) ***
Vandalism	1.963 (1.651-2.335)	
AWOL	1.185 (1.001- 1.403)	1.083(0.911-1.288) ***
Psychosocial dysfunction	1.586 (1.380-1.822)	1.544(1.340-1.779) ***

* ORs were adjusted for age, civil status, period of service and type of employment.
**ORs were adjusted for fatigue, probable depression, current smoking, and cannabis use.
***ORs were adjusted for exposure to childhood abuse, aggression, AWOL, and psychosocial dysfunction.

Table 4 factors that were predictive of BD after adjusting the odds ratio with multiple logistic regression.

	Unadjusted OR (95% CI)	*Adjusted OR (95% CI)
Socio-demographic factors		
Age (Younger age)	1.860 (1.513-2.285)	1.583(1.240-2.020) *
Civil status (Being single)	1.733 (1.413- 2.124)	1.372(1.075-1.750) *
Period of service (Lesser service)	1.633 (1.301- 2.051)	1.051(0.797-1.387) *
Mental health factors		
Currently smoking	2.366(1.907-2.937)	2.017(1.525-2.668) **
Fatigue	1.791 (1.549 - 2.072)	1.222(0.936-1.596) **
Probable depression	1.895 (1.607-2.234)	1.462(0.988-2.162) **
Cannabis use	2.570(1.971-3.352)	2.076(1.422-3.031) **
Other factors		
Admitted for inward treatment	1.365(1.012-1.840)	1.306(0.965-1.766) ***
Aggression		
Verbally	1.673 (1.345-2.082)	
Physically	2.296 (1.741-3.029)	2.169(1.640-2.870) ***
Vandalism	1.948 (1.545-2.455)	
Psychosocial dysfunction	1.586 (1.380 - 1.822)	1.324(1.079-1.625) ***

* ORs were adjusted for age, civil status, and period of service.
**ORs were adjusted for fatigue, probable depression, current smoking, and cannabis use.
***ORs were adjusted for exposure to inward admission, aggression, and psychosocial dysfunction.

DISCUSSION

We observed a high prevalence of alcohol use within the Army. According to the adjusted ORs, younger age, being single, type of employment, probable depression, fatigue, smoking, cannabis use, exposure to child abuse, aggression, and psychosocial dysfunction significantly was predictive of HRD, BD, or both. With corroborating scientific evidence, this paper will explain these predictive factors in terms of risk and outcome of HRD, BD, or both.

Prevalence

The prevalence of use of alcohol was estimated to be 76.5% in the Army, out of which 43% were HRD and 15.5 % were BD. Within the HRD, hazardous use was the highest to be observed (35.2 %). Reflecting our findings, a study done in the Sri Lanka Navy revealed that 71.23% consume alcohol and among them, 16.7% were in the HRD and 14.01% were in the BD category [35]. In the US, Australia and Nigeria, current alcohol use in the military was extrapolated to be 86.6%, 96% and 76%, respectively [36, 37, 38], which was higher than ours.

According to past community studies, the current alcohol usage in the Army is comparatively higher than in the civilian community [33, 39, 40]. This observation has been cited by militaries of other countries [7, 8, 41], and is attributed to the unique cultural concepts (alcohol is used to assist military cohesion) [22], beliefs ("alcohol use is part of being in the military" and "alcohol is a way of recreational activity in the army") [9] and social pressure [23]. More so, the "military family" plays an important role in the loco parentis1 for younger soldiers, and hence senior members of the chain of command could be potent role models promoting drinking [16].

Comparatively, HRD and BD were higher in Western forces than ours; the hazardous pattern of alcohol use in the UK military varied between 49% to 92% [7, 41] and in the ADF it was 36% [37], whereas harmful and dependent use in the US and UK were over 13% [41, 42]. Nevertheless, studies portray, that the prevalence of alcohol-related disorders (i.e., harmful use and alcohol

dependence) and heavy drinking in the military were comparatively lower than in the community [43, 44]. However, according to a community study, the prevalence of harmful and dependent use in the Army is neither high nor low compared to the community [45].

HRD / BD and socio-demographic correlates

Stress-vulnerable individuals excessively use alcohol due to the bidirectional effect of alcohol and stress; on the one hand, alcohol is consumed as it momentarily relieves stress and on the other hand, alcohol causes neuroadaptation in stress-related brain pathways and as well as in hypothalamic pituitary adrenal (HPA) axis function, so much so, stress becomes a potent trigger inducing cravenness to take alcohol [46]. Studies have illuminated that, in forces, personnel at younger ages cope poorly with stress [23]. Further, younger armed personnel are prone to stress due to adjustment issues followed by inexperience [47]. Marriage reduces the harmful effects of stress by providing emotional sustenance to cope with stress, providing invisible support and enabling one to acquire social skills to manage stress [48]. In addition, alcohol use stems from emulation, which is common among younger individuals in forces who strongly perceive seniors as mentors [49]. Thereby, younger age and being single can be discerned as risk factors for HRD, BD or both in the militaries. However, we could not confirm the type of employment as a risk factor for heavy use of alcohol due to a lack of empirical evidence, warranting further research.

HRD/ BD and mental health correlates

Converging with our observations HRD, BD or both were shown to be significantly associated with depression [18,50, 51], fatigue [18, 19, 52], PTSD [53, 54], smoking [16, 55, 56], and cannabis use [51]. Studies have revealed the genetic link between heavy use of alcohol and depression [57, 58, 59] and have demonstrated depression as an outcome as well as a risk factor for excessive use of alcohol [60, 61]. Fatigue is shown to reciprocate with stress (i.e., stress can give rise to fatigue or vice versa) [62] and as emphasized above, stress is associated with heavy alcohol use, thus fatigue could be accounted for as a risk factor for HRD, BD

or both. Likewise, in PTSD, alcohol is used as a means of coping with the unbearable symptoms, which inevitably ensue in heavy alcohol use [63], substantiating PTSD as a risk factor for HRD, BD or both. The scientific literature asserts that nicotine and alcohol have a cue eliciting craving for each other, the desire to drink is associated with quitting nicotine and the sedative and intoxicating effect of alcohol is lessened by nicotine allowing one to drink more [19], and thereby, arguably, smoking can be discerned as a risk factor or an outcome of HRD, BD or both. Similarly, cannabis and alcohol enhance each other's euphoric effects [64] and complement each other's nature of the interaction [65], hence, cannabis also can be confirmed as risk factor or an outcome of HRD, BD or both.

HRD/BD and other correlates

Reflecting on depictions, studies have shown the significance of the association between excessive use of alcohol and exposure to childhood abuse, aggression and psychosocial dysfunction [65, 66, 67]. Exposure to childhood abuse gives rise to subsequent urgency (i.e., repeated impulsive behaviour), behavioural dysregulation and psychological distress leading to heavy alcohol use in adulthood [21, 65, 68]. Aggression is likely during inebriation because the cognitive functions necessary to regulate emotions and behaviour become impaired, in other words, the self-control mechanism to contain anger unleashing into violence is compromised by alcohol [66, 69, 70]. Lastly, heavy alcohol use is shown to cause problems in the workplace due to loss of productivity, the occurrence of serious consequences, absenteeism, and interpersonal issues (due to loss of inhibition, impulsivity and aggression) [9, 67, 71, 72]. Moreover, marital disharmony is also shown to occur with heavy alcohol use due to frequent impulsivity and violence [73, 74]. Thereby, in Forces, childhood abuse is a risk factor and psychosocial dysfunction could be inferred as an outcome of HRD, BD or both. However, though aggression was shown as an outcome of HRD, BD, or both, more research with many variables to be excluded as confounders is warranted. In addition, mirroring our findings, studies show cohesion reduces with excessive alcohol use [75, 76], and in fact, cohesion is

evinced to protect from alcohol use [76, 77]. Thus, lack of cohesion can be either an outcome or a risk for HRD, BD or both.

Limitations

The causation of the associations was unable to be determined as this was a cross-sectional study, and recall bias, unacceptability bias (i.e., reluctance to expose perceived sensitive information), and misinterpretation bias were possible as data were exclusively dependent on self-administrative questionnaires. Moreover, due to the possibility of false positive and negative responses, type 1 and type 2 errors cannot be discounted. As only serving personnel were included, the healthy worker effect [78] can give rise to an outcome bias. This study should have included a control comprised of an age-matched sample of non-service personnel for comparison. Gender was not sought as a possible correlate of alcohol use, which, however, can be negated as this study was done in a predominantly male community. Finally, the clusters, for the sample, should have been from all military establishments in the country to increase the generalizability of the results. Nevertheless, as SF HQ–East proportionally represents that of the entirety of the Army (i.e., in terms of officers, ORs, ranks and regiments), our sample population can be contended to reflect the total population of the Army.

CONCLUSIONS AND RECOMMENDATIONS

In comparison to community studies, the consumption of alcohol in the Army was high, which may be due to military-related factors. However, the prevalence of harmful and dependent alcohol use in the Army may not be higher than in the community. Younger age and being single were discerned to be socio-demographic risk factors for HRD, BD or both. Mental health factors such as depression, fatigue, smoking and use of cannabis can either lead to or result in HRD, BD or both. PTSD can be inferred as a risk factor for HRD, BD or both. Exposure to abuse during childhood may predispose to heavy use of alcohol in adulthood.

Raising awareness about the repercussions of alcohol use, implementing restrictions on using alcohol, disseminating mental health services throughout the Army, and screening for vulnerable individuals in the field and during recruitment are actions recommended to reduce alcohol use within the Army.

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