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Research on depression, anxiety, post-traumatic stress and sleep disturbances among civilian and military populations during the war in Ukraine

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A – research concept and design; B – collection and/or assembly of data; C – data analysis and interpretation; D – writing the article; E – critical revision of the article; F – final approval of the article

Aim. To determine the characteristics of depression, anxiety, post-traumatic stress disorder (PTSD), and sleep disturbances among civilian and military populations during the war in Ukraine.

Materials and methods. The study included 81 civilians (63 women and 18 men), predominantly residents of frontline regions, and 25 military personnel (all men). The survey was conducted in March 2025. The following standardized questionnaires were used: PHQ-9, GAD-7, PSQI, PC-PTSD-5.

Results. Median depression scores corresponded to a moderate level among civilians and a mild level among military personnel, while anxiety levels in both groups were within the mild range. The median PTSD screening score indicated the absence of clinically significant symptoms; however, the global sleep quality index in both groups fell within the range of poor sleep quality. No statistically significant differences were found between civilians and military personnel in levels of depression, anxiety, PTSD symptoms, or overall sleep quality. Among civilians, women and unmarried participants demonstrated higher levels of depression, anxiety, and PTSD symptoms. Analysis of sleep components revealed shorter sleep duration in military personnel, whereas civilians exhibited more pronounced daytime dysfunction. In civilians, clinically significant depression was associated with an increased risk of poor sleep quality (RR = 1.98; OR = 9.39; $p < 0.01$), and PTSD symptoms were associated with higher relative risk and odds of poor sleep (RR = 1.49; OR = 5.11; $p < 0.05$). No statistically significant predictors of poor sleep quality were identified among military personnel. Significant positive correlations between depression, anxiety, PTSD symptoms, and sleep quality were observed in both groups.

Conclusions. No statistically significant differences in depression, anxiety, PTSD symptoms, or sleep disturbances were identified between civilian and military populations during wartime. Social and demographic factors influenced psycho-emotional status only among civilians, with higher levels of depression, anxiety, and PTSD symptoms observed in women and unmarried individuals. Military personnel exhibited shorter sleep duration, whereas civilians demonstrated more pronounced daytime dysfunction. Depression and PTSD symptoms were the primary factors associated with poor sleep quality among civilians.

Keywords: depression, anxiety, post-traumatic stress disorder, sleep, sleep quality, civilians, military personnel.

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Дослідження депресії, тривоги, посттравматичного стресу і порушень сну серед цивільних і військових осіб в умовах війни в Україні

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Мета роботи – визначити особливості проявів депресії, тривоги, посттравматичного стресового розладу (ПТСР) і порушень сну в цивільних і військових осіб в умовах війни в Україні.

Матеріали та методи. До дослідження залучено 81 цивільну особу (63 жінки та 18 чоловіків), переважно мешканців прифронтових областей, а також 25 військовослужбовців (усі – чоловіки). Опитування здійснили у березні 2025 року. Застосовували такі опитувальники: PHQ-9, GAD-7, PSQI та PC-PTSD-5.

Результати. Медіанні показники депресії у цивільних відповідали помірному рівню, у військових – легкому; рівень тривоги в обох групах легкий. Медіана скринінгового показника ПТСР відповідала відсутності клінічно значущих симптомів, а загальний індекс якості сну в обох групах перебував у межах поганої якості сну. Статистично значущих відмінностей між цивільними та військовими за рівнями депресії, тривоги, симптомами ПТСР і загальним індексом якості сну не виявлено. Серед цивільних жінки та неодружені мали вищі показники депресії, тривоги та симптомів ПТСР. Аналіз компонентів сну показав коротшу тривалість сну у військових і вираженішу денну дисфункцію у цивільних. У цивільних клінічно значуща депресія асоційована з підвищеним ризиком поганої якості сну (ВР = 1.98; ВШ = 9.39; $p < 0.01$), а симптоми ПТСР – з підвищенням відносного ризику та відношення шансів поганого сну (ВР = 1,49; ВШ = 5,11; $p < 0,05$). У військових статистично значущих предикторів поганого сну не виявлено. В обох групах встановлено значущі прямі кореляційні зв'язки між рівнями депресії, тривоги, симптомами ПТСР та якістю сну.

Висновки. У цивільних і військових в умовах війни не виявлено статистично значущих відмінностей за рівнем депресії, тривоги, симптомів ПТСР і порушень сну. Соціально-демографічні фактори впливали на психоемоційний стан лише серед цивільних, адже жінки та неодружені учасники мали вищі рівні депресії, тривоги та симптомів ПТСР. За показником компонентів якості сну військові мали коротшу тривалість сну, а цивільні – більш виражену денну дисфункцію. Депресія та симптоми ПТСР – основні фактори, що асоційовані з поганою якістю сну у цивільних.

Ключові слова: депресія, тривога, ПТСР, сон, якість сну, цивільні, військові.

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The full-scale war in Ukraine has significantly increased the burden of mental disorders among the civilian and military populations. Chronic danger, regular air raid sirens, bombings, and forced migrations create a constant stressful environment that contributes to the development of depression, anxiety, post-traumatic stress disorder (PTSD), and sleep disorders. According to WHO assessments, the prevalence of mental disorders in areas of humanitarian crisis increases by 3–5 times compared to peacetime [1].

Sleep is among the first physiological systems to respond to prolonged stress. Sleep disturbances, including insomnia, fragmentation, nightmares, are widely reported among individuals experiencing danger, loss of control, and constant threats to life. Sleep deprivation intensifies emotional instability, disrupts the regulation of stress responses, and impairs cognitive function [2,3]. A critical concern for the general population is that such issues may persist for years, significantly impacting the ability to successfully reintegrate and rebuild lives post-war [4].

Data from the early large-scale studies among the Ukrainian population indicate high levels of psychological distress. According to the results of a 2022 study, more than one-third of Ukrainians exhibit symptoms of anxiety or depression, and signs of PTSD are prevalent in a significant portion of the war-affected population [5].

Studies conducted during the war also record a high prevalence of sleep disorders among Ukrainians, particularly in regions subjected to frequent and intense air strikes. Sleep disorders are directly correlated with levels of anxiety, depression, and post-traumatic symptoms. Specifically, prevalence estimates have been reported as 19.6–54.8 %, anxiety 3.7–33.4 %, and PTSD 15.0–41.2 % [6,7].

Research data indicate that the prevalence of PTSD among military personnel is approximately 30 %, with insomnia identified as a primary risk factor for its development and chronicity [8,9]. Despite existing research, there are few systematic studies simultaneously comparing depression, anxiety, PTSD, and sleep disorders among civilians and military personnel in Ukraine. This gap complicates the planning of medical and psychological care and the identification of high-risk groups. Therefore, studying the psychological consequences of war across different population groups remains a priority for modern medical science in Ukraine.

Aim

The aim of the study was to identify the characteristics of depression, anxiety, post-traumatic stress, and sleep disorders among civilians and military personnel in the context of the war in Ukraine.

Materials and methods

The study sample consisted of 81 civilians (63 women and 18 men) from various regions of Ukraine, predominantly residents of frontline areas and internally displaced persons, and 25 male military personnel. Most military personnel were undergoing inpatient treatment at the time of the survey. The survey was conducted in March 2025.

All respondents provided written informed consent to participate in the study. The study was conducted in strict compliance with bioethical principles, in accordance with the Helsinki Declaration "Ethical Principles for Medical Research Involving Human Subjects" developed by the World Medical Association, and the "United Nations Educational, Scientific and Cultural Organization (UNESCO)" [10,11]. The Biomedical Ethics Commission of Dnipro State Medical University reviewed the materials provided in the article and found no violations of current ethical standards (Minutes dated 12/17/2025 No. 33).

Clinical-anamnestic, clinical-psychopathological, and psychodiagnostic examinations were conducted, supplemented by the following psychometric scales: Patient Health Questionnaire-9 (PHQ-9) [12]; Generalized Anxiety Disorder (GAD-7) scale [13]; Pittsburgh Sleep Quality Index (PSQI) [14]; Primary Care PTSD Screen for DSM-5 (PC-PTSD-5) [15].

Data processing was performed using Statistica 6.1 software (StatSoft Inc., serial No. AGAR909E415822FA) and MedCalc Statistical Software trial version 23.3.7 (MedCalc Software Ltd, Ostend, Belgium, 2025). For non-normally distributed data, nonparametric statistical methods were used; data were presented as median and interquartile range (Me [Q1; Q3]). The Mann–Whitney U test was used for pairwise comparison of independent groups. The homogeneity of groups in terms of qualitative indicators was tested using the χ^2 criterion with Yates' correction [16]. To calculate the relative risk (RR), we used the log method with a 95 % confidence interval (CI), and to determine the odds ratio (OR) with a 95 % CI, we performed a simple logistic regression analysis. Given the presence of quantitative parameters with a distribution type different from normal, the correlation analysis of indicators was performed using Spearman's rank correlation coefficient. The correlation coefficient values were as follows: r = 0.0–0.3 – very weak correlation; r = 0.3–0.5 – weak correlation; r = 0.5–0.7 – moderate correlation; r = 0.7–0.9 – strong correlation; r = 0.9–1.0 – very strong correlation [17]. Differences with a p-value <0.05 were considered statistically significant.

Results

Based on the study results, the levels of depression, anxiety, PTSD symptoms, and sleep quality in the sample were analyzed *(Table 1)*.

Data analysis has revealed no statistically significant differences between the civilian and military groups across all indicators.

The median depression score in the civilian group corresponded to moderate severity, whereas in the military group it was mild. The median anxiety score in both groups fell within the mild range. The median PTSD screening score indicated an absence of clinical symptoms. The median Global PSQI score indicated poor sleep quality in both groups.

We subsequently analyzed the qualitative indicators of clinically significant depression and anxiety (moderate severity and above), PTSD symptoms, and poor sleep *(Fig. 1)*.

The analysis has not revealed any statistically significant differences in qualitative indicators between the groups. However, most civilians exhibited clinically significant levels of depression (PHQ-9 >9 points), compared to only one-third

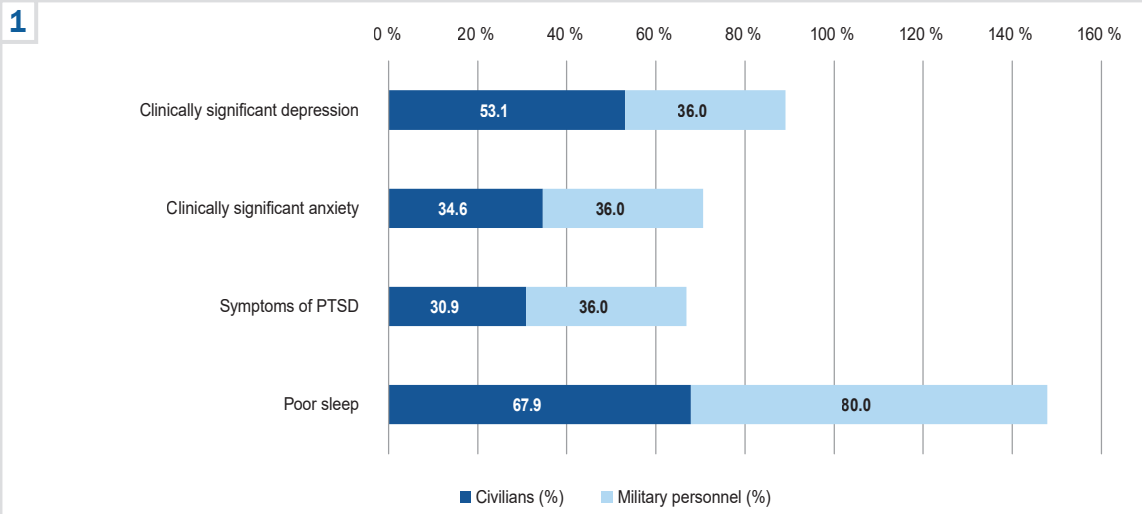

Fig. 1. Comparison of qualitative indicators between groups.

of military personnel. Poor sleep quality (PSQI >5 points) was prevalent in most participants, and approximately one-third of both groups had clinically significant levels of anxiety (GAD-7 >9 points) and PTSD symptoms (PTSD screening >2 points).

A comparative analysis of depression, anxiety, PTSD symptoms, and sleep quality was conducted based on socio-demographic factors. Statistically significant results are presented in *Table 2*.

Thus, statistical analysis has shown significant differences in selected socio-demographic characteristics within the civilian group only, specifically with respect to sex and marital status. Female participants had statistically significantly worse scores for depression, anxiety, PTSD symptoms, and sleep quality. Unmarried civilians exhibited worse indicators of depression, anxiety, and PTSD symptoms, though no significant differences were found in sleep quality compared to married individuals.

The next stage of the study analyzed and compared specific sleep quality components among civilian and military participants *(Table 3)*.

The analysis has presented statistically significant differences between civilians and military personnel only in "Sleep duration" (military personnel reported worse scores, indicating shorter duration) and "Daytime dysfunction" (civilians reported worse scores). No statistically significant differences have been found for all other components of sleep quality and for the Global PSQI Score.

Correlation analysis of indicators was performed for both groups *(Fig. 2)*.

The correlation analysis has shown statistically significant direct correlations between levels of depression, anxiety, PTSD symptoms, and the Global PSQI Score in both civilian and military groups. The strength of these correlations did not differ significantly between groups.

We calculated the RR and OR regarding the impact of mental health symptoms and socio-demographic factors on sleep quality *(Table 4)*.

Clinically significant depression has been found to increase the RR of developing poor sleep by 1.98 times and the OR by 9.39 times. The presence of PTSD symptoms increased the RR of poor sleep by 1.49 times and the OR by 5.11 times.

Married civilians have been found to have a 2.1 times lower risk of developing clinically significant depression, and the OR was 3.7 times lower.

Table 1. Measures of depression, anxiety, PTSD symptoms, and sleep quality

Indicator	Civilians, n = 81	Military personnel, n = 25	p*
PHQ-9	11 [7.00; 14.00]	8 [6.00; 13.00]	0.40
GAD-7	7.00 [4.00; 11.00]	8.00 [5.00; 12.00]	0.54
PTSD	1.00 [0.00; 3.00]	2.00 [1.00; 3.00]	0.31
Global PSQI score	7 [5.00; 10.00]	8 [6.00; 11.00]	0.21

*: p-values indicate differences between groups according to the Mann–Whitney U test.

Table 2. Comparison of depression and anxiety indicators by sex and marital status among civilians

Indicator	Women, n = 63	Men, n = 18	Married, n = 22	Single, n = 59
PHQ-9	12.0 [8.0; 14.0]*	8.0 [6.0; 12.75]*	7.0 [4.25; 8.75]*	12.0 [8.0; 14.5]*
GAD-7	9.0 [5.0; 12.0]*	6.5 [3.0; 9.0]*	4.5 [3.0; 7.5]*	9.0 [5.0; 11.5]*
PTSD	2.0 [1.0; 3.0]*	1.0 [0.0; 3.0]*	0.0 [0.0; 2.0]*	2.0 [1.0; 3.0]*
PSQI	7.0 [5.0; 10.0]*	*	6.0 [4.0; 8.0]	7.0 [5.0; 10.0]

* indicates a statistically significant intergroup difference ($p < 0.05$) according to the Mann–Whitney U test.

Table 3. Comparative analysis of sleep quality components between civilians and military personnel

Indicator	Civilians, n = 81	Military personnel, n = 25	p*
Subjective sleep quality	2.00 [1.00; 2.00]	1.00 [1.00; 2.00]	0.53
Sleep latency	1.00 [1.00; 2.00]	2.00 [1.00; 2.00]	0.35
Sleep duration	1.00 [0.00; 2.00]	2.00 [0.00; 3.00]	<0.05
Sleep efficiency	0.00 [0.00; 0.00]	0.00 [0.00; 0.00]	0.75
Sleep disorders	1.00 [1.00; 2.00]	2.00 [1.00; 2.00]	0.11
Use of sleep medication	0.00 [0.00; 0.00]	0.00 [0.00; 1.00]	0.12
Daytime dysfunction	1.00 [1.00; 2.00]	1.00 [1.00; 1.00]	<0.01
Global PSQI Score	7.00 [5.00; 10.00]	8.00 [6.00; 11.00]	0.21

*: p-values indicate intergroup differences according to the Mann–Whitney U test

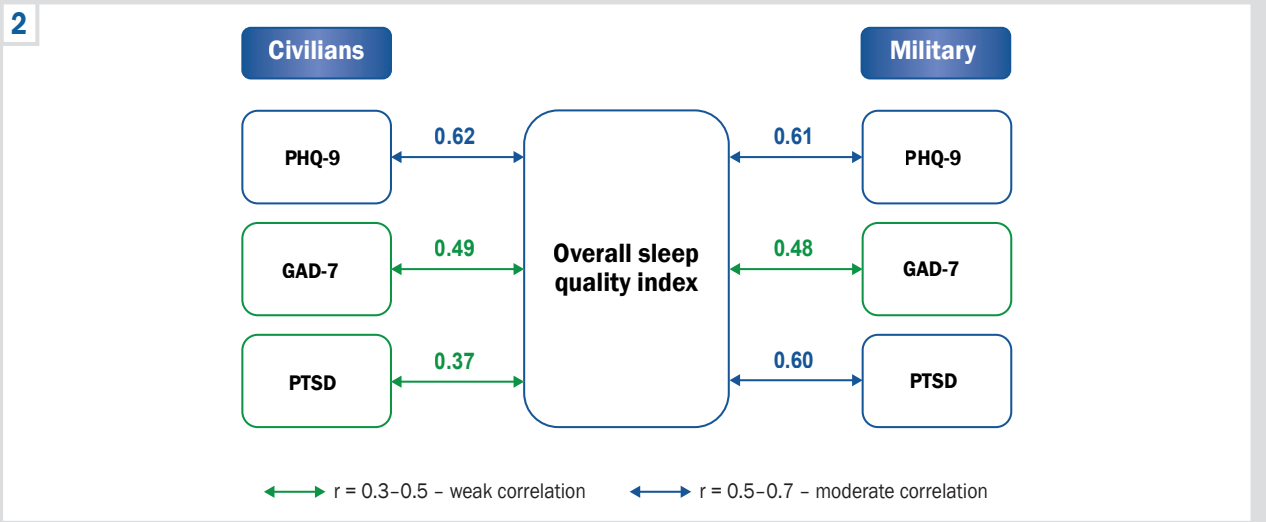

Fig. 2. Correlations between levels of depression, anxiety, PTSD symptoms, and Global PSQI Score.

Table 4. Relative risks and odds ratios for poor sleep among civilians

Indicator	Poor sleep				
	RR	RR 95 % CI	OR	OR 95 % CI	p
Clinically significant depression	1.98	1.36–2.86	9.39	3.03–29.08	<0.01
Symptoms of PTSD	1.49	1.15–1.94	5.11	1.37–19.11	<0.05
	Clinically significant depression				
Married	0.48	0.28–0.82	0.27	0.11–0.63	<0.01

No statistically significant RR or OR values have been identified within the military group.

Discussion

The results of our study are consistent with recent research on the mental health of the Ukrainian population during the war. In particular, a large-scale survey published in 2024 has indicated the high prevalence of psychological distress, depression, and anxiety among Ukrainians regardless of location, sex, or age [18]. The prevalence of PTSD and the association of this disorder with sleep disturbances among the military personnel in our study aligns with the data from recent studies and reviews [8,9].

In our study, indicators of depression, anxiety, PTSD symptoms, and the Global PSQI Score have shown no statistically significant differences between civilian and military groups. This suggests that the impact of war is pervasive and non-specific, affecting different population groups to a similar extent. This finding is consistent with a comparative study of German military and civilian populations [19].

Our correlation analysis (demonstrating the interdependence of sleep quality, depression, anxiety, and PTSD) reflects global patterns. A meta-analysis of 34 prospective studies has shown that insomnia increased the risk of developing depression by 2–3-fold [20]. These data support our observation that depression is the strongest predictor of poor sleep among civilian participants (OR = 9.39). A 2019 meta-analysis has established a significant association between insomnia and both depressive and anxiety disorders, which aligns closely with the present study's observations regarding the interrelationships among depression severity, anxiety levels, and sleep quality [21].

Our findings regarding civilians align with a study of medical students in Sudan during armed conflict, which found that women were more likely to exhibit symptoms of depression and anxiety [22].

Similarly, a 2024 study of Ukrainians from 10 regions and refugees in Zurich has reported a significantly higher burden of mental disorders among the population of south-eastern regions and refugees, noting a higher prevalence of depression, anxiety, and PTSD among women, which corroborates our results [7].

Conclusions

1. The study has identified no statistically significant differences between civilians and military personnel regarding levels of depression, anxiety, symptoms of post-traumatic stress disorder, or overall sleep quality. In both groups, depression and anxiety levels ranged from mild to moderate, and sleep quality was generally poor.

2. Socio-demographic disparities in psycho-emotional status were evident only among civilians. In the civilian group, men and married participants demonstrated better psycho-emotional indicators; specifically, married civilians had a significantly lower risk of clinically significant depression (OR = 0.48; approximately 3.7-fold lower odds). No statistically significant associations between socio-demographic characteristics and psycho-emotional status or sleep quality were identified among military personnel.

3. Analysis of sleep components has revealed that military personnel experienced shorter sleep duration, while civilians reported more pronounced daytime dysfunction. In civilians, poor sleep was significantly associated with clinically significant depression (OR = 1.98; CI = 9.39) and symptoms of post-traumatic stress disorder (OR = 1.49; CI = 5.11). No statistically significant predictors of poor sleep have been found in military personnel.

4. Correlations between depression, anxiety, symptoms of post-traumatic stress disorder, and sleep quality

were significant in both groups. The strength of these associations did not differ between civilians and military personnel, indicating similar overall psycho-emotional stress mechanisms but potential differences in the specific drivers of sleep disturbance.

Prospects for further research. The results obtained emphasize the need for further research to develop and implement treatment and rehabilitation programs for both civilians and military personnel affected by war-related mental disorders. A promising area of research is the study of individual and group resilience factors in military personnel, their potential protective role, and their influence on post-war integration.

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