












# The risk of developing alcohol addiction – what coping strategies do Ukrainian military personnel use after participating in intense hostilities?

Ihor Prykhodko <sup>1</sup>, Yanina Matsehora <sup>1</sup>, Maksim Baida <sup>1</sup>,  
Oleksandr Zahrebelnyi <sup>1</sup>, Ivan Lipatov <sup>1</sup>, Viktoriia Kuzina <sup>2</sup>,  
Kateryna Marushchenko <sup>2</sup>, Yurii Rumiantsev <sup>2</sup>, Hanna Skliarova <sup>3</sup>

<sup>1</sup> National Academy of the National Guard of Ukraine, Kharkiv, Ukraine

<sup>2</sup> Ukrainian Military Medical Academy, Kyiv, Ukraine

<sup>3</sup> University "KROK", Kyiv, Ukraine

## ABSTRACT

**Introduction and aim.** Since February 24, 2022, military personnel of the Ukrainian Defense Forces have been resisting the military aggression of the Russian Federation. After participating in combat operations, military personnel accumulated combat stress. Drinking alcohol was one of the ways to overcome it. The purpose of the article is to identify the types of coping strategies for the risk of developing alcohol addiction among Ukrainian military personnel who participated in intense hostilities.

**Material and methods.** Ukrainian Defense Forces military personnel (n=162 males, between 20 and 60 years of age) took part in this study. To determine coping strategies and the risk of developing alcohol addiction the AUDIT and the COPE Inventory were used.

**Results.** Cluster analysis made it possible to identify 4 types of coping strategies with different prevalence and levels of risk of developing alcohol addiction among participants.

**Conclusion.** Productive coping has been associated with a reduced risk of alcohol use in military personnel, but the ability to be situational flexible in the use of coping is important. Compulsive alcohol use was preceded by a period of intensive use of social support coping by military personnel. This period is sensitive to the risk of developing alcohol addiction.

**Keywords.** alcohol addiction, coping strategies, military personnel

## Introduction

Since February 24, 2022, military personnel of the Ukrainian Defense Forces have been resisting the military aggression of the Russian Federation. Hundreds of thousands of military personnel from both sides participate in large-scale combat operations, where the combat contact zone is more than 1,100 kilometers.<sup>1</sup> Almost all military personnel who participated in combat expe-

rience combat stress, which manifests itself in the form of acute stress reactions, affective and anxiety disorders, adaptation disorders, addictive and delinquent behavior, and suicidal manifestations.<sup>2-5</sup> Especially for military personnel called up for mobilization, participation in hostilities became a significant stressful event.<sup>6</sup> On the one hand, this forced them to look for ways and reserves to adapt to a situation in which they had to not only be

Corresponding author: Ihor Prykhodko, e-mail: prikhodko1966@ukr.net

Received: 29.01.2024 / Revised: 7.03.2024 / Accepted: 15.03.2024 / Published: 30.09.2024

Prykhodko I, Matsehora Y, Baida M et al. The risk of developing alcohol addiction – what coping strategies do Ukrainian military personnel use after participating in intense hostilities? *Eur J Clin Exp Med.* 2024;22(3):482–490. doi: 10.15584/ejcem.2024.3.1.



but also actively act, carrying out assigned combat missions.<sup>7</sup> On the other hand, after participating in intense combat operations, military personnel accumulated combat stress, manifested by negative mental reactions.<sup>5</sup> Drinking alcohol was one of the ways to overcome it.<sup>8</sup> It was used as a “folk” remedy in the absence of high-quality psychological assistance and knowledge about methods of self-help and self-regulation.<sup>9</sup> Although the effectiveness of this method of overcoming negative experiences is relative, military personnel used this coping even if before the war they were not prone to drinking alcohol.

Traditionally alcohol has been used by the military to cope with the intense stress of battle but also as a way of mediating the transition from the heightened experience of combat to routine safety.<sup>8,10</sup> The use of alcohol has divided researchers. Some viewed it as wholly harmful to both social and occupational function and to health, while others argued that alcohol had a specific role in lifting morale, aiding unit cohesion, and protecting soldiers from adjustment disorders.<sup>11,12</sup> Although alcoholism has always been identified as incompatible with military service, the effects of habitual heavy drinking among military personnel are less well understood. Recent studies have suggested that young single males, who have less education, are of lower military rank and those who have undergone particularly stressful experiences are at the greatest risk of misusing alcohol.<sup>13</sup>

Overcoming difficult life situations, including combat stress, is often associated with mechanisms and strategies for coping with stress.<sup>14,15</sup> The most common are problem-focused coping, which is aimed at getting out of a problem situation, and emotion-focused coping, aimed at experiencing difficult emotional events without the possibility of influencing them.<sup>16,17</sup> In our opinion, the most used psychodiagnostic technique for determining strategies for coping with stress is the COPE Inventory.<sup>17</sup>

It was previously found that drugs, substance abuse, and alcohol were often used by military personnel in various military conflicts as a means of relieving stress both in the combat zone and after its completion.<sup>8,18-21</sup> It has also been shown that alcohol may be a coping mechanism for traumatic events.<sup>22</sup> However, excessive alcohol consumption can negatively affect the mental and physical health of military personnel and the combat effectiveness and combat readiness of troops as a whole.<sup>23,24</sup>

The study on the impact of military service on military personnel's alcohol use found that changes in troop deployments, the dangerous nature of deployments, and combat stress were associated with alcohol abuse among military personnel.<sup>25</sup> The main factors influencing alcohol consumption among military personnel were: mental health, family status, age, type of army, active participation in hostilities, and family problems. Another study

found that alcohol use was considered highest among those who performed combat missions or participated in more intense combat.<sup>22</sup> It was found that military personnel who had a higher risk of death or injury were more likely to abuse alcohol.<sup>26</sup> However, the prevalence of alcohol abuse among military personnel of different branches was not the same: among Special Operations Forces soldiers, alcohol use was the same or less than in the US military.<sup>27</sup> Although combat experience was positively correlated with alcohol abuse, killing experience significantly reduced alcohol use following deployments.<sup>28</sup> This was explained by the awareness of one's mortality and the inclusion of self-preservation mechanisms, manifested in a decrease in alcohol consumption.

Studies have revealed a relationship between the amount and frequency of alcohol consumption and the diagnosis of post-traumatic stress disorder (PTSD) in military personnel.<sup>29-31</sup> However, the results of studying the relationship between alcohol consumption and the consequences of stress on the body of military personnel were ambiguous. For example, stress was equally likely to predict increases, decreases, and no association with alcohol use, although overall stress showed a positive association with craving for alcohol.<sup>32</sup> As a coping strategy with stress, alcohol consumption and its ability to reduce mental stress has been indicated in some studies.<sup>33-36</sup> The results suggested a moderating effect of alcohol on stress levels and reactivity. However, these studies showed that as the intensity of acute stress increased or stress became chronic, alcohol abuse became more compulsive, moving from a method of stress reduction to a dominant or sole means of maintaining homeostasis.<sup>37</sup> Thus, long-term alcohol use may have increased baseline stress levels, causing persistent cravings to drink.

Coping strategies as moderators of the relationship between stress and alcohol use have also been examined in studies, but their effects have been mixed.<sup>32</sup> Specifically, in the study with an all-female sample, it was determined that participants with low levels of problem-solving focus drank more alcohol during a low-stress week.<sup>38</sup> At the same time, other researchers using a different sample found the opposite result among college students.<sup>39</sup> They found that the effects of alcohol coping strategies differed significantly among college students by race/ethnicity: emotional rumination reduced alcohol use among African American students, had no effect among Hispanic students, and increased alcohol use among White students.<sup>39</sup>

It should be noted that the nature of alcoholism is such that it does not matter for what reasons alcohol addiction was formed.<sup>8</sup> Over time, these motives are lost, and alcohol abuse continues, destroying a person's physical and mental health, social connections, and personality.<sup>40</sup> This makes it urgent to search for preventive measures in situations that can provoke long-term alco-

hol consumption. It is also important to identify groups of military personnel who are prone to using coping to overcome negative experiences such as alcohol abuse and to study the tendency to use a certain type of coping associated with alcohol abuse.

## Aim

The purpose of the article is to identify the types of coping strategies for the risk of developing alcohol addiction among Ukrainian military personnel who participated in intense hostilities.

## Material and methods

### *Study design and participants*

All participants gave their informed consent for inclusion before participating in the study. The ethics committee's approval was obtained before the initiation of the study (meeting date; 17/07/2023, decision number; 2023/19). All procedures performed in this study involving human participants were by the ethical standards specified by the institutional and national research committee and with the Helsinki Declaration and its later amendments or comparable ethical standards.

This study is a cross-sectional, descriptive study. Ukrainian Defense Forces military personnel ( $n=162$  males, between 20 and 60 years of age,  $41.84\pm 6.49$  years) participated in this study. All participants (71% were privates, and 29% were non-commissioned officers) took part in the Russian-Ukrainian war and had combat experience 6–10 months ( $8.75\pm 2.58$  months). Before the war, 62% of participants had urban origin, 38% had rural origin; 24% had secondary education, 57% had secondary specialized education, and 19% had higher education. The military personnel were sent to the rehabilitation center from combat positions to participate in the psychological recovery program ("Invincibility Program") lasting 14 days.<sup>41</sup>

The "Invincibility Program" goal was to reduce combat stress's impact on combatants, strengthen mental health and mobilize their psychological resources, improve adaptation and resilience, and promptly return to combat activities. The main criteria and indications for the selection of military personnel were: 1) acute stress reactions in the form of motor and mental disorders, requiring psychological first aid and subsequent outpatient or inpatient treatment; 2) prolonged states of psycho-emotional stress; various sleep disorders that worsen well-being, and performance and require psychotherapy; 3) an increase in irritability, unmotivated aggression, conflict, and decrease in behavioral, and cognitive functions, leading to a violation of combat activity, in which a critical attitude towards the mental state is not maintained; 4) vegetative disorders after minor psycho-emotional stress; 5) an anxious, pessimistic, depressive, or other negative mental reactions and

conditions detected during psychodiagnostics; 6) stable preservation of asthenic symptoms; 7) progressive isolation, the desire for loneliness, limiting the circle of communication with colleagues, a decrease in interest in life; 8) unmotivated and unusual for a serviceman increased activity during the performance of combat missions or after their completion, combined with an unstable mood; 9) signs of increasing distress, manifested in a decrease in the quality and volume of tasks performed, including daily duties, with a general desire to fulfill the assigned tasks; 10) long-term pain syndromes after traumas, wounds without signs of development of organic changes in the places of injuries. The participants were identified: with various manifestations of acute stress reactions; significant negative experiences, including signs of depression and suicidal ideation; presence of PTSD symptoms; sleep problems (more than 50%); somatic complaints (more than 80%), wounds and contusions (more than 75%); difficulties in returning to combat missions due to the consequences of illness, injury and wounds. According to military specialties, there were infantrymen, attack aircraft, scouts, snipers, tankers, artillerymen, and other military specialists.

The "Invincibility Program" began in June 2022 and continues to this day based on the sanatorium in the Kharkiv region of Ukraine. All participants were divided into 9–10 groups for group psychotherapy and psycho-correction (15–20 people in a group with 1–2 military psychologists). The total number of military personnel involved since the beginning of the psychological recovery program has amounted to more than 6,000 people. Female military personnel were excluded in this study because less than 0.5% of female combatants participated over the entire program period. Officers were also not included in the study because there were a small number of them in the psychological recovery program (less than 1%). Participants were randomly selected for the study.

### *Instruments*

To determine the risk of developing alcohol addiction among study participants, the Alcohol Use Disorders Identification Test (AUDIT) was used, and the COPE Inventory was used to determine coping strategies.

The AUDIT (Cronbach's  $\alpha=0.864$ ) is a 10-item screening tool developed by the World Health Organization to assess alcohol consumption, drinking behaviors, and alcohol-related problems.<sup>42</sup> The test allows you to determine the risk levels of alcohol addiction: 0–7 points – a low level; 8–15 points – an average level; 16–19 points – a high level; 20 or more points – a probabilistic alcohol addiction level. According to researchers, the AUDIT and AUDIT-C are the most common tests for studies related to alcohol use problems in military personnel.<sup>26</sup>

The COPE Inventory assesses a variety of functional and dysfunctional coping strategies utilized by individuals in their response to stress, adapted into Ukrainian.<sup>17,43</sup> The Ukrainian-language version of COPE (Cronbach's  $\alpha=0.732$ ) also consisted of 60 statements that must be answered on the Likert scale from "1" to "4". All items in the questionnaire are grouped into 15 scales, with 4 statements per scale, following the original version. The scores on the scales were determined simply by adding all the values of the answers to the statement (numbered from 1 to 60) included in a certain scale.

The COPE can determine someone's primary coping styles with scores on the following three subscales: "Problem-focused coping", "Emotion-focused coping" and "Avoidant coping". "Problem-focused coping" is characterized by the facets of active coping, the use of informational support, planning, and positive reframing. A high score indicates coping strategies that are aimed at changing the stressful situation, are indicative of psychological strength, grit, and a practical approach to problem-solving, and are predictive of positive outcomes. "Emotion-focused coping" is characterized by the facets of venting, the use of emotional support, humor, acceptance, self-blame, and religion. A high score indicates coping strategies that aim to regulate emotions associated with the stressful situation. High or low scores are not uniformly associated with psychological problems or ill health but can be used to inform a wider formulation of the respondent's coping styles. "Avoidant coping" is characterized by the facets of self-distraction, denial, substance use, and behavioral disengagement. A high score indicates physical or cognitive efforts to disengage from the stressor. Low scores are typically indicative of adaptive coping.

For the data presented basic descriptive statistics were used (arithmetical mean  $M$ , standard deviation  $SD$ ). The reliability of differences in the results of the mean values in four interrelated groups was determined using the Student's  $t$ -test. For the assessment of the statistical significance of differences, we used the level of significance from  $p<0.1$  to  $p<0.001$ . To determine the relationship between the risk of alcohol consumption by military personnel (dependent variable) and coping strategies (independent variables), multiple regression analysis (linear regression) was used. To identify groups of military personnel with different coping strategies, a hierarchical cluster analysis procedure was used. The statistical analysis of the study results was carried out using the program SPSS 20.0 (IBM, Armonk, NY, USA).

## Results

Table 1 shows the prevalence of risk levels for developing alcohol addiction among participants in the psychological recovery program.

**Table 1.** The prevalence of risk levels for developing alcohol addiction among participants in the psychological recovery program

Risk levels for developing alcohol addiction	Low	Average	High	Probabilistic alcohol addiction
Prevalence (%)	69.14	29.01	1.23	0.62

High levels and probable alcohol addiction were identified in less than 2% of participants. However, almost 30% of participants were diagnosed with an average risk of developing alcohol addiction, which is the threshold at which a service member may lose the ability to control alcohol consumption.

The main indicators of alcohol consumption by study participants, identified using the AUDIT, were presented in Table 2.

**Table 2.** Indicators of alcohol consumption by study participants

	Indicators	%
Period of military service	Up to 6 months	7.37
	From 6 months to 1 year	17.89
	From 1 year to 3 years	45.26
	From 3 years to 5 years	17.89
	From 5 years to 10 years	8.42
	More than 10 years	3.16
Frequency of alcohol consumption	Never	11.92
	Once a month or less	28.5
	2–4 times a month	37.31
	2–3 times a week	16.58
	4 times a week or more	5.7
The number of servings of alcohol consumed in one typical day of alcohol consumption (a serving of 0.5 liters of beer; or 200 grams of wine; or 50 grams of vodka (or cognac))	Not a single portion	14.51
	1–2 servings	38.34
	3–4 servings	29.02
	5–6 servings	10.36
	7–9 servings	4.15
	10 servings or more	3.63

Using the multiple regression analysis procedure allowed us to create a regression equation:

$$RIAA =$$

$$3.867 - 0.330MD + 0.439SSSI + 0.654ADD - 0.321P + 0.79,$$

where RIAA is the risk indicator for alcohol addiction using AUDIT, 3.867 is a constant, MD is coping "Mental disengagement", UISS is coping "Use of instrumental social support", SU is coping "Substance use", P is coping "Planning", 0.79 is error.

However, despite the satisfactory indicators of the significance of the model ( $F=10.99$ ;  $p<0.001$ ) and the significance of the regression coefficients ( $p\leq 0.05$ ), the calculations showed that for this model  $R\text{-square}=0.213$ . Therefore, it is inappropriate to use it to predict the risk of developing alcohol addiction.

The use of cluster analysis made it possible to identify four groups of participants according to indicators of coping strategies, taking into account the risk of developing alcohol addiction, two of which were less than 5% (Table 3).

**Table 3.** Indicators of coping strategies in participants groups identified using cluster analysis taking into account the risk indicator for alcohol addiction (points)

Scale name	Groups of participants			
	Group 1	Group 2	Group 3	Group 4
AUDIT				
Risk of developing alcohol addiction	6.09±4.24	4.77±3.5	8.60±1.67	16±11.4
COPE Inventory				
Positive reinterpretation and growth	12.91±1.80	8.86±2.38	8.60±2.07	12.5±3.11
Mental disengagement	9.50±2.43	7.75±2.23	11.80±4.09	14±1.41
Focus on and venting of emotions	10.08±2.29	8.16±2.8	12.60±1.14	13±4.76
Use of instrumental social support	11.66±2.15	7.98±2.1	13.40±1.14	15
Active coping	12.97±1.64	9.43±2.32	11.6±2.41	15.00±1.41
Denial	9.03±2.34	7.64±2.72	11.6±3.05	14.25±2.87
Religious coping	10.48±3.52	8.52±2.49	12.6±1.82	13±6
Humor	10.81±2.78	7.61±2.61	7.20±3.27	10.75±4.65
Behavioral disengagement	8.6±2.1	7.50±2.35	10.80±1.79	14.25±0.5
Restraint coping	11.19±1.7	8.25±2.23	11.6±1.14	14.25±1.5
Use of emotional social support	10.91±2.49	7.32±2.26	14.8±0.84	15.50±0.58
Substance use	7.21±3.11	6.61±2.4	13.8±1.92	11.25±4.99
Acceptance	11.45±2.43	8.41±2.48	9.40±3.85	13.75±1.71
Suppression of competing activities	12.37±1.87	8.91±2.38	10±1.87	14.75±2.22
Planning	13.43±1.66	9.34±2.47	13.2±1.79	12.75±3.77

**Table 4.** Differences in coping indicators between groups of participants (Student's t-test)<sup>a</sup>

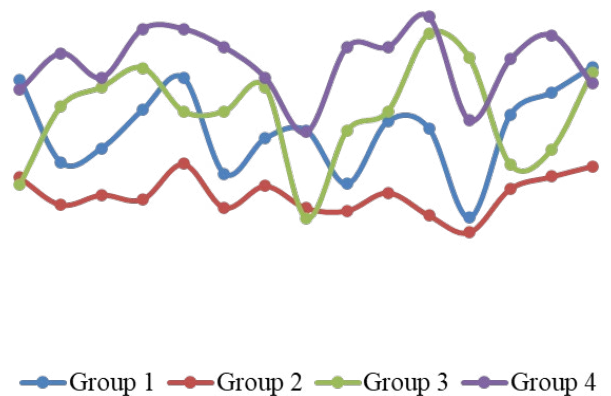
Scale name	Differences between groups					
	t <sub>1-2</sub>	t <sub>1-3</sub>	t <sub>1-4</sub>	t <sub>2-3</sub>	t <sub>2-4</sub>	t <sub>3-4</sub>
Risk of developing alcohol addiction	1.98*	3.15**	1.73 <sup>0</sup>	4.43***	1.96 <sup>0</sup>	1.29
Positive reinterpretation and growth	10.16***	4.99***	0.26	0.29	2.28*	2.20*
Mental disengagement	4.27***	1.37	6.04***	2.38*	7.98***	1.21
Focus on and venting of emotions	4.04***	4.89***	1.22	7.06***	2*	0.16
Use of instrumental social support	9.75***	3.42***	16.19***	9.64***	22.22***	3.44*
Active coping	9.24***	1.38	2.80**	2.08*	7.06***	2.81*
Denial	2.97**	2.03*	3.59***	3.02**	4.43***	1.39
Religious coping	3.87***	2.6*	0.83	4.90***	1.48	0.13
Humor	6.74***	2.65**	0.03	0.3	1.33	1.32
Behavioral disengagement	2.70**	2.90**	17.56***	4.07***	15.58***	4.47**
Restraint coping	7.84***	0.84	3.99***	5.83***	7.30***	3*
Use of emotional social support	8.62***	9.33***	12.24***	15.51***	18.32***	1.57
Substance use	1.27	7.84***	1.61	8.31***	1.84 <sup>0</sup>	0.97
Acceptance	6.90***	1.29	2.59*	0.61	5.73***	2.43*
Suppression of competing activities	8.62***	3.02**	2.12*	1.29	5.01***	3.53**
Planning	10.09***	0.3	0.36	4.71***	1.77 <sup>0</sup>	0.22

<sup>a</sup> <sup>0</sup>p<0.1, \* p<0.05, \*\* p<0.01, \*\*\* p<0.001

The vast majority of coping indicators in the identified groups differed from each other at a statistically significant level (Table 4).

Participants in the four groups did not differ from each other in such demographic characteristics as military rank, the presence of wounds and concussions, and sleep problems. However, minor age differences were found.

When interpreting the data obtained, it turned out to be appropriate to present them graphically. The chosen form corresponded to the idea of the presence of coping strategies profiles and made it possible to form a visual representation of the general propensity (height of indicators) and the hierarchy of coping strategies used in each group (Fig. 1).



**Fig. 1.** Typical profiles of coping strategies used by study participants (points): 1) "Positive reinterpretation and growth"; 2) "Mental disengagement"; 3) "Focus on and venting of emotions"; 4) "Use of instrumental social support"; 5) "Active coping"; 6) "Denial"; 7) "Religious coping"; 8) "Humor"; 9) "Behavioral disengagement"; 10) "Restraint coping"; 11) "Use of emotional social support"; 12) "Substance use"; 13) "Acceptance"; 14) "Suppression of competing activities"; 15) "Planning"

As seen in Figure 1, each group occupies its niche, except for peaks, which may invade the niche of another group.

**Discussion**

The cluster analysis showed that the sample of participants was heterogeneous in using different coping strategies. The distribution of participants by group is presented in Table 5.

Participants in group 1 (66.67% of the total study sample) were the oldest: the average age of the participants was 43.6 years. This group was characterized by an average placement of the profile of coping strategies, and its hierarchy, which was achieved due to pronounced positive peaks ("Planning", "Active coping", "Positive reinterpretation and growth" and "Suppression of competing activities") and negative peaks ("Be-

havioral disengagement” and “Substance use”). These peaks formed a pronounced opposition between productive and unproductive coping. This profile was combined with AUDIT indicators, which indicates a low and average risk of developing alcohol addiction in participants in this group.

**Table 5.** Indicators in participants groups identified using cluster analysis taking into account the risk indicator for alcohol addiction

Indicators	Groups of participants			
	Group 1 (66.67%)	Group 2 (27.16%)	Group 3 (3.70%)	Group 4 (2.47%)
Age (years)	43.6	37.8	37.7	30.2
Positive peaks of coping strategies	“Planning”, “Active coping”, “Positive reinterpretation and growth” and “Suppression of competing activities”	“Planning” and “Active coping”	“Use of emotional social support”, “Substance use” and “Use of instrumental social support”	“Use of emotional social support”, “Use of instrumental social support” and “Active coping”
Negative peaks of coping strategies	“Behavioral disengagement” and “Substance use”	“Substance use”	“Humor”	“Humor”, “Substance use” and “Positive reinterpretation and growth”

Participants in group 2 (27.16%) were somewhat younger than group 1: the average age was 37.8 years. This group is characterized by a low and fairly smooth profile. However, weakly expressed peaks partly correspond to the tendency of participants to give preference to productive coping compared to unproductive ones. The positive peaks in this group were “Planning”, and “Active coping”, and the negative peak was “Substance use”. All other coping strategies are placed in a fairly narrow range of 7-9 points, which indicates a situational (flexible) attitude towards the use of coping strategies. In this group, the lowest risk of developing alcohol addiction and maintaining psychological safety of personality was determined among all groups.<sup>44</sup>

Participants in group 3 (3.7%) had an average age of 37.7 years, which was almost identical to group 2. As in group 1, their profile of coping strategies was located in the average range of indicators and was characterized by a pronounced hierarchy. However, its peaks were, if not mirrored to the peaks of group 1, and then at least shifted towards socially oriented coping, occupying an intermediate position between productive and unproductive coping, as in these studies.<sup>15,16</sup> The highest peaks in this group included copings: “Use of emotional social support”, “Substance use”, and “Use of instrumental social support”. The lowest point of the profile was “Humor”, which can indicate both emotional problems (inability to maintain a positive mood) and certain cognitive problems (inability to anticipate inconsistencies, the pressure of negative experiences over cognitive abil-

ities). This group of participants was characterized by an average risk of developing alcohol addiction.

Group 4 (2.47%) was the youngest, with a mean age of 30.2 years. Group 4 had the highest profile of coping strategies, located mainly in the range of 13–16 points, which comprised pronounced negative peaks “Humor”, “Substance use” and “Positive reinterpretation and growth”. If a high profile could indicate reactivity and tension of all resources, then negative peaks indicated an inability to maintain a positive mood, which was characteristic of compulsive behavior. It was in this group that the highest risk of developing alcohol addiction was diagnosed.

The results obtained allowed us to conclude that coping skills such as “Planning” and “Mental disengagement”, which allow the ability to manage one’s behavior while maintaining the ability, predicted a decrease in alcohol consumption, which kept military personnel from drinking it. It was expected that the risk of alcohol use increased with coping “Substance use”, given its ability to reduce stress previously described in research.<sup>8,25</sup> It was interesting that the risk of drinking alcohol and coping “Use of emotional social support” increased, which could be associated with the existing tradition of “feast”, traditionally used in Ukrainian culture to overcome communication barriers and, if necessary, ask for help or the need to speak out.

Although military personnel undergoing the psychological recovery program had significant negative experiences, the prevalence of alcohol abuse among them was predominantly low. But, as experience in working with such servicemen shows, after leaving the combat zone, the number of servicemen who drank alcohol increased significantly. In our opinion, this was a consequence of the formation of PTSD symptoms, for which it is important to be able to influence reflection after leaving a traumatic situation, shifting the focus of attention from external events to their experiences, forming an attitude towards them, the possibility of processing them and “fitting them in” into one’s own experience. We also confirmed and identified the following factors of alcohol consumption among military personnel: physical and social availability of alcohol, which increases alcohol consumption among military personnel<sup>44</sup>; less expectation of negative consequences from drinking alcohol (being in a zone of intense combat operations, military personnel sought to protect each other, commanders and colleagues reduced the possibility of drinking alcohol).

The results obtained in the regression equation about the positive relationship between coping “Use of instrumental social support” and the risk of developing alcohol addiction were consistent with the data that military personnel used alcohol to support social connections and sociability.<sup>8</sup> The identified negative relationship be-

tween the risk of drinking alcohol and the coping “Mental disengagement” and “Planning” reflected the military personnel’s awareness of the negative consequences of alcohol abuse, and disapproval of this by comrades and commanders; these data were quite similar to the study.<sup>46</sup> Interestingly, the relationship between “awareness of the potential social benefits of alcohol use and awareness of the negative consequences of alcohol abuse” has also been pointed out by other researchers.<sup>25</sup>

We found benefits from interpreting the types of coping profiles. The results obtained using cluster analysis confirmed previously established findings that adaptive coping was inversely associated with alcohol consumption.<sup>47,48</sup> Consistent with other studies, these data also predicted that the use of coping “Planning” and “Suppression of competing activities” will be associated with less alcohol consumption.<sup>48-50</sup>

But the use of coping profiles seems to us more productive than the assessment of individual coping or their total assessment (combined scores on the scales “Active coping”, “Planning”, “Suppression of competing activities”, “Positive reinterpretation and growth”, “Religious coping”, “Acceptance”, “Use of instrumental social support” and “Use of emotional social support”) used in the study.<sup>39</sup> The use of profiles made it possible to identify such aspects as hierarchy (providing a pronounced advantage to certain copings), flexibility (situational use of copings), compulsivity (demand for almost all copings and the inability to maintain a positive mood in other ways (without alcohol)). The graphical representation made it possible to identify profiles of productive coping and counterproductive types of coping or focused on social support.

The results also suggested that compulsive alcohol use is preceded by an intense search for social support against the background of a decrease in one’s cognitive abilities due to stress, which was characterized by an average risk of developing alcohol addiction. Perhaps this is the most favorable period for preventing alcohol use in military personnel experiencing significant long-term stressful events. Our results supported those of researchers who have found that post-deployment cognitive decline in younger military personnel is associated with the risk of alcohol abuse.<sup>51</sup>

### **Study limitations**

This study certainly had limitations. First, female military personnel were not included in this study because, over the entire period of the “Invincibility Program”, less than 0.5% of female combatants participated. Secondly, the sample of participants included only ordinary military personnel and sergeants; officers did not take part in the study. Thirdly, the study was limited by the short period of the psychological recovery program and the inappropriateness to overload participants with additional

activities that did not correspond to the purpose of the program, which reduced the possibility of using research methods, repeatability of the survey, etc. Finally, the current study was limited by not having an active comparison condition and by not having a longitudinal follow-up.

### **Conclusion**

The use of profiles to interpret coping strategies provides new opportunities for assessing the risk of developing alcohol addiction among military personnel participating in intense combat operations. The study showed that productive coping is associated with a reduced risk of alcohol use in military personnel, but equally important is the ability to be situationally flexible in the use of coping. Compulsive drinking of alcohol, which occurs against the backdrop of strain on all coping resources and the inability to maintain a positive background of mood independently, is preceded by a period of intensive recourse to coping with social support due to the stress experienced. Perhaps this particular period is sensitive to the risk of developing alcohol dependence.

Before the mass rotation of military personnel from the combat zone, when alcohol abuse is not widespread, it is necessary to develop alcoholism prevention programs and evaluate their effectiveness. These activities should be aimed at those military personnel who have an average (threshold) level of risk of developing alcohol dependence. Such military personnel also need social support (the type of coping strategy characteristic of group 3 participants identified in the study).

### **Declarations**

#### **Funding**

This research received no external funding.

#### **Author contributions**

Conceptualization, I.P. and Y.M.; Methodology, I.P.; Software, M.B. and H.S.; Validation, Y.M., I.P. and M.B.; Formal Analysis, V.K.; Investigation, I.L.; Resources, O.Z.; Data Curation, Y.M. and I.P.; Writing – Original Draft Preparation, Y.M.; Writing – Review & Editing, I.P.; Visualization, K.M.; Supervision, Y.R.; Project Administration, I.P.; Funding Acquisition, H.S.

#### **Conflicts of interest**

The authors declare no competing interests.

#### **Data availability**

All data generated or analyzed during this study are included in this published article.

#### **Ethical approval**

The approval of the ethics committee was obtained before the initiation of the study (meeting date; 17/07/2023, decision number; 2023/19).

## Reference

1. Prykhodko I, Kolesnichenko O, Matsehora Y, et al. Effects of posttraumatic stress and combat losses on the combatants' resilience. *Cesk Psychol.* 2022;66(2):157-169. doi: 10.51561/cspych.66.2.157
2. Adler AB, Gutierrez IA. Preparing Soldiers to Manage Acute Stress in Combat: Acceptability, Knowledge and Attitudes. *Psychiatry.* 2022;85(1):30-37. doi: 10.1080/00332747.2021.2021598
3. Kokun O, Pischko I, Lozinska N. Military personnel's stress reactivity during pre-deployment in a war zone. *Psychol Health Med.* 2022;1-12. doi: 10.1080/13548506.2022.2104882
4. Prykhodko I, Matsehora Y, Kolesnichenko O, et al. Psychological Markers of Suicides in Military Service During Wartime: A Contemporary Example. *Int J Psychol Psychol Ther.* 2021;21(1):45-57.
5. Prykhodko I, Matsehora Y, Kryvokon N, et al. Manifestations of post-traumatic stress in military personnel after participating in hostilities in the Russian-Ukrainian war. *Eur J Clin Exp Med.* 2023;21(4):776-784. doi: 10.15584/ejcem.2023.4.19
6. Shvets AV, Kalnysh VV, Marushchenko KY. Peculiarities of disadaptation characteristics in military personnel after being in a zone of armed conflict of different intensity. *Ukr J Mil Med.* 2023;4(3):38-48. doi: 10.46847/ujmm.2023.3(4)-038
7. Prykhodko II, Bielai SV, Hrynzovskiy AM, et al. Medical and psychological aspects of safety and adaptation of military personnel to extreme conditions. *Wiad Lek.* 2020;73(4):679-683.
8. Jones E, Fear NT. Alcohol use and misuse within the military: a review. *Int Rev Psychiatry.* 2011;23(2):166-172. doi: 10.3109/09540261.2010.550868
9. Prykhodko I, Matsehora Y, Kolesnichenko O, et al. Psychological First Aid for Military Personnel in Combat Operations: The Ukrainian Model. *Mil Behav Heal.* 2021;9(3):289-296. doi: 10.1080/21635781.2020.1864530
10. Larson MJ, Wooten NR, Adams RS, Merrick EL. Military Combat Deployments and Substance Use: Review and Future Directions. *J Soc Work Pract Addict.* 2012;12(1):6-27. doi: 10.1080/1533256X.2012.647586
11. Teeters JB, Lancaster CL, Brown DG, Back SE. Substance use disorders in military veterans: prevalence and treatment challenges. *Subst Abuse Rehabil.* 2017;8:69-77. doi: 10.2147/SAR.S116720
12. Witkiewitz K, Estrada AX. Substance Abuse and Mental Health Treatment in the Military: Lessons Learned and a Way Forward. *Mil Psychol.* 2011;23(1):112-123. doi: 10.1080/08995605.2011.548651
13. Brady LL, Credé M, Harms PD, Bachrach DG, Lester PB. Meta-analysis of risk factors for substance abuse in the US military. *Mil Psychol.* 2019;31(6):450-461. doi: 10.1080/08995605.2019.1657754
14. Merrill JE, Thomas SE. Interactions between adaptive coping and drinking to cope in predicting naturalistic drinking and drinking following a lab-based psychosocial stressor. *Addict Behav.* 2013;38(3):1672-1278. doi: 10.1016/j.addbeh.2012.10.003
15. Prykhodko I, Matsehora Y, Bielai S, et al. Classification of coping strategies influencing mental health of military personnel having different combat experience. *Georgian Med News.* 2019;(297):130-135.
16. Frydenberg E, Lewis R. Teaching Coping to adolescents: when and to whom? *Am Educ Res J.* 2000;37:727-745.
17. Carver CS, Scheier MF, Weintraub JK. Assessing coping strategies: a theoretically based approach. *J Pers Soc Psychol.* 1989;56(2):267-283.
18. Bergen-Cico DK. *War and Drugs: The Role of Military Conflict in the Development of Substance Abuse* (1st ed.). Routledge; 2012. doi: 10.4324/9781315631226
19. Kamienski L. *Shooting Up. A Short History of Drugs and War.* Oxford University Press; 2016.
20. Kan PR. *Drugs and Contemporary Warfare.* Dulles, VA: Potomac Books; 2009.
21. Korsmeyer P, Kranzler HR. *Encyclopedia of Drugs Alcohol & Addictive Behavior.* 3rd ed. Macmillan Reference USA; 2009.
22. Besse K, Hunt S, Lenk KM. How soldiers perceive the drinking environment in communities near military installations. *J Alcohol Drug Educ.* 2018;62:71-90.
23. Fear NT, Jones M, Murphy D, et al. What are the consequences of deployment to Iraq and Afghanistan on the mental health of the UK armed forces? A cohort study. *Lancet.* 2010;375(9728):1783-1797. doi: 10.1016/S0140-6736(10)60672-1
24. Vest BM, Homish DL, Fillo J, et al. Military status and alcohol problems: Former soldiers may be at greater risk. *Addict Behav.* 2018;84:139-143. doi: 10.1016/j.addbeh.2018.04.011
25. Osborne AK, Wilson-Menzfeld G, McGill G, et al. Military service and alcohol use: a systematic narrative review. *Occup Med (Lond).* 2022;72(5):313-323. doi: 10.1093/occmed/kqac045
26. Wilk JE, Bliese PD, Kim PY, et al. Relationship of combat experiences to alcohol misuse among U.S. soldiers returning from the Iraq war. *Drug Alcohol Depend.* 2010;108(1-2):115-121. doi: 10.1016/j.drugalcdep.2009.12.003
27. Dretsch MN, Neff D, Caserta R, et al. Rates of Behavioral Health Conditions and Health Risk Behaviors in Operators and Support Personnel in U.S. Special Operations Forces. *Psychiatry.* 2020;83(4):358-374. doi: 10.1080/00332747.2020.1768787
28. Russell DW, Russell CA, Riviere LA, et al. Changes in alcohol use after traumatic experiences: the impact of combat on Army National Guardsmen. *Drug Alcohol Depend.* 2014;139:47-52.
29. Norman SB, Schmied E, Larson GE. Predictors of continued problem drinking and substance use following military discharge. *J Stud Alcohol Drugs.* 2014;75(4):557-566. doi: 10.15288/jsad.2014.75.557



30. Jakupcak M, Tull MT, McDermott MJ, et al. PTSD symptom clusters in relationship to alcohol misuse among Iraq and Afghanistan war veterans seeking post-deployment VA health care. *Addict Behav.* 2010;35(9):840-843. doi: 10.1016/j.addbeh.2010.03.023
31. Capone C, McGrath AC, Reddy MK, et al. Trauma-related correlates of alcohol use in recently deployed OEF/OIF veterans. *J Trauma Stress.* 2013;26(3):354-360. doi: 10.1002/jts.21817
32. Wolkowicz NR, Peltier MR, Wemm S, et al. Subjective stress and alcohol use among young adult and adult drinkers: Systematic review of studies using Intensive Longitudinal Designs. *Drug Alcohol Depend Rep.* 2022;3:100039. doi: 10.1016/j.dadr.2022.100039
33. Baker TB, Piper ME, McCarthy DE, et al. Addiction motivation reformulated: an affective processing model of negative reinforcement. *Psychol Rev.* 2004;111(1):33-51. doi: 10.1037/0033-295X.111.1.33
34. Cooper M, Kuntsche E, Levitt A, et al. Motivational models of substance use: A review of theory and research on motives for using alcohol, marijuana, and tobacco. In: Sher K., ed. *The Oxford Handbook of Substance Use and Substance Use Disorders.* Oxford University Press (OUP); 2016:375-421.
35. Koob GF. Drug Addiction: Hyperkatifeia/Negative Reinforcement as a Framework for Medications Development. *Pharmacol Rev.* 2021;73(1):163-201. doi: 10.1124/pharmrev.120.000083
36. Koob GF, Volkow ND. Neurobiology of addiction: a neurocircuitry analysis. *Lancet Psychiatry.* 2016;8:760-773. doi: 10.1016/S2215-0366(16)00104-8
37. Verheul R, van den Brink W, Geerlings P. A three-pathway psychobiological model of craving for alcohol. *Alcohol Alcohol.* 1999;34(2):197-222. doi: 10.1093/alcalc/34.2.197
38. Breslin F, Keeffe MO, Burrell L, et al. A comparison of 2 report formats for alcohol and caffeine use. *Psychol Health.* 1995;10(5):439-448.
39. Aldridge-Gerry AA, Roesch SC, Villodas F, et al. Daily stress and alcohol consumption: modeling between-person and within-person ethnic variation in coping behavior. *J Stud Alcohol Drugs.* 2011;72(1):125-134. doi: 10.15288/jsad.2011.72.125
40. Prykhodko I, Matsehora J, Lipatov I, et al. Servicemen's Motivation in the National Guard of Ukraine: Transformation After the 'Revolution of Dignity.' *J Slav Mil Stud.* 2019;32(3):347-366. doi: 10.1080/13518046.2019.1645930
41. Prykhodko I, Matsehora Y, Kolesnichenko O, et al. The psychological recovery program of Ukrainian military personnel after completing combat missions in the Russian-Ukrainian war. *Cesk Psychol.* 2023;67(6):455-473. doi: 10.51561/cpsych.67.6.455
42. 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(6):791-804. doi: 10.1111/j.1360-0443.1993.tb02093.x
43. Kovalenko YV. Adaptation and validation of the Ukrainian dispositional 'cope' questionnaire. *Bull Alfred Nobel Univ Ser "Pedagogy Psychol."* 2019;2(18):75-84. doi: 10.32342/2522-4115-2019-2-18-9
44. Prykhodko I. The model of psychological safety of a soldier's personality. *Curr Issues Personal Psychol.* 2021;10(2):112-122. doi: 10.5114/cipp.2021.108684
45. Gruenewald PJ. Regulating availability: how access to alcohol affects drinking and problems in youth and adults. *Alcohol Res Health.* 2011;34(2):248-256.
46. Irizar P, Leightley D, Stevelink S, et al. Drinking motivations in UK serving and ex-serving military personnel. *Occup Med (Lond).* 2020;70(4):259-267. doi: 10.1093/ocmed/kqaa003
47. Cooper ML, Russell M, George WH. Coping, expectancies, and alcohol abuse: a test of social learning formulations. *J Abnorm Psychol.* 1988;97(2):218-230. doi: 10.1037//0021-843x.97.2.218
48. Willis A, Wallston K, Johnson K. Tobacco and alcohol use among young adults: Exploring religious faith, locus of health control, and coping strategies as predictors. In: Plante T, Sherman A, eds. *Faith and Health: Psychological Perspectives.* Guilford Press; 2001:213-239.
49. Britton PC. The relation of coping strategies to alcohol consumption and alcohol-related consequences in a college sample. *Addict Res Theory.* 2004;12(2):103-114. doi: 10.1080/16066350310001613062
50. McKee SA, Hinson RE, Wall AM, et al. Alcohol outcome expectancies and coping styles as predictors of alcohol use in young adults. *Addict Behav.* 1998;23(1):17-22. doi: 10.1016/s0306-4603(97)00008-7
51. Trautmann S, Schönfeld S, Behrendt S, et al. Predictors of changes in daily alcohol consumption in the aftermath of military deployment. *Drug Alcohol Depend.* 2015;147:175-182. doi: 10.1016/j.drugalcdep.2014.11.019