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Impact of the full-scale invasion on the mental health of the population of the country in a state of military conflict: a study of regional trends in anxiety, depression, early symptoms of acute stress disorder and post-traumatic stress disorder

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ABSTRACT

Aim: To evaluate subjective distress caused by the invasion and examine the relationship between regional residency and mental health indicators. **Materials and Methods:** Descriptive statistics, a cross-sectional observational analysis. Data were collected through an online questionnaire comprising demographics, anxiety and depression assessment (HADS), and trauma impact evaluation (IES-R). Statistical analysis was conducted using MedStat software, with statistical analysis incorporating descriptive statistics, tests for normality and correlation analysis (Pearson's correlation). **Results:** The highest depression (39.36%) and anxiety (48.94%) rates were recorded in Ivano-Frankivsk Oblast, while the lowest were in Dnipropetrovsk (26%) and Lviv (26.83%) Oblasts. No significant correlation was found between proximity to the frontline and depression (r=0.107, p=0.615) or anxiety (r=-0.106, p=0.622). The highest trauma impact (IES-R) was observed in Kherson (37.14%), Donetsk (36.36%) and Mykolaiv (35.29%) Oblasts. No significant correlation was found between growing of acute stress disorder or post-traumatic stress disorder symptoms (r=-0.307, p=0.145). **Conclusions:** Mental health outcomes were not significantly linked to geographical proximity to the frontline. The highest rates of depression and anxiety were found in Ivano-Frankivsk Oblast, while the most severe trauma impact was observed in Kherson, Donetsk, and Mykolaiv Oblasts.

KEY WORDS: anxiety, depression, post-traumatic stress disorder, frontline proximity

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INTRODUCTION

Research indicates that war refugees and veterans frequently experience neuropsychiatric conditions such as depression, PTSD, and anxiety, which can profoundly alter their emotional responses and leave lasting psychological effects [1]. The civilian population, which is not in a constant state of readiness for military attacks, is exposed to all elements of war. For instance, a 2024 study found that civilian students exhibited significantly higher rates of moral injury, PTSD, depression, and anxiety compared to a sample of active-duty military personnel [2]. Additionally, research from 2023 emphasized that these mental health disorders among civilians contribute to greater risks for physical health issues [3]. Thus, mental health becomes a root cause of deteriorating somatic well-being, worsening chronic disease management, and other health complications. During the presentation of our initial findings on the

increase in cardiovascular complaints among Ukrainian students amid heightened situational anxiety during martial law [4], we received an intriguing question at the 18th Warsaw International Medical Congress regarding whether proximity to the frontline influences the development of mental health issues due to wartime conditions. It is important to understand that modern warfare is not the clichéd image retained in the minds of many, where infantry and close-range weaponry dominate the battlefield. While such tactics are still used today, the primary focus has shifted toward long-range weaponry, including guided air missiles, unmanned aerial vehicles, ballistic missiles - some of which are intercontinental - and so on. These weapons can cover thousands of kilometers, often evading air defense systems and, inevitably, impacting civilian populations as well. This article aims to explore this question widely.

	Anxiety				Depression			
Oblast	Normal, n	Subclinical, n	Clinically significant, n	Total, n	Normal, n	Subclinical, n	Clinically significant, n	Total, n
Vinnytsia	16	14	18	48	19	14	15	48
Volyn	16	11	10	37	16	10	11	37
Dnipropetrovsk	18	16	16	50	21	16	13	50
Donetsk	10	10	13	33	11	10	12	33
Zhytomyr	10	11	10	31	10	11	10	31
Zakarpattia	11	10	12	33	11	10	12	33
Zaporizhzhia	12	12	13	37	13	12	12	37
Ivano-Frankivsk	20	28	46	94	31	26	37	94
Kyiv	21	16	34	71	31	19	21	71
Kirovohrad	11	12	11	34	12	12	10	34
Lviv	14	16	11	41	13	12	16	41
Mykolaiv	10	11	13	34	11	11	12	34
Kyiv (city)	68	54	74	196	80	58	58	196
Odesa	18	14	21	53	22	14	17	53
Poltava	11	12	14	37	13	12	12	37
Rivne	10	13	10	33	12	11	10	33
Sumy	12	13	13	38	14	13	11	38
Ternopil	11	12	14	37	16	11	10	37
Kharkiv	11	10	14	35	11	13	11	35
Kherson	12	11	12	35	13	11	11	35
Khmelnytskyi	10	11	12	33	11	10	12	33
Cherkasy	11	10	12	33	11	10	12	33
Chernivtsi	13	10	11	34	14	10	10	34
Chernihiv	15	12	20	47	19	16	12	47
Total, n			434	1154			367	1154

Table 1. Number of Respo	ondents with Correspondin	ng Levels of Anxiety	y and Depression L	evels in Ukraine According	to HADS
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AIM

To assess subjective distress caused by the traumatic event in the population of the country that has suffered an invasion from a neighboring country. To analyze the association between regional residency and the severity of stress responses. To assess the correlation between heightened anxiety and depression levels with stress reactivity.

MATERIALS AND METHODS

This study is a cross-sectional observational analysis assessing the impact of the full-scale invasion on the mental health of the Ukrainian population, focusing on regional variations in anxiety, depression, and trauma-related symptoms. Data was gathered through online surveys using Google Forms, chosen for its accessibility, rapid distribution, and ability to reach a broader respondent pool. Additionally, this method was selected for its environmental benefits, reducing paper use and carbon emissions. The online questionnaire was divided into three sections. The first section contained general demographic questions, including gender, age, the region where the respondent was located at the time of the survey, and the region where the respondent had spent the longest period in Ukraine since February 24.02.2022. The Hospital Anxiety and Depression Scale (HADS) was used to assess levels of anxiety and depression in the second section. The third section included the Impact of Event Scale-Revised (IES-R), where the traumatic event was defined as the onset of the full-scale invasion. A total of 1154 respondents participated in the survey, representing all regions of Ukraine except Luhansk Oblast. Respondents were between the ages of 15 and 84, including 958 female respondents (83%) and 196 male respondents (17%). The survey which was conducted anonymously from 10.12.2024 to 26.01.2025 with informed consent obtained from all participants regarding

Oblast	Intra-Oblast Anxiety Rate	Intra-Oblast Depression Rate
Vinnytsia	37,50%	31,25%
Volyn	27,03%	29,73%
Dnipropetrovsk	32,00%	26,00%
Donetsk	39,39%	36,36%
Zhytomyr	32,26%	32,26%
Zakarpattia	36,36%	36,36%
Zaporizhzhia	35,14%	32,43%
Ivano-Frankivsk	48,94%	39,36%
Kyiv	47,89%	29,58%
Kirovohrad	32,35%	29,41%
Lviv	26,83%	39,02%
Mykolaiv	38,24%	35,29%
Kyiv (city)	37,76%	29,59%
Odesa	39,62%	32,08%
Poltava	37,84%	32,43%
Rivne	30,30%	30,30%
Sumy	34,21%	28,95%
Ternopil	37,84%	27,03%
Kharkiv	40,00%	31,43%
Kherson	34,29%	31,43%
Khmelnytskyi	36,36%	36,36%
Cherkasy	36,36%	36,36%
Chernivtsi	32,35%	29,41%
Chernihiv	42,55%	25,53%

Table 2. Percentage of clinically significant anxiety and depression in every oblast of Ukraine included in the study

the use of their provided data. The sample included only those respondents who reported continuous residence in Ukraine from 24.02.2022 until the date of completing the online questionnaire. This survey format is validated from the previous studies. MedStat software were used for data processing, with statistical analysis incorporating descriptive statistics, tests for normality and correlation analysis. The Shapiro-Wilk W-test confirmed that the data followed a normal distribution, ensuring the validity of subsequent statistical tests. To examine the correlation between mental health indicators and proximity to the frontline, Pearson's correlation coefficient was calculated for depression, anxiety, and trauma impact scores in relation to the distance between the respondent's regional center and the nearest frontline point.

RESULTS

Out of all 1,154 respondents from across Ukraine, 434 (37.6%) respondents scored on the HADS questionnaire at a level indicating clinically significant anxiety, while

367 (31.8%) scored at a level indicating clinically significant depression (Table 1).

The proportion of individuals with clinically significant depression was calculated separately for each oblast in Ukraine based on the total number of respondents within that oblast. Similarly, the percentage of individuals with clinically significant anxiety was determined for each oblast. These measures were labeled as the Intra-Oblast Depression Rate (IODR) and the Intra-Oblast Anxiety Rate (IOAR). The highest IODR was recorded in Ivano-Frankivsk Oblast (39.36%), followed by Lviv (39.02%), Donetsk (36.36%), Zakarpattia (36.36%) and Khmelnytskyi (36.36%) Oblasts, while the lowest IODR values were found in Dnipropetrovska (26%) and Chernihiv (25.53%) Oblasts. Ivano-Frankivsk also had the highest IOAR (48.94%), followed by Kyiv (47.89%), Chernihiv (42.55%), Kharkiv (40%), Odesa (39.62%), Donetsk (39.39%) and Mykolaiv (38.24%) Oblasts. The lowest IOAR values were observed in Rivne (30.30%), Volyn (27.03%) and Lviv (26.83%) Oblasts (Table 2).

Table 3. Levels of traumatic event impact, assessed by IES-R, in each oblast of Ukraine and the intra-oblast indicator of the pronounced impact of a traumatic event

Oblast	Low atress response (<30 points)	Moderate stress response (30-50 points)	Severe stress response (>50 points)	Total	Intra-oblast indicator of the pronounced impact of the traumatic event
Vinnytsia	17	19	12	48	25.00%
Volyn	19	12	10	37	27,03%
Dnipropetrovsk	21	16	13	50	26.00%
Donetsk	10	11	12	33	36.36%
Zhytomyr	10	11	10	31	32,26%
Zakarpattia	10	12	11	33	33.33%
Zaporizhzhia	14	11	12	37	32.43%
Ivano-Frankivsk	25	49	20	94	21,28%
Kyiv	23	36	12	71	16.90%
Kirovohrad	13	11	10	34	29.41%
Lviv	16	13	12	41	29.27%
Mykolaiv	10	12	12	34	35.29%
Kyiv (city)	70	105	21	196	10.71%
Odesa	18	22	13	53	24.53%
Poltava	11	14	12	37	32.43%
Rivne	13	10	10	33	30.30%
Sumy	12	15	11	38	28.95%
Ternopil	14	13	10	37	27,03%
Kharkiv	12	12	11	35	31.43%
Kherson	11	11	13	35	37,14%
Khmelnytskyi	10	13	10	33	30.30%
Cherkasy	11	12	10	33	30.30%
Chernivtsi	10	11	10	31	32.26%
Chernihiv	12	28	10	50	20,00%
Total				1154	

The Shapiro-Wilk W test was used to evaluate the normality of data distribution, revealing no significant deviation from normality for IODR (n=24, W=0.947, p>0.1) and IOAR (n=24, W=0.951, p>0.1). To examine the correlation between IODR and IOAR values and the distance of respondents from the frontline, a linear correlation analysis (Pearson's coefficient) was performed using the following variables: (1) IOAR and IODR percentages and (2) distance, where Point A represented the administrative center of each oblast and Point B was the nearest frontline point to that center as of February 2025 (Hlyboke, Hola Prystan, Enerhodar) in kilometers. The DeepStateMap resource was used to determine Point B (13.02.25). The only

exception was made for Donetsk, whose administrative center has been under occupation since 2014; for this oblast, the distance was recorded as zero. For border oblasts adjacent to the aggressor state, the direct distance to the nearest border checkpoint was calculated (e.g., Sumy). The normality test for these distances showed no significant deviation from normal distribution (n=24, W=0.926, p=0.08). The analysis of the linear correlation between IOAR and distance showed that there was no significant linear correlation (r=0, p=0.622). Similarly, the correlation between IODR and distance indicated that no significant linear relationship was found (r=0, p=0.615). The intra-regional indicator of the pronounced impact of the traumatic event (IRIPITE) was determined as the ratio of the number of respondents in each oblast who scored more than 50 points on the IES-R to the total number of surveyed individuals in that oblast. The highest levels of IRIPITE were recorded in Kherson (37.14%), Donetsk (36.26%), Mykolaiv (35.29%), Zakarpattia (33,33%) and Zaporizhia (32,43%) Oblasts. To confirm or refute the hypothesis regarding the relationship between the distance from the front line and the scores obtained on the IES-R, the collected data were analyzed based on the following parameters: the first parameter - IPRITE and the second parameter - the distance from the regional center to the nearest point of the front line. The distribution did not differ from normal for both variables. A significance test for the linear correlation was conducted for the two samples using Pearson's correlation coefficient. Statistical analysis revealed no significant correlation between proximity from the place of permanent residence to the frontline and the severity of acute stress disorder (ASD) and post-traumatic stress disorder symptoms (PTSD) (r=-0,307, p=0,145) (Table 3).

DISCUSSION

The identified indicators suggest high levels of anxiety, depression, as well as signs of ASD and PTSD in each of the regions of Ukraine that were included in the study. We present the experience of Georgia for comparison. The 2008 summer war, which resulted in the occupation of Abkhazia and South Ossetia, was a major shock for the country, which at the time had not yet fully recovered from the civil war. The collective trauma of that period was a significant source of stress for society [5]. To date, there are relatively few studies examining the mental health status of the Georgian population from 2008 to the present. However, there are representative data on the psychological well-being of internally displaced persons (IDPs) from Abkhazia and South Ossetia. Previous studies recorded levels of presumed PTSD, depression, and anxiety at 23.3%, 14.0%, and 10.4%, respectively [6]. These findings highlight the persistence of PTSD symptoms, particularly among those displaced during the conflicts of the 1990s. Additionally, the data indicate significantly better mental health outcomes among returnees compared to long-term IDPs from the 1990s. Higher rates of mental disorders among displaced populations align with prior research on the impact of forced displacement on mental health [7]. Studies emphasize the enduring presence of PTSD among conflict-affected individuals in Georgia and the need for a comprehensive approach to addressing

trauma-related and common mental disorders, as well as their impact on daily functioning [6]. Interestingly, in our current study, individuals with IDP status appear to have played a role in the lack of correlation between predominant location after February 24, 2022, and the severity of anxiety, depression, ASD and PTSD symptoms. Those who have experienced displacement or the loss of their homes show higher mental health impact scores, despite residing in areas considered relatively safe and far from the frontline (e.g., Zakarpattia, Lviv Oblast). As previously mentioned, there is a significant difference between modern warfare and how war was perceived a decade ago. A review of the literature, as well as the personal recollections of the study's co-authors, found no evidence that the aggressor country used drones or missiles capable of crossing Georgia's entire territory during the 2008 war. In contrast, since 2022, such weapons have been actively used to strike across all of Ukraine. This has likely contributed to the increase in mental health impact scores, regardless of respondents' distance from the frontline as defined on the map. Another contributing factor to these increased levels may be military mobilization. Although many respondents remained within a single oblast throughout the war, some were undergoing military training or actively serving in the armed forces. Thus, even prolonged residence in a relatively safe area did not guarantee lower mental health impact scores at the time of the survey for this population group. To enhance the robustness of the study, it would be beneficial to explore potential confounding variables that might influence the observed results. For example, the pre-existing mental health conditions of respondents could play a significant role, as individuals with prior anxiety or depression diagnoses may report higher symptom severity regardless of external stressors. Additionally, socioeconomic conditions, including income level, employment status and access to healthcare, could be crucial in shaping mental health outcomes and should be controlled for in further research. Another potential confounder is the extent of social support available to respondents, as those with strong family or community networks may experience lower stress levels compared to individuals who lack such support systems. Furthermore, differences in media exposure, particularly the consumption of war-related news, may contribute to varying degrees of psychological distress. Incorporating these factors into the analysis would allow for a more comprehensive interpretation of the findings and improve the study's reliability. Considering regional differences, mental health interventions should be adapted based on the availability of medical services, the level of trauma experienced by the population and cultural characteristics. In regions most affected by military actions, such as Kherson, Donetsk and Mykolaiv oblasts, it is essential to strengthen the provision of emergency psychological assistance, expand crisis centers and conduct specialized training for healthcare professionals and social services. For residents of relatively safe regions who still experience high levels of anxiety and depression, it is important to implement stress-reduction programs such as group-based cognitive-behavioral therapy, educational campaigns on mental health preservation, and initiatives to reduce social isolation. Additionally, in rural areas where access to specialists is limited, telemedicine consultations and mobile psychological support teams should be introduced. To enhance the effectiveness of these interventions, it is crucial to

consider the cultural and social characteristics of each region, making mental health support more acceptable to the local population and reducing the stigma associated with seeking psychological help.

CONCLUSIONS

The highest rates of depression (39.36%) and anxiety (48.94%) were observed in Ivano-Frankivsk Oblast, the lowest were in Dnipropetrovska (26%) and Lviv (26.83%) Oblasts. No significant correlation was found between proximity to the frontline and the prevalence of depression, anxiety or the severity of ASD and PTSD symptoms. The highest trauma impact was recorded in Kherson, Donetsk and Mykolaiv Oblasts. These results suggest that mental health outcomes are not directly linked to geographical proximity to the frontline.

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CONFLICT OF INTEREST

The Authors declare no conflict of interest

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