

# SUBSTANCE USE AND MISUSE IN THE CROATIAN ARMY SPECIAL FORCES: PREVALENCE AND INFLUENCING FACTORS

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## Abstract

**Objectives:** In addition to being a serious health-hazard, substance-use-and-misuse (SUM) in military forces negatively influences physical fitness and army readiness. The aim of this study was to define the prevalence of SUM, which includes cigarette smoking, alcohol consumption, and multiple SUM (i.e. practice of daily smoking and harmful alcohol drinking), and factors influencing SUM in the Croatian Special Army Forces (SAF). **Materials and Methods:** We studied 73 SAF members. A self-administered validated questionnaire was used to gather socio-demographic and military-profession-related data, and SUM factors. The associations between studied variables were established by the Chi<sup>2</sup> test, and forward conditional logistic regression (FCLR). **Results:** With less than 40% of daily smokers, smoking was within expected values. Almost 80% of the examinees reported no binge drinking, while 54% reported harmful drinking according to the Alcohol Use Disorders Identification Test scale. Paternity and education level were negatively associated with daily smoking, while higher incidence of daily smoking was found for privates and those who practiced harmful drinking (all at  $p < 0.05$ ). The FCLR demonstrated a higher risk of harmful alcohol consumption for younger commissioned officers (OR for military rank = 5.54, 95% CI: 2.19–13.99; OR for age = 0.85, 95% CI: 0.76–0.95). **Conclusion:** Although SUM incidence was not alarming compared to the overall population and the previously reported military data, additional efforts are necessary in order to decrease cigarette consumption. The study showed that protective/risk structure of the substance misuse in the military should be investigated specifically with regard to particular military services, corps, and socio-cultural environment.

## Key words:

Risk factor, Smoking, Binging, Predictors, Physical readiness

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## INTRODUCTION

Regardless of the type of service, military occupations are known to be at high risk of several health-hazards, including sexually transmitted diseases, mental health disorders, musculoskeletal disorders, and substance use and misuse [1–6]. Alcohol consumption and cigarette smoking in the military service are greater than the substance-use-and-misuse (SUM) rates in the overall population. This prevalence is explained by several important factors. First, it is known that the initial status of SUM among youngsters who enter military forces after leaving high school is significantly higher compared to their age-peers, leading to a higher prevalence of SUM during active military service. Second, the increased stress of military duties should be observed as a significant risk factor for SUM. Third, the use of some substances such as cigarettes and/or alcohol is known to be an integral part of the military identity. It all constitutes an occupation-specific environment which indirectly “stimulates” SUM [7–10]. At the same time, studies on military subjects have defined a pronounced influence of SUM on decreased physical readiness, higher injury occurrence, and overall limited duties, lost productivity, and personnel shortages [11–14].

It is generally accepted that investigating predictors of SUM will assure effective prevention with the aim of decreasing the SUM prevalence [15–19]. The risk factors for smoking behavior in US Army professionals are recognized as being a male Caucasian, having less education, coming from a lower income household and being married [20]. In the French Army, tobacco smoking is related to other SUM forms (cannabis usage and heavy alcohol drinking) and lower military rank (being a private) [21].

The predictors of harmful alcohol consumption are similar to those reported for cigarette smoking. In short, studies reported younger age, low military rank and subjectively poor mental health score as the risk factors for heavy alcohol drinking [21,22]. Additionally, those soldiers who have never been married, and/or have been separated

(divorced) were at a higher risk of heavy alcohol consumption [8]. However, we have found no study which investigated the problem of SUM in special army units (special army forces).

Special army forces (SAF) are an integral part of the armies in most countries. Those soldiers are full-time professionals whose duties are specific and consist of short-term engagement in highly important tasks that are performed in different environments in and/or out of the domicile country or homeland territory. In addition to their exceptional military skills, SAF are primarily recognized by their outstanding physical readiness [23]. There is no doubt that SUM consumption is a particularly important issue among SAF due to the high risks and overall stress put on those persons. However, the data about SUM habits in SAF are scarce. To the best of our knowledge, no study has investigated the factors which influence SUM among the SAF members.

The aim of this study was to investigate the prevalence of SUM among members of the Croatian SAF, and to identify socio-demographic and specific military variables as potential protective/risk factors of SUM in this specific military profession. The data will allow precise insight into SUM-related habits, as well as targeting the SAF members potentially at risk of SUM.

## MATERIALS AND METHODS

In this study, we investigated 73 subjects who were members of the Croatian SAF (all full-time professionals,  $33.41 \pm 6.42$  years of age (6 months equals 0.5 year), and  $10.47 \pm 6.26$  years of military service). The sample included 45% of the SAF soldiers in Croatia. The sampling was performed semi-randomly, meaning that we performed the investigation on one day at different locations where SAF units are located. All SAF members who were at the location on the day of testing were asked to join the procedure, and their informed consent was obtained.

To determine the reliability of the questionnaire, 16 subjects were tested twice within 10 days. The response rate was greater than 98%, indicating that only some of the examinees did not respond to all questions. The participation was anonymous, but the subjects were asked to use a confident code (known only to them), which allowed us to compare the results of those subjects tested twice. Each respondent was informed that the survey was strictly anonymous, that they could refuse to participate, and that they could leave some of the questions and/or the entire questionnaire unanswered. The investigation was directly accepted and supervised by the Ministry of Defense of the Republic of Croatia.

The evaluated variables included those collected by the Questionnaire of Substance Use (QSU). QSU is a tool that had been previously used and validated to determine the SUM patterns among different physically active professionals and athletes [24–27]. QSU collects socio-demographic data and comprises profession-related questions (in this case, military-specific questions) and questions on SUM. The socio-demographic variables included age, education level completed (a four-point scale from a primary school level to a university degree), marital status, having children, and religiosity, which was measured by the Santa Clara Strength of Religious Faith questionnaire (SCSRF) [27]. Military service-related factors consisted of questions concerning the time of being involved in military service (in years), and current rank (private, non-commissioned officer, commissioned officer – with additional specification of the officers' rank).

The substance use and misuse was studied by evaluating cigarette smoking and alcohol consumption. Cigarette smoking was evaluated using a 6-point scale (from “not smoking” to “daily more than a packet”). For the purpose of defining the dichotomous criterion, subjects were additionally grouped into “daily smokers” and “non-smokers”. Alcohol consumption was examined using questions on binge drinking (5-point scale from “I do not drink alcohol”

to “I binge a few times a week”) and by the Alcohol Use Disorders Identification Test (AUDIT) scale [16,28]. The subjects were additionally grouped according to AUDIT results into those who practice harmful drinking (scores of 11 or above) vs. non-harmful drinking (scores below 11). Finally, multiple-risk behavior included those subjects with AUDIT score of 11 and above (i.e. “harmful drinkers”) who were evidenced as daily smokers.

In the first part of the statistical processing, QSU was checked for its reliability by calculating the percentage of equally responded queries. This procedure allowed us to define the reliability of the questionnaire although most of the queries were nominal (categorical; such as “military rank”). Depending on the parametric/nonparametric nature of the variables, the means and standard deviations (for parametric) or counts/frequencies and proportions (for nonparametric variables) were calculated. The differences between characteristic groups (with regard to harmful drinking, daily smoking, and multiple risk behavior) for age, time of being involved in military service, and religiosity as determined by SCSRF, were established by the t-test for an independent sample. The Chi<sup>2</sup> test was applied with a dichotomous dependent criterion, to identify the univariate association between each predictor and three SUM criteria (daily smoking, harmful drinking, and multiple risk behavior). The forward conditional logistic regressions were used to identify independent variables related to three SUM criteria:

- harmful drinking,
- daily cigarette smoking,
- simultaneous daily smoking and harmful drinking.

The independent variables (predictors) were: socio-demographic characteristics, military service-related variables and SUM data (not including the criteria variables). A forward conditional model was applied to identify possible confounding effects of mutually dependent predictors. A statistical significance level of 95% ( $p < 0.05$ ) was applied.

## RESULTS

The reliability of QSU was high. On average, the percentage of equally responded queries was 96% for the SUM questions, and almost 100% for the socio-demographic and military service-related variables.

The sample consisted of 27 privates (37%), 25 non-commissioned officers (34%), and 21 commissioned-officers (29%). Forty-five subjects (61%) were married, and 41 had children (56%). Forty-two finished high school (58%), 5 were students (7%) and 25 earned a university/college degree (35%) (Table 1).

A significant univariate association was found between paternity and daily smoking, education and daily smoking (daily smoking was more common in those subjects who had no children and who were less educated), military rank and daily smoking (higher rates of daily smoking among privates), and harmful drinking and heavy smoking (higher prevalence of daily smoking in those who practiced harmful drinking). There was an evident “U” shape association between military rank and harmful drinking, where privates and commissioned officers tended to practice harmful drinking more often than non-commissioned

**Table 1.** Characteristics of the studied sample; a univariate association between substance misuse prevalence and each studied characteristic

Characteristic	Total		DS		Chi <sup>2</sup>	HD		Chi <sup>2</sup>	MRB		Chi <sup>2</sup>
	n	%	n	%		n	%		n	%	
Marital status											
married	45	61	13	65		24	60		7	58	
divorced/separated	2	3	0	0		0	0		0	0	
single	26	36	7	35	–	16	40	–	5	42	–
Paternity											
no	32	44	12	60		22	55		7	58	
yes	41	56	8	40	0.01	18	45	0.06	5	42	0.01
Education											
elementary school	–	–	–	–		–	–		–	–	
high school	42	58	14	70		20	50		7	58	
student	5	7	1	5		2	5		1	8	
college/university	25	34	5	25	0.01	18	45	0.06	4	33	0.06
Military rank											
private	27	37	14	70		19	48		7	58	
non-commissioned officer	25	34	4	20		3	8		1	8	
commissioned officer	21	29	2	10	0.01	18	44	0.01	4	33	0.01
Smoking											
no smoking	53	73				28	70				
daily smoking	20	27				12	30	0.61			
Alcohol											
non-harmful drinking	33	45	12	60							
harmful drinking	40	55	8	40	0.01						

DS – daily smoking; HD – harmful drinking; MRB – multiple-risk behavior; Chi<sup>2</sup> – Chi square significance.

officers. A similar association was evident for military rank and multiple-risk behavior. Parental status was negatively related to multiple substance misuse (Table 1).

Daily smoking was evidenced for 20 subjects (27%), with 13 subjects (17%) smoking 10–20 cigarettes daily, and 7 (10%) smoking fewer than 10 cigarettes daily. A significant proportion of the tested soldiers (20%) quit smoking.

Seventeen subjects (23.3%) reported binge drinking. More precisely, one of ten practiced binge drinking at least once per week, and 10 subjects (14%) declared binge drinking once or twice per month. Multiple-risk behavior (simultaneous daily smoking and harmful drinking) was found for 12 (16%) subjects.

No significant differences ( $p > 0.05$ ) were noted for age, time of involvement in the military service, and religiousness for any of the studied SUM behaviors (Table 2).

The results of the forward conditional logistic regression analysis for harmful alcohol drinking indicated that military rank (OR for higher military rank = 5.54, 95% CI: 2.19–13.99) and age (OR = 0.85, 95% CI: 0.76–0.95) significantly contributed to the incidence of harmful drinking. The regression model was:

$$\text{Harmful drinking} = 1.633 + 0.850 \times \text{age} + 5.542 \times \text{rank} \quad (1)$$

A significant model successfully classified 79% of the subjects (78% non-harmful drinkers, and 79.5% harmful drinkers).

The logistic regression did not reach the appropriate level of significance when daily cigarette smoking and multiple SUM behavior were observed as criteria.

## DISCUSSION

There are several important findings of this study. First, the smoking incidence among SAF was within the expected values. Also, the analysis showed a known negative association between military rank and education status with daily smoking. Alcohol consumption was relatively low, particularly with regard to the binge drinking occurrence. The univariate analysis indicated parental status as a protective factor against daily cigarette smoking and multiple SUM. Multivariately, high risk for harmful alcohol drinking was found for younger subjects with higher military rank, while we failed to identify significant predictors of daily cigarette smoking and multiple SUM (daily smoking and harmful drinking).

For numerous reasons (smoking-related illness, increased injury risk, reduced physical fitness, increased healthcare costs, and lower productivity), it is crucial to reduce smoking behavior in military units [11,13]. Regardless of all efforts, smoking prevalence in the military forces has appeared to change little during the last decade [29]. Although the comparison is limited due to the different methodologies of data collection, the smoking prevalence among the Croatian SAF should be

**Table 2.** Differences in age, time involved in military service (Service) and religiousness (SCSRF) between characteristic groups

Dependent variables	Harmful drinking (M±SD)		Daily smoking (M±SD)		Multiple-risk behavior (M±SD)	
	yes	no	yes	no	yes	no
Age (years)	32.10±6.73	34.51±5.89	38.70±8.28	32.62±5.76	33.33±9.13	33.16±5.86
Service (years)	11.87±5.95	9.35±6.35	11.81±7.45	9.96±5.74	10.83±8.18	10.40±5.89
SCSRF (score)	21.72±9.72	25.39±9.86	25.05±9.91	20.40±9.69	24.48±9.95	20.25±9.99

SCSRF – Santa Clara Strength of Religious Faith questionnaire.

M – mean; SD – standard deviation.

There was no significant t-test difference between groups for any of the studied variables.

considered lower than the prevalence recently reported for the French Army (54% current smokers; ranging from 21% among officers to 63% among privates), but higher than among the US Army personnel (about 10% of those who smoke more than 10 cigarettes per day) [21,29].

Although the difference between smoking frequency in US and Croatian soldiers is evident, it must be emphasized that the US data relate to cigarette smoking exclusively. More precisely, in the US Army, there is significant prevalence of smokeless tobacco consumption, which is a substance practically unknown in Croatia. The daily smoking incidence in SAF is lower than the one recently reported for the Croatian Army in general (50%) [11]. It is likely that high physical demands and the specifics of their duties directly decrease tobacco consumption among SAF members in comparison to their peers serving in regular army units. On the other hand, the smoking incidence in SAF is similar to the value of 32% of daily smokers recently reported for Croatian age-match males [30].

Socio-culturally, alcohol consumption in Croatia is similar to the Mediterranean style of drinking (i.e. alcohol is consumed regularly with the meal, but intoxication is not socially accepted). However, there is strong epidemiological evidence that excessive consumption of alcohol is a growing problem in Croatia [28]. Taking into account the specific military environment (which in general accepts alcohol consumption), we may highlight that alcohol consumption in the Croatian Army should be precisely monitored, although our data showed relatively low levels of alcohol consumption in the studied sample of SAF members.

The average alcohol consumption in the Croatian SAF appears to be lower than that reported for other armed forces [2,21,22]. More precisely, only a small percentage of males in the UK Navy reported no binge drinking (only 4%), while our data showed no binge drinking

in almost 80% of the examinees [22]. Likewise, the data collected on the French Army indicated that 56% soldiers declared drunkenness 1+ time per month, while only 10% of the participants admitted total abstinence from alcohol. At the same time, 25% declared no alcohol consumption [21]. Most probably the relatively low prevalence of alcohol consumption in SAF is related to their specific duties including diving with self-contained underwater breathing apparatus (i.e. SCUBA diving). Since alcohol consumption has a direct effect on the kidneys, causing an obligatory loss of body fluids (i.e. dehydration), and therefore it induces the occurrence of the decompression illness, it almost certainly directly explains the low prevalence of alcohol consumption in the sample of subjects studied here.

Cigarette smoking and alcohol consumption in military units are more common among those soldiers who consume other substances, who have lower military rank, who are less educated, Caucasians (cigarette smoking), and are non-married and/or divorced (alcohol) [20–22]. Supportively, we found the highest daily smoking for those who practiced harmful drinking, among privates and less educated soldiers. Since the previous studies did not include SAF members in their investigations, it seems that factors influencing cigarette smoking are stable across different military services.

The results showed the highest incidence of harmful drinking among privates and commissioned officers (i.e. the “U shape” relationship between military rank and harmful drinking), while the multivariate logistic analysis revealed higher military rank and younger age as factors of significant influence on harmful drinking among SAF. At first glance, such results appear to be in certain disagreement with the previous findings which found low-ranked personnel being at risk of heavy drinking [22].

In explaining such finding, a recent study of Brazilian authors who investigated job stress and mental health

variables among military personal is particularly important [30]. Briefly, the authors recognized lieutenants as a military rank with the highest risk of common mental disorders (in our study 70% of all commissioned officers were lieutenants). Although they were not specifically studied here, we may support the discussion of our respected colleagues who explained their findings by some highly specific issues related to this military rank. In short, lieutenant is the lowest commissioned officer rank, burdened with a high possibility of undesirable changes at work, more superiors to report to, direct responsibility for the duties of subordinated soldiers and generally high liability [31]. All these characteristics are evident sources of stress, which is a known risk factor for alcohol misuse in military forces [32].

### Study limitations

The first limitation of this study is related to the self-reported nature of the data. The subjects may not have been truthful if they felt uncomfortable. However, we believe that the questionnaire design, study protocol, experience from previous studies, and the fact that testing was performed by SAF members (i.e. insiders) decreased this possibility. Additionally, the reliability analysis showed that the results are plausible.

The second limitation of the study is related to the number of subjects. Indeed, we studied a relatively small sample, but we included a significant proportion of the SAF members in Croatia and selected them randomly. Consequently, the percentage of respondents was almost maximal, which is known to be a more important factor of plausibility than the number of subjects *per se* [24]. Apart from the fact that a low response rate can give rise to sampling bias, the fact that we had almost a maximal response rate gave us right to conclude that the subjects felt comfortable when the questionnaire was administered. It altogether resulted in high reliability of the testing.

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