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BURNOUT RISK AMONG ANESTHESIOLOGISTS AND INTENSIVE CARE PHYSICIANS IN UKRAINE UNDER WARTIME CONDITIONS

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- Mental health of anesthesiologists and intensive care physicians remains an important public health concern as this professional group is particularly susceptible to burnout due to the extreme emotional demands.
- **THE OBJECTIVE** of this study was to assess the impact of wartime working conditions on the risk of occupational burnout syndrome among anesthesiologists and intensive care physicians in Ukraine in 2023 compared to the pre-war period in 2021.
- **MATERIALS AND METHODS.** A total of 115 physicians from Kharkiv participated in a voluntary, anonymous paper-based survey. Seventy-three participated in 2021 during the pandemic, and 42 participated in 2023 during active hostilities. Burnout risk was assessed using the Maslach Burnout Inventory — General Survey (MBI-GS), which encompasses three dimensions: Emotional Exhaustion (EE), Cynicism (CY), and Professional Efficacy (PE). Burnout risk was classified according to Kalimo et al. (2003). The Mann-Whitney U test ($p \leq 0.05$) was used to test for statistical significance between cohorts.
- **RESULTS.** The percentage of physicians experiencing high levels of emotional exhaustion increased from 21.9% in 2021 to 28.6% in 2023. The proportion reporting high cynicism rose from 39.7% to 47.6%. In contrast, the proportion of physicians reporting high reduction in professional efficacy decreased significantly, dropping from 49.3% in 2021 to 16.7% in 2023 ($p \leq 0.002$). The overall burnout risk (Kalimo classification) increased from 2.7% in 2021 to 4.8% in 2023 ($p = 0.060$).
- **CONCLUSIONS.** Wartime conditions have been linked with increased emotional exhaustion and cynicism among anesthesiologists in Ukraine. Paradoxically, their perceived professional efficacy has improved, likely reflecting heightened professional motivation, collective solidarity, and adaptive resilience in response to wartime stress. The findings underscore the urgent need for systematic psychological support programs for this vulnerable professional group.
- **KEYWORDS:** *burnout syndrome; occupational stress; anesthesiologists; wartime; MBI-GS; professional efficacy*.

РИЗИК ВИГОРАННЯ СЕРЕД АНЕСТЕЗІОЛОГІВ ТА ЛІКАРІВ ІНТЕНСИВНОЇ ТЕРАПІЇ В УКРАЇНІ В УМОВАХ ВОЄННОГО ЧАСУ

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- Психічне здоров'я анестезіологів та лікарів інтенсивної терапії залишається важливою проблемою громадського здоров'я, оскільки ця професійна група є особливо схильною до вигорання через надзвичайно високі емоційні навантаження.
- **МЕТОЮ** цього дослідження була оцінка впливу умов праці воєнного часу на ризик синдрому професійного вигорання серед анестезіологів та лікарів інтенсивної терапії в Україні у 2023 році у порівнянні з довоєнним періодом 2021 року.
- **МАТЕРІАЛИ ТА МЕТОДИ.** У добровільному анонімному паперовому опитуванні взяли участь 115 лікарів з Харкова. Із них 73 брали участь у 2021 році в період пандемії, а 42 — у 2023 році в період активних бойових дій. Ризик вигорання оцінювався за допомогою опитувальника Maslach Burnout Inventory — General Survey (MBI-GS), який охоплює три виміри: емоційне виснаження, цинізм та професійна ефективність. Рівень ризику вигорання класифікувався відповідно до критеріїв Kalimo et al. (2003). Для визначення статистичної значущості між когортами використовувався критерій Манна-Уїтні ($p \leq 0{,}05$).
- **РЕЗУЛЬТАТИ.** Частка лікарів із високим рівнем емоційного виснаження зросла з 21,9% у 2021 році до 28,6% у 2023 році. Частка респондентів із високим рівнем цинізму збільшилась із 39,7% до 47,6%. Натомість частка лікарів із високим зниженням професійної ефективності суттєво зменшилась — з 49,3% у 2021 році до 16,7% у 2023 році ($p \leq 0{,}002$). Загальний ризик вигорання (класифікація за Kalimo) зріс із 2,7% у 2021 році до 4,8% у 2023 році ($p = 0{,}060$).
- **ВИСНОВКИ.** Умови воєнного часу пов'язані із зростанням емоційного виснаження та цинізму серед анестезіологів в Україні. Парадоксально, але суб'єктивна оцінка їхньої професійної ефективності покращилась, що, найімовірніше, відображає підвищену професійну мотивацію, колективну солідарність та адаптивну стійкість у відповідь на стрес воєнного часу. Отримані результати підкреслюють нагальну необхідність запровадження систематичних програм психологічної підтримки для цієї вразливої професійної групи.
- **КЛЮЧОВІ СЛОВА:** *синдром вигорання; професійний стрес; анестезіологи; воєнний стан; MBI-GS; професійна ефективність*.

INTRODUCTION

Mental health disorders, including burnout syndrome, are among the most prevalent occupational health problems affecting healthcare professionals worldwide [1, 2]. Anesthesiologists and intensive care physicians are particularly vulnerable to burnout due to the nature of their work, which includes continuous exposure to life-threatening emergencies, a high cognitive load, and the immense responsibility for patient outcomes [3, 4]. International studies report burnout prevalence rates ranging from 2.7% to 67% among this professional group [5–7].

Burnout is a work-related syndrome resulting from prolonged exposure to occupational stress. It is typically characterized by emotional exhaustion, emotional distancing or depersonalization, and a reduced sense of professional efficacy [8], particularly in professions involving intensive interpersonal interactions. Emerging evidence suggests that physician burnout is closely associated with depression, anxiety, and suicidal ideation, reflecting the substantial psychological burden of chronic occupational stress [9]. Given these potentially severe consequences for both healthcare professionals and patient care, the identification of factors contributing to burnout is of particular importance, especially in settings characterized by extraordinary stressors such as pandemics or armed conflicts. Such environments may exacerbate existing occupational demands through prolonged uncertainty, increased workload, resource limitations, disrupted work-life balance, and continuous exposure to critically ill or injured patients [9]. Furthermore, healthcare professionals working in crisis settings frequently encounter moral and ethical challenges that may contribute to psychological distress and burnout [10]. Continuous exposure to war-related threats and traumatic events has also been shown to negatively affect professional quality of life and increase the risk of burnout among healthcare workers [11].

During the COVID-19 pandemic, healthcare workers around the world experienced extraordinary physical and psychological burdens, resulting in a significant decline in mental health indicators [4]. Ukraine, which was already heavily affected by the pandemic, faced an additional and unprecedented challenge when Russian military invaded the country on a large scale in February 2022. Kharkiv, a city located near the front line, became one of the most severely affected regions. Physicians continued to work under conditions of constant artillery fire, personnel shortages, and prolonged working hours regulated under martial law. In their scoping review, Jarrassier et al. identified the many challenges that anesthesiologists and intensive care physicians have faced during the war in Ukraine. These include shortages of resources, mass casualty situations, long working hours and repeated exposure to severely injured patients [12].

While the international literature on disaster medicine and crisis response increasingly recognizes the psychological toll on medical personnel, studies specifically addressing burnout specifically among Ukrainian anesthesiologists under wartime conditions are scarce. The first assessment of this cohort, conducted in March 2021 during the COVID-19 pandemic, revealed that 74% of respondents exhibited some burnout symptoms and 2.7% met the criteria for high burnout risk [4].

There is no longitudinal data comparing burnout before and during the war. The aim of this study was to assess the burnout risk among anesthesiologists and intensive care physicians in Kharkiv, Ukraine during active wartime in 2023, and to compare these findings with baseline data from 2021 obtained during the COVID-19 pandemic. Kharkiv is the second-largest city in Ukraine and represents a unique setting because of its proximity to the frontline and its continuous exposure to military attacks throughout the study period. We hypothesized that levels of burnout would be significantly higher in 2023 than in the 2021 assessment conducted during the pandemic.

At the time of the 2023 survey, working conditions in Kharkiv had significantly deteriorated due to the city and surrounding region being under heavy shelling. According to Ukrainian martial law (Law No. 2136-IX of 15 March 2022), weekly working hours could be extended up to 60 hours.

The objective of this study was to assess the impact of wartime working conditions on the risk of occupational burnout syndrome among anesthesiologists and intensive care physicians in Ukraine in 2023 compared to the pre-war period in 2021.

MATERIALS AND METHODS

This cross-sectional study included 115 anesthesiologists and intensive care physicians from Kharkiv, Ukraine. Of these, 73 were surveyed in March 2021 during the COVID-19 pandemic and 42 were surveyed in 2023 during active hostilities. The 2021 and 2023 samples are independent, with different respondents participating in each survey. All participants were actively working in anesthesiology and intensive care during their re-

spective survey periods. The age of respondents ranged from 23 to 78 years in 2021 and from 23 to 80 years in 2023. Participation was voluntary and anonymous, and the surveys were administered in a paper-based format. It should be noted that, in Ukraine, anesthesiologists are specialists in both anesthesiology and intensive care medicine. The study was conducted in accordance with the ethical principles of the Declaration of Helsinki and approved by the Bioethics and Ethics Committee of Kharkiv National Medical University (Protocol No. 1, September 20, 2022). Informed consent was obtained from all participants.

Instrument. Burnout risk was assessed using the Maslach Burnout Inventory — General Survey (MBI-GS) [8, 13], a 16-item, validated questionnaire that measures burnout across three dimensions:

1) Emotional Exhaustion (EE),
2) Cynicism / Depersonalisation (CY),
3) Professional Efficacy (PE).

The severity thresholds for each MBI-GS dimension are presented in *Table 1*.

Table 1. **MBI-GS dimension severity thresholds**

Burnout Dimension	Low	Moderate	High
Emotional Exhaustion (EE)	≤ 2.00	2.01–3.19	≥ 3.20
Cynicism (CY)	≤ 1.00	1.01–2.19	≥ 2.20
Professional Efficacy (PE)	≤ 4.00	4.01–4.99	≥ 5.00

Note: For PE, a high score reflects preserved professional efficacy, while a low score indicates reduction.

Overall burnout risk was classified according to Kalimo et al. (2003) [14], based on the MBI-GS total score (*Table 2*).

Table 2. **Burnout risk classification according to Kalimo et al. (2003)**

Total Score	Classification	Symptom Frequency
0–1.49	No burnout	A few times a year
1.5–3.49	Some burnout symptoms	A few times a month
3.5–6.00	Burnout risk	Several times a week or daily

Statistical analysis. Data were analysed using SPSS Statistics (version 26.0, IBM, New York, USA). Descriptive statistics were calculated for all variables. Differences between the 2021 and 2023 cohorts were assessed using the Mann–Whitney U test, since the samples were different. A significance level of $p \leq 0.05$ was applied.

RESULTS AND DISCUSSION

The mean age of the participants was 39.5 ± ± 1.29 years. According to calculations, physicians' average actual monthly workload amounted to 206.5 hours in 2021 and 204.9 hours in 2023. This exceeded the standard working time balance of 166.8 hours per month, which is equivalent to 38.5 hours per week for a full-time anesthesiologist (intensivist) in Ukraine.

Table 3 shows the mean differences in the burnout dimensions between the 2021 and 2023 samples. Analysis of the burnout dimensions across the two samples revealed significant differences in professional efficacy ($p = 0.001$).

Table 3. **Severity of burnout dimensions**

MBI	2021 (*n* = 73)	2023 (*n* = 42)	$p_{\text{Mann-Whitney}}$
	MW ± SD [Points] Median (Min–Max) [95% CI]		
Emotional Exhaustion	2,19 ± 1,42 2,0 (0,0–5,8) [1,86–2,53]	2,34 ± 1,44 2,2 (0,0–5,0) [1,92–2,80]	0,589
Cynicism	1,81 ± 1,24 2,0 (0,0–6,0) [1,56–2,12]	1,87 ± 1,28 1,8 (0,0–4,6) [1,5–2,27]	0,784
Professional Efficacy	3,71 ± 1,91 4,1 (0,16–6,0) [3,29–4,15]	5,05 ± 1,17 5,5 (1,0–6,0) [4,67–5,37]	**0,001***
MBI-Total Score	2,10 ± 0,88 2,3 (0,18–4,12) [1,91–2,31]	1,78 ± 1,02 1,7 (0,0–3,68) [1,48–2,10]	0,100

Notes: * $p \leq 0.01$.

The distribution of MBI-GS dimension severity levels for the 2021 and 2023 cohorts is presented in *Fig. 1*.

Emotional Exhaustion. The proportion of physicians experiencing high levels of emotional exhaustion increased from 21.9% in 2021 to 28.6% in 2023. The proportion of people experiencing moderate emotional exhaustion was 26.0% in 2021, falling to 23.8% in 2023.

Cynicism. High levels of cynicism were observed in 39.7% of respondents in 2021, increasing to 47.6% in 2023. The proportion with moderate cynicism was 26.0% in 2021 and 16.7% in 2023.

Professional Efficacy. In 2021, a high degree of reduced professional efficacy (low PE scores) was reported by 49.3% of physicians. This proportion

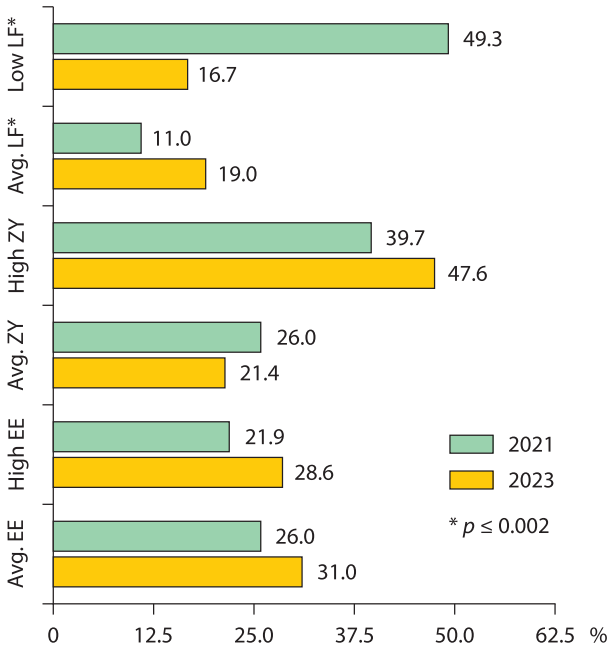

Fig. 1. MBI-GS Results: Distribution of burnout dimension severity among anesthesiologists and intensive care physicians in Ukraine, 2021 and 2023. EE = Emotional Exhaustion; CY = Cynicism / Depersonalisation; PE = Professional Efficacy

decreased markedly to 16.7% in 2023, a difference that was statistically significant ($p \leq 0.002$). The proportion of physicians with high professional efficacy scores (≥ 5.00) increased from 39.7% in 2021 to 61.9% in 2023.

Overall burnout risk (Kalimo classification). Analysis of the total burnout score across the two samples showed no significant differences ($p = 0.100$). The values fell within the «some burnout symptoms» range (*Table 3*).

The proportion of physicians classified as being at risk of burnout (with a total score of at least 3.5) was 2.7% in 2021 and 4.8% in 2023 ($p = 0.060$). The majority of participants in both cohorts fell into the "some burnout symptoms" category: 74.0% in 2021 and 69.0% in 2023 (*Fig. 2*).

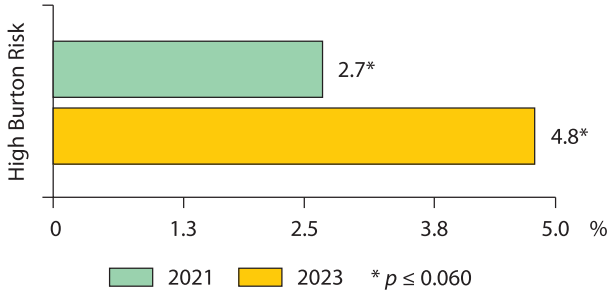

Fig. 2. Burnout risk according to Kalimo et al. (2003) among anesthesiologists and intensive care physicians in Ukraine, 2021 and 2023

This study examined the risk of burnout among anesthesiologists and intensive care physicians in Kharkiv, Ukraine, during active wartime conditions, and compared the findings with data collected during the 2021 wave of the COVID-19 pandemic. The results partly confirmed our hypothesis that levels of burnout would be significantly higher in 2023 than in the assessment conducted in 2021 during the COVID-19 pandemic. Although emotional exhaustion and cynicism increased during the war, indicating a growing psychological burden, the overall risk of burnout did not increase significantly. Furthermore, perceived professional efficacy improved considerably.

The results of the present study demonstrate that wartime conditions in Ukraine are associated with an overall deterioration in the key burnout indicators among anesthesiologists and intensive care physicians. The observed increase in emotional exhaustion and cynicism is consistent with previous research conducted among healthcare professionals working in wartime and crisis conditions. For instance, Loskutov et al. reported a high prevalence of burnout symptoms among Ukrainian anesthesiologists during the ongoing war, emphasizing emotional exhaustion as a significant issue [15].

Emotional exhaustion and cynicism are considered the core dimensions of burnout, being sensitive indicators of psychological distress in healthcare workers [3, 15]. The increase observed in our 2023 cohort is also consistent with findings from studies conducted in disaster-affected settings and among military medical personnel, as sustained exposure to crisis conditions has been found to be significantly associated with increased emotional exhaustion [12, 16].

One of the structural factors that contributes to psychological stress during wartime is an increase of working hours. Under Ukrainian martial law (Law No. 2136-IX of 15 March 2022), the maximum weekly working hours are 60. Consistent international evidence consistently shows that working more than 40 hours per week is a reliable risk factor for burnout among medical personnel [11, 12]. The results of our survey show that the average actual number of working hours per month was 206.5 hours in 2021 and 204.9 hours in 2023, which exceeds the standard workweek of 38.5 hours for a full-time anesthesiologist (resuscitator) in Ukraine.

The most striking finding of this study is the paradoxical improvement in perceived professional efficacy between 2021 and 2023, despite an

increase in emotional exhaustion and cynicism being observed during this period. The proportion of physicians reporting high professional efficacy increased from 39.7% to 61.9%, while the proportion reporting reduced efficacy fell from 49.3% to 16.7% ($p \leq 0.002$).

These results suggest an intricate pattern in which mounting occupational strain coexists with adaptive psychological mechanisms that could temporarily shield against the onset of complete burnout. These findings suggest a complex pattern in which an increased level of occupational strain coexists with adaptive resilience processes and a sense of professional purpose that remains intact. This combination has the potential to mitigate the progression to full burnout, even when an individual is exposed to severe stressors on an ongoing basis [11, 17].

Wartime conditions may intensify the existential significance of medical work. The direct dependence of wounded soldiers' and civilians' lives on the physicians' professional performance of physicians creates a powerful intrinsic motivator. Research in crisis psychology suggests that a sense of social significance can offset emotional exhaustion and preserve subjective professional competence [11].

Second, collective solidarity and professional identity may serve as protective resources. In the face of a shared threat, anesthesiologists may experience increased team cohesion, which reinforces professional role identification and adaptive coping. Studies confirm that high team cohesion among healthcare professionals in crisis settings contributes to preserving professional identity and a sense of meaningful contribution [18]. For Ukrainian physicians, this effect is likely amplified by their awareness of being part of the national defense effort.

Prolonged exposure to stress can lead to the development of adaptive resilience, which can mitigate the negative effects of stress on subjective performance. According to the international literature, strategies such as peer support, access to psychological services, and intrinsic motivation are key factors to maintaining self-perception of performance during crises [19].

The relatively low overall burnout prevalence of 4.8% in 2023, compared to the increase expected from rising exhaustion and cynicism, can also be attributed to these adaptive psychological mechanisms. This pattern of «paradoxical functioning» under extreme conditions has been described in previous studies of crisis medicine and is common among highly motivated professional groups [12].

Despite this resilience, the trends are concerning. If sustained, the progressive increase in emotional exhaustion and cynicism poses a risk of cumulative deterioration that may eventually overwhelm adaptive capacity. Jarrassier et al. (2024) emphasize the importance of timely psychological support and workload optimization to prevent long-term health consequences in anesthesia services in conflict settings [12]. Similarly, the American Society of Anesthesiologists similarly emphasizes that professional burnout should be addressed as a complex challenge requiring both individual psychological interventions and systematic review of organizational working conditions [20].

CONCLUSIONS

Wartime conditions in Ukraine are associated with increased emotional exhaustion and cynicism among anesthesiologists and intensive care physicians. However, perceived professional efficacy has paradoxically improved. This finding may be explained by heightened intrinsic motivation, collective solidarity, and adaptive resilience under extreme conditions.

The overall burnout risk is relatively low but rising. These findings highlight the urgent need to develop and implement comprehensive mental health support programs for this professional group. These programs should include behavioral (individual psychological interventions) and structural (organizational) prevention strategies.

Further research is needed to monitor burnout trajectories and identify the most relevant risk and protective factors for wartime medical practice in Ukraine. This research should include larger samples and a longitudinal design.

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ФІНАНСУВАННЯ

Дослідження проведено в рамках науково-дослідної роботи «Обґрунтування критеріїв передпатологічних станів професійного вигорання у працівників сфери охорони здоров'я» (державна реєстрація № 0121U110914), що фінансувалась за рахунок коштів державного замовлення Міністерства охорони здоров'я України.

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CONFLICT OF INTEREST

The authors declare no conflict of interest.

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