

ADDICTION VULNERABILITY IN WARTIME UKRAINE: DOPAMINERGIC MECHANISMS, AGE-RELATED RISK, AND SOCIAL STRESS

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INTRODUCTION

Addiction remains a major clinical and public health concern with broad social consequences. In wartime, the conditions that sustain addictive behavior often become more intense: prolonged stress, displacement, social disruption, and reduced psychological safety can erode coping capacity and increase reliance on maladaptive forms of self-regulation¹. Since the start of the full-scale Russian invasion, Ukraine has been exposed to these overlapping stressors, creating a context in which both substance-related and behavioral addictions may become more common².

At the neurobiological level, addiction is closely related to the dopaminergic reward system, which contributes to reinforcement, motivation, craving, and compulsive behavior³. Repeated exposure to rewarding stimuli can heighten cue salience, strengthen reward-seeking, and weaken behavioral control over time⁴. At the same time, addiction cannot be

¹ Kurapov, A., Kalaitzaki, A., Keller, V., Danyliuk, I., & Kowatsch, T. (2023). The mental health impact of the ongoing Russian-Ukrainian war 6 months after the Russian invasion of Ukraine. *Frontiers in Psychiatry*, 14, Article 1134780. <https://doi.org/10.3389/fpsyt.2023.1134780>; Patel, S. S., Sukhovii, O., Zvinchuk, O., Neylan, J. H., & Erickson, T. B. (2021). Converging impact of the ongoing conflict and COVID-19 pandemic on mental health and substance use disorders in Ukraine. *Journal of Emergency Management*, 19(9), 63–68. <https://doi.org/10.5055/jem.0603>.

² Kurapov, A., Kalaitzaki, A., Keller, V., Danyliuk, I., & Kowatsch, T. (2023). The mental health impact of the ongoing Russian-Ukrainian war 6 months after the Russian invasion of Ukraine. *Frontiers in Psychiatry*, 14, Article 1134780. <https://doi.org/10.3389/fpsyt.2023.1134780>; Patel, S. S., Sukhovii, O., Zvinchuk, O., Neylan, J. H., & Erickson, T. B. (2021). Converging impact of the ongoing conflict and COVID-19 pandemic on mental health and substance use disorders in Ukraine. *Journal of Emergency Management*, 19(9), 63–68. <https://doi.org/10.5055/jem.0603>; Deac, A. A., Zaviryukha, I., Rozanova, J., Zeziulin, O., Kiriazova, T., Shenoi, S., Psycheva, A., Solórzano de Souza, R., Skipper, H., Abubakar, A. A., Gustilo, V. B., Thornicroft, G., Dellamura, P., Rich, K. M., Earnshaw, V., Bromberg, D. J., Mamedova, E., & Yariy, V. (2023). Treatment system adaptations during war: Lessons from Ukrainian addiction treatment providers. *Substance Use & Misuse*, 58(11), 1447–1450. <https://doi.org/10.1080/10826084.2023.2212377>.

³ Koob, G. F., & Volkow, N. D. (2016). Neurobiology of addiction: A neurocircuitry analysis. *The Lancet Psychiatry*, 3(8), 760–773. [https://doi.org/10.1016/S2215-0366\(16\)00104-8](https://doi.org/10.1016/S2215-0366(16)00104-8); Speranza, L., di Porzio, U., Viggiano, D., de Donato, A., & Volpicelli, F. (2021). Dopamine: The neuromodulator of long-term synaptic plasticity, reward and movement control. *Cells*, 10(4), Article 735. <https://doi.org/10.3390/cells10040735>; Uhl, G. R., Koob, G. F., & Cable, J. (2019). The neurobiology of addiction. *Annals of the New York Academy of Sciences*, 1451(1), 5–28. <https://doi.org/10.1111/nyas.13989>.

⁴ Koob, G. F., & Volkow, N. D. (2016). Neurobiology of addiction: A neurocircuitry analysis. *The Lancet Psychiatry*, 3(8), 760–773. [https://doi.org/10.1016/S2215-0366\(16\)00104-8](https://doi.org/10.1016/S2215-0366(16)00104-8); Kalivas, P. W., & Volkow, N. D. (2005). The neural basis of addiction: A pathology of motivation and choice. *American Journal of Psychiatry*, 162(8), 1403–1413.

reduced to neurobiology alone. Its development depends on how brain-based mechanisms interact with age, stress exposure, social environment, and access to support⁵.

This interplay becomes particularly visible under wartime conditions in Ukraine. Both population-based and group-specific studies have reported a substantial burden of anxiety, depression, trauma-related symptoms, and stress among war-affected Ukrainians, especially among displaced populations, adolescents, and other socially vulnerable groups⁶. In such settings, psychoactive substances or repetitive reward-seeking behaviors may serve as short-term responses to distress, uncertainty, and emotional overload⁷. Age is likely to shape this risk in important ways, because adolescence, emerging adulthood, and some military age groups combine heightened stress exposure with still-uneven coping and self-regulatory capacity⁸.

<https://doi.org/10.1176/appi.ajp.162.8.1403>; Wanat, M. J., Willuhn, I., Clark, J. J., & Phillips, P. E. M. (2009). Phasic dopamine release in appetitive behaviors and drug abuse. *Current Drug Abuse Reviews*, 2(2), 195–213. <https://doi.org/10.2174/1874473710902020195>.

⁵ Uhl, G. R., Koob, G. F., & Cable, J. (2019). The neurobiology of addiction. *Annals of the New York Academy of Sciences*, 1451(1), 5–28. <https://doi.org/10.1111/nyas.13989>; Substance Abuse and Mental Health Services Administration, Office of the Surgeon General. (2016). The neurobiology of substance use, misuse, and addiction. In *Facing addiction in America: The Surgeon General's report on alcohol, drugs, and health*. U.S. Department of Health and Human Services. <https://www.ncbi.nlm.nih.gov/books/NBK424849/>; Patel, S. S., Zvinchuk, O., & Erickson, T. B. (2020). The conflict in East Ukraine: A growing need for addiction research and substance use intervention for vulnerable populations. *Forensic Science and Addiction Research*, 5(3), 406–408. <https://pmc.ncbi.nlm.nih.gov/articles/PMC7194209/>.

⁶ Kurapov, A., Kalaitzaki, A., Keller, V., Danyliuk, I., & Kowatsch, T. (2023). The mental health impact of the ongoing Russian-Ukrainian war 6 months after the Russian invasion of Ukraine. *Frontiers in Psychiatry*, 14, Article 1134780. <https://doi.org/10.3389/fpsyt.2023.1134780>; Riad, A., Drobov, A., Krobot, M., Antalová, N., Alkasaby, M. A., Peřina, A., & Koščík, M. (2022). Mental health burden of the Russian-Ukrainian War 2022 (RUW-22): Anxiety and depression levels among young adults in Central Europe. *International Journal of Environmental Research and Public Health*, 19(14), Article 8418. <https://doi.org/10.3390/ijerph19148418>; Lushchak, O., Velykodna, M., Bolman, S., Strilbytska, O., Berezovskyi, V., & Storey, K. B. (2024). Prevalence of stress, anxiety, and symptoms of post-traumatic stress disorder among Ukrainians after the first year of Russian invasion: A nationwide cross-sectional study. *The Lancet Regional Health – Europe*, 36, Article 100773. <https://doi.org/10.1016/j.lanepe.2023.100773>; Goto, R., Pinchuk, I., Kolodezhny, O., Pimenova, N., Kano, Y., & Skokauskas, N. (2024). Mental health of adolescents exposed to the war in Ukraine. *JAMA Pediatrics*, 178(5), 480–488. <https://doi.org/10.1001/jamapediatrics.2024.0295>.

⁷ Uhl, G. R., Koob, G. F., & Cable, J. (2019). The neurobiology of addiction. *Annals of the New York Academy of Sciences*, 1451(1), 5–28. <https://doi.org/10.1111/nyas.13989>; Deac, A. A., Zaviryukha, I., Rozanova, J., Zeziulin, O., Kiriazova, T., Sheno, S., Peycheva, A., Solórzano de Souza, R., Skipper, H., Abubakar, A. A., Gustilo, V. B., Thornicroft, G., Dellamura, P., Rich, K. M., Earnshaw, V., Bromberg, D. J., Mamedova, E., & Yariy, V. (2023). Treatment system adaptations during war: Lessons from Ukrainian addiction treatment providers. *Substance Use & Misuse*, 58(11), 1447–1450. <https://doi.org/10.1080/10826084.2023.2212377>.

⁸ Goto, R., Pinchuk, I., Kolodezhny, O., Pimenova, N., Kano, Y., & Skokauskas, N. (2024). Mental health of adolescents exposed to the war in Ukraine. *JAMA Pediatrics*, 178(5), 480–488. <https://doi.org/10.1001/jamapediatrics.2024.0295>; Arain, M., Haque, M., Johal, L., Mathur, P., Nel, W., Rais, A., Sandhu, R., & Sharma, S. (2013). Maturation of the adolescent brain. *Neuropsychiatric Disease and Treatment*, 9, 449–461. <https://doi.org/10.2147/NDT.S39776>.

Although the mental health effects of the war in Ukraine are now well documented, the relationship between dopaminergic mechanisms, age-related vulnerability, and wartime social stress has received less focused attention in the addiction literature⁹. This narrative review addresses that gap by examining how dopamine-related mechanisms, age, and war-related social conditions may jointly influence substance-related and behavioral addictions in contemporary Ukraine. Particular attention is paid to youth, displaced populations, and military personnel, whose wartime experiences reflect different but partly intersecting forms of vulnerability.

This article was prepared as a narrative review of literature on addiction in wartime Ukraine, with attention to dopaminergic mechanisms, age-related vulnerability, and the effects of prolonged social stress. The review covered studies on addiction neurobiology, behavioral and substance-related addictions, trauma, displacement, youth mental health, and military populations, with a particular focus on the Ukrainian context.

Relevant publications were identified through PubMed, PubMed Central, Google Scholar, and other academic sources during the preparation of the manuscript from February to May 2026. The search used different combinations of the following terms: addiction, dopamine, reward system, behavioral addiction, substance use, Ukraine, war, trauma, displacement, adolescents, students, and military personnel. Most of the sources included in the review were English-language peer-reviewed journal articles, although selected official reports were also used when they were directly related to the topic. The main emphasis was placed on publications from 2020 to May 2026, while earlier studies were cited in cases where they provided essential background on dopamine function, addiction neurobiology, or developmental vulnerability.

This is a narrative review, so no formal protocol such as PRISMA was applied. The literature was selected according to its relevance to the research question and its analytical value for the topic under consideration. Special attention was given to studies dealing with war-related mental health problems, maladaptive coping, age differences in vulnerability, and addiction risk in Ukrainian or other war-affected populations. The review is intended as a focused analytical synthesis rather than a complete account of all publications on addiction and war in Ukraine.

The selected material was examined thematically. For the purposes of analysis, the literature was grouped into four main areas: dopaminergic mechanisms of addiction formation, behavioral and substance-related addictions in youth, war-related social vulnerability and addiction risk, and age- and occupation-related differences, including military personnel. This made it possible to consider neurobiological and psychosocial factors together in one analytical structure.

⁹ Uhl, G. R., Koob, G. F., & Cable, J. (2019). The neurobiology of addiction. *Annals of the New York Academy of Sciences*, 1451(1), 5–28. <https://doi.org/10.1111/nyas.13989>; Patel, S. S., Zvinchuk, O., & Erickson, T. B. (2020). The conflict in East Ukraine: A growing need for addiction research and substance use intervention for vulnerable populations. *Forensic Science and Addiction Research*, 5(3), 406–408. <https://pmc.ncbi.nlm.nih.gov/articles/PMC7194209/>.

1. Dopamine Mechanisms in Addiction Formation

Addiction is a chronic and relapsing condition marked by compulsive substance use or behavior, impaired control, and persistence despite harmful consequences¹⁰. Dopamine is central to this process through D1-like and D2-like receptor systems involved in motivation, reinforcement learning, and reward-seeking behavior¹¹. At the neurobiological level, addiction involves dysfunction in the mesocorticolimbic dopamine system, particularly the ventral tegmental area-nucleus accumbens pathway, which is important for reward processing and reinforcement¹². Repeated dopaminergic reinforcement increases the salience of addiction-related cues, making them more likely to attract attention, trigger craving, and promote repeated seeking behavior¹³.

With repeated exposure, neuroadaptive changes further strengthen addictive behavior¹⁴. Phasic dopamine signaling reinforces learned responses to salient cues, whereas altered tonic activity and repeated overstimulation may reduce sensitivity to natural rewards and contribute to tolerance and compulsive engagement¹⁵.

At the same time, impaired prefrontal regulation may weaken decision-making and self-control, increasing the likelihood that behavior becomes cue-driven rather than goal-

¹⁰ Koob, G. F., & Volkow, N. D. (2016). Neurobiology of addiction: A neurocircuitry analysis. *The Lancet Psychiatry*, 3(8), 760–773. [https://doi.org/10.1016/S2215-0366\(16\)00104-8](https://doi.org/10.1016/S2215-0366(16)00104-8).

¹¹ Klein, M. O., Battagello, D. S., Cardoso, A. R., Hauser, D. N., Bittencourt, J. C., & Correa, R. G. (2019). Dopamine: Functions, signaling, and association with neurological diseases. *Cellular and Molecular Neurobiology*, 39(1), 31–59. <https://doi.org/10.1007/s10571-018-0632-3>.

¹² Klein, M. O., Battagello, D. S., Cardoso, A. R., Hauser, D. N., Bittencourt, J. C., & Correa, R. G. (2019). Dopamine: Functions, signaling, and association with neurological diseases. *Cellular and Molecular Neurobiology*, 39(1), 31–59. <https://doi.org/10.1007/s10571-018-0632-3>; Morita, K., Morishima, M., Sakai, K., & Kawaguchi, Y. (2013). Dopaminergic control of motivation and reinforcement learning: A closed-circuit account for reward-oriented behavior. *Journal of Neuroscience*, 33(20), 8866–8890. <https://doi.org/10.1523/JNEUROSCI.4614-12.2013>; Speranza, L., di Porzio, U., Viggiano, D., de Donato, A., & Volpicelli, F. (2021). Dopamine: The neuromodulator of long-term synaptic plasticity, reward and movement control. *Cells*, 10(4), Article 735. <https://doi.org/10.3390/cells10040735>.

¹³ Speranza, L., di Porzio, U., Viggiano, D., de Donato, A., & Volpicelli, F. (2021). Dopamine: The neuromodulator of long-term synaptic plasticity, reward and movement control. *Cells*, 10(4), Article 735. <https://doi.org/10.3390/cells10040735>; Wanat, M. J., Willuhn, I., Clark, J. J., & Phillips, P. E. M. (2009). Phasic dopamine release in appetitive behaviors and drug abuse. *Current Drug Abuse Reviews*, 2(2), 195–213. <https://doi.org/10.2174/1874473710902020195>

¹⁴ Koob, G. F., & Volkow, N. D. (2016). Neurobiology of addiction: A neurocircuitry analysis. *The Lancet Psychiatry*, 3(8), 760–773. [https://doi.org/10.1016/S2215-0366\(16\)00104-8](https://doi.org/10.1016/S2215-0366(16)00104-8); Speranza, L., di Porzio, U., Viggiano, D., de Donato, A., & Volpicelli, F. (2021). Dopamine: The neuromodulator of long-term synaptic plasticity, reward and movement control. *Cells*, 10(4), Article 735. <https://doi.org/10.3390/cells10040735>.

¹⁵ Kalivas, P. W., & Volkow, N. D. (2005). The neural basis of addiction: A pathology of motivation and choice. *American Journal of Psychiatry*, 162(8), 1403–1413. <https://doi.org/10.1176/appi.ajp.162.8.1403>; Wanat, M. J., Willuhn, I., Clark, J. J., & Phillips, P. E. M. (2009). Phasic dopamine release in appetitive behaviors and drug abuse. *Current Drug Abuse Reviews*, 2(2), 195–213. <https://doi.org/10.2174/1874473710902020195>.

directed¹⁶. Together, these processes show that addiction is maintained not only by immediate reward, but also by lasting changes in motivation, learning, and executive control.

2. Behavioral and Substance Addictions in Ukrainian Youth

In young people, addictive problems may involve psychoactive substances as well as repetitive behaviors such as gaming, problematic internet use, gambling, or excessive online communication. These manifestations are usually discussed as substance addictions and behavioral addictions. They are not identical, but they share several clinical features, including impaired control, repeated engagement despite harm, and reinforcement through reward-related learning¹⁷. Behavioral addiction involves repeated engagement in maladaptive behaviors that overlap clinically with substance use disorder¹⁸. Substance addiction, in turn, is commonly described as a chronic, relapsing condition marked by compulsive substance seeking and use, impaired control, and continued use despite harmful consequences¹⁹. The ICD-11 classification distinguishes an episode of harmful substance use, a harmful pattern of substance use, and substance dependence²⁰. Dependence is characterized by impaired control, increasing priority of substance use over other areas of life, and continued use despite adverse consequences²¹.

This distinction is particularly relevant in wartime Ukraine because it allows behavioral and substance-related manifestations to be analyzed together without obscuring their clinical differences. In Ukrainian youth, behavioral addiction does not follow a single pattern. Instead, its form varies by age and gender. In a sample of 316 participants aged 15-21 years, Hangan et al. (2024) found different cyber-addiction profiles: gaming-related patterns were more typical of boys, whereas selfie- and cybercommunication-related patterns were more typical of girls²². Their subgroup analysis also pointed to differences across age categories,

¹⁶ Jiménez-González, A., Gómez-Acevedo, C., Ochoa-Aguilar, A., & Chavarria, A. (2022). The role of glia in addiction: Dopamine as a modulator of glial responses in addiction. *Cellular and Molecular Neurobiology*, 42(7), 2109–2120. <https://doi.org/10.1007/s10571-021-01105-3>; Koob, G. F., & Volkow, N. D. (2016). Neurobiology of addiction: A neurocircuitry analysis. *The Lancet Psychiatry*, 3(8), 760–773. [https://doi.org/10.1016/S2215-0366\(16\)00104-8](https://doi.org/10.1016/S2215-0366(16)00104-8).

¹⁷ Kalivas, P. W., & Volkow, N. D. (2005). The neural basis of addiction: A pathology of motivation and choice. *American Journal of Psychiatry*, 162(8), 1403–1413. <https://doi.org/10.1176/appi.ajp.162.8.1403>; Boumparis, N., Haug, S., Abend, S., Billieux, J., Riper, H., & Schaub, M. P. (2022). Internet-based interventions for behavioral addictions: A systematic review. *Journal of Behavioral Addictions*, 11(3), 620–642. <https://doi.org/10.1556/2006.2022.00054>.

¹⁸ Boumparis, N., Haug, S., Abend, S., Billieux, J., Riper, H., & Schaub, M. P. (2022). Internet-based interventions for behavioral addictions: A systematic review. *Journal of Behavioral Addictions*, 11(3), 620–642. <https://doi.org/10.1556/2006.2022.00054>

¹⁹ Koob, G. F., & Volkow, N. D. (2016). Neurobiology of addiction: A neurocircuitry analysis. *The Lancet Psychiatry*, 3(8), 760–773. [https://doi.org/10.1016/S2215-0366\(16\)00104-8](https://doi.org/10.1016/S2215-0366(16)00104-8).

²⁰ Volkow, N. D., & Blanco, C. (2023). Substance use disorders: A comprehensive update of classification, epidemiology, neurobiology, clinical aspects, treatment and prevention. *World Psychiatry*, 22(2), 203–229. <https://doi.org/10.1002/wps.21073>.

²¹ Volkow, N. D., & Blanco, C. (2023). Substance use disorders: A comprehensive update of classification, epidemiology, neurobiology, clinical aspects, treatment and prevention. *World Psychiatry*, 22(2), 203–229. <https://doi.org/10.1002/wps.21073>.

²² Hanhan, Y., Yang, Y., Porpult, O., Melnichuk, I., & Synitska, T. (2024). A study of cyber-addictions in Ukrainian youth. *Amazonia Investiga*, 13(78), 124–133. <https://doi.org/10.34069/AI/2024.78.06.11>.

suggesting that the expression of behavioral addiction changes across adolescence and emerging adulthood rather than following a stable pattern²³. A developmental perspective helps explain this pattern. Adolescence and emerging adulthood are periods in which reward sensitivity remains comparatively high, while executive control is still maturing. Under these conditions, dopaminergic reinforcement may increase the pull of digital and behavioral rewards, and still-developing self-regulation may make repetitive engagement harder to resist²⁴. For war-exposed youth, this vulnerability may be intensified by chronic stress and maladaptive coping. In a national sample of 8,096 adolescents aged 15 years and older, Goto et al. (2024) reported that 20.5% screened at medium risk or higher for substance use disorder²⁵. The same study documented a substantial burden of depression, anxiety, trauma-related symptoms, and substance-use risk among war-exposed adolescents, underscoring the need for integrated prevention and early intervention²⁶. In Ukrainian youth, behavioral addictions may take different forms depending on age and gender, whereas substance-related disorders should be interpreted clinically and in the context of prolonged wartime stress.

3. War-Related Social Vulnerability and Addiction Risk in Ukraine

War-related conditions may increase addiction risk unevenly across social groups. In Ukraine, this risk rises when people face trauma, financial hardship, displacement, family separation, and the loss of social support. Long-term stress and disruptions in everyday life can weaken coping abilities and make substance use more likely. During wartime, addiction is linked not only to health factors but also to the social instability caused by war²⁷. In Ukraine, these conditions frequently overlap. In such settings, addictive behavior may function as a maladaptive way of coping with persistent psychological overload.

At the national level, the full-scale invasion created a prolonged environment of chronic stress that may increase vulnerability to addictive behaviors. Under chronic stress, psychoactive substances may be used as a short-term way to reduce emotional overload and escape from distress²⁸. A nationwide survey of 3,173 adults, conducted 9-12 months after the invasion, found that 83.7% of Ukrainians who remained in their usual place of residence, 86.0% of internally displaced persons, and 89.9% of refugees reported moderate or high

²³ Hanhan, Y., Yang, Y., Porpult, O., Melnichuk, I., & Synitska, T. (2024). A study of cyber-addictions in Ukrainian youth. *Amazonia Investiga*, 13(78), 124–133. <https://doi.org/10.34069/AI/2024.78.06.11>.

²⁴ Jiménez-González, A., Gómez-Acevedo, C., Ochoa-Aguilar, A., & Chavarria, A. (2022). The role of glia in addiction: Dopamine as a modulator of glial responses in addiction. *Cellular and Molecular Neurobiology*, 42(7), 2109–2120. <https://doi.org/10.1007/s10571-021-01105-3>

²⁵ Goto, R., Pinchuk, I., Kolodezhny, O., Pimenova, N., Kano, Y., & Skokauskas, N. (2024). Mental health of adolescents exposed to the war in Ukraine. *JAMA Pediatrics*, 178(5), 480–488. <https://doi.org/10.1001/jamapediatrics.2024.0295>.

²⁶ Goto, R., Pinchuk, I., Kolodezhny, O., Pimenova, N., Kano, Y., & Skokauskas, N. (2024). Mental health of adolescents exposed to the war in Ukraine. *JAMA Pediatrics*, 178(5), 480–488. <https://doi.org/10.1001/jamapediatrics.2024.0295>.

²⁷ Lorek, M., Kamiński, P., Baszyński, J., Tadrowski, T., Gorzelańczyk, E. J., Feit, J., Kurhaluk, N., Woźniak, A., & Tkaczenko, H. (2024). Molecular and environmental determinants of addictive substances. *Biomolecules*, 14(11), Article 1406. <https://doi.org/10.3390/biom14111406>.

²⁸ Lorek, M., Kamiński, P., Baszyński, J., Tadrowski, T., Gorzelańczyk, E. J., Feit, J., Kurhaluk, N., Woźniak, A., & Tkaczenko, H. (2024). Molecular and environmental determinants of addictive substances. *Biomolecules*, 14(11), Article 1406. <https://doi.org/10.3390/biom14111406>.

stress, while only 7.2% showed low levels of stress, anxiety, and PTSD symptoms²⁹. PTSD symptoms were reported in 32.9% of those who remained in their original location, 39.4% of internally displaced persons, and 47.2% of refugees. The lowest level of mental health problems was observed among people who did not have to leave their homes, whereas internal displacement and especially migration to a different cultural environment were associated with much higher levels of stress, anxiety, and PTSD. Some social groups are particularly vulnerable under these conditions. Pensioners, internally displaced persons, and people with disabilities were reported among the most stressed groups, with stress affecting about 90% of individuals in these categories³⁰. Such conditions may increase the likelihood of substance use as a coping response to prolonged stress, especially among displaced and war-affected populations exposed to trauma, family separation, and loss of livelihoods³¹. At the same time, many Ukrainians continue to struggle to meet basic needs, while a substantial share of the population relies on crisis or emergency coping strategies, particularly in displacement-affected and frontline settings³². Material deprivation, prolonged uncertainty, social loss, and chronic psychological strain together create a setting in which both substance-related and behavioral addictions may become more common. For some groups, these pressures are especially severe. Military personnel and veterans face repeated trauma exposure and a high burden of stress-related symptoms. Internally displaced persons and refugees often experience disruption of daily life, economic instability, and weakened social ties. Bereaved individuals may also face an elevated risk because prolonged grief and depressive symptoms can intensify maladaptive coping patterns³³.

Age modifies these risk patterns. Children and adolescents may be especially vulnerable to maladaptive coping under prolonged stress. In wartime, this may include both substance-related risk and excessive reliance on digital forms of escape. In wartime, Ukrainian adolescents use social media to express themselves, stay connected with peers, and distract themselves from anxiety. More intensive social media use may increase the risk of overinvolvement and addiction³⁴. Earlier substance use may lead to faster development of

²⁹ Lorek, M., Kamiński, P., Baszyński, J., Tadrowski, T., Gorzelańczyk, E. J., Feit, J., Kurhaluk, N., Woźniak, A., & Tkaczenko, H. (2024). Molecular and environmental determinants of addictive substances. *Biomolecules*, 14(11), Article 1406. <https://doi.org/10.3390/biom14111406>.

³⁰ Lorek, M., Kamiński, P., Baszyński, J., Tadrowski, T., Gorzelańczyk, E. J., Feit, J., Kurhaluk, N., Woźniak, A., & Tkaczenko, H. (2024). Molecular and environmental determinants of addictive substances. *Biomolecules*, 14(11), Article 1406. <https://doi.org/10.3390/biom14111406>.

³¹ Patel, S. S., Zvinchuk, O., & Erickson, T. B. (2020). The conflict in East Ukraine: A growing need for addiction research and substance use intervention for vulnerable populations. *Forensic Science and Addiction Research*, 5(3), 406–408. <https://pmc.ncbi.nlm.nih.gov/articles/PMC7194209/>

³² International Organization for Migration. (2024). *Mental health in Ukraine: Displacement, vulnerabilities and support – Thematic brief (November 2024)*. <https://reliefweb.int/report/ukraine/mental-health-ukraine-displacement-vulnerabilities-and-support-thematic-brief-november-2024>.

³³ Kulish, O., Avramchenko, S., & Tuz, L. (2025). The impact of the war in Ukraine on the addictive behaviour of individuals. *Psychological Journal*, 15, 78–85. <https://doi.org/10.31499/2617-2100.15.2025.342124>.

³⁴ Stoliarchuk, O., Prorok, N., Serhieienkova, O., Khrypko, S., Sychynska, M., & Lobanchuk, O. (2022). Real and virtual space of life activities of Ukrainian adolescents in war conditions. *IJCSNS International Journal of Computer Science and Network Security*, 22(6). <https://doi.org/10.22937/IJCSNS.2022.22.6.75>.

addiction, while young adulthood remains a high-risk period; approximately 30% of young adults develop heroin use disorder, and 25% develop methamphetamine use disorder within one year after first use³⁵. This pattern is broadly consistent with developmental evidence showing that reward-related circuitry matures earlier than prefrontal control systems, which may increase sensitivity to reward and weaken behavioral control during adolescence and emerging adulthood³⁶.

Changes in opioid agonist treatment also reflect the wartime transformation of addictive behavior. Despite the destruction of clinics, the occupation of territories, and the large-scale migration of people who inject drugs, the number of patients receiving treatment increased from 17,232 at the beginning of the war to 19,342 by August 2022³⁷. This increase indicates both the resilience of the treatment system and a growing need for addiction-related care. In practical terms, forced displacement and persistent traumatic stress may have contributed to both relapse and the emergence of new dependence-related cases³⁸.

Overall, the full-scale war in Ukraine has created age-specific and socially uneven conditions that increase the risk of addictive behavior across multiple groups. Chronic stress, trauma, social disintegration, and restricted access to resources weaken adaptive coping and increase vulnerability to maladaptive forms of self-regulation. These conditions are especially relevant for adolescents and young adults, internally displaced persons, older adults, people with chronic health conditions, veterans, and bereaved individuals, all of whom need special attention in prevention and intervention.

4. Age-and gender-related vulnerability to addiction under wartime conditions

Age-related vulnerability to addiction under wartime conditions can be observed across several groups of Ukrainian youth and young adults. Evidence from Ukrainian students collected in October 2023 points to the same age-related vulnerability³⁹. In that study of 1,398 students with a mean age of 19.6 years, 48.1% met the criteria for PTSD, 34.1% reported moderate or severe anxiety, 33.6% had depression, and 68.5% had experienced war-related trauma. These data suggest that young adults may be especially vulnerable to maladaptive

³⁵ Volkow, N. D., Han, B., Einstein, E. B., et al. (2021). Prevalence of substance use disorders by time since first substance use among young people in the US. *JAMA Pediatrics*, 175(6). <https://doi.org/10.1001/jamapediatrics.2020.6981>

³⁶ Arain, M., Haque, M., Johal, L., Mathur, P., Nel, W., Rais, A., Sandhu, R., & Sharma, S. (2013). Maturation of the adolescent brain. *Neuropsychiatric Disease and Treatment*, 9, 449–461. <https://doi.org/10.2147/NDT.S39776>

³⁷ Ivasiy, R., Galvez de Leon, S. J., Meteliuk, A., et al. (2023). Responding to health policy recommendations on managing opioid use disorder during Russia's invasion of Ukraine: Divergent responses from the frontline to the west. *Frontiers in Public Health*, 10, Article 1044677. <https://doi.org/10.3389/fpubh.2022.1044677>.

³⁸ Patel, S. S., Sukhovii, O., Zvinchuk, O., Neylan, J. H., & Erickson, T. B. (2021). Converging impact of the ongoing conflict and COVID-19 pandemic on mental health and substance use disorders in Ukraine. *Journal of Emergency Management*, 19(9), 63–68. <https://doi.org/10.5055/jem.0603>.

³⁹ Polyviania, A., Vyshnya, K., Kovalchuk, O., Klymenko, V., & Klymenko, T. (2025). Mental health of university students twenty months after the beginning of the full-scale Russian-Ukrainian war. *BMC Psychiatry*, 25(1), Article 236. <https://doi.org/10.1186/s12888-025-06654-1>; Wagner, F. A., & Anthony, J. C. (2002). From first drug use to drug dependence: Developmental periods of risk for dependence upon marijuana, cocaine, and alcohol. *Neuropsychopharmacology*, 26(4), 479–488.

responses under war-related stress⁴⁰. Among people aged 18-25, severe distress may increase vulnerability to maladaptive behavioral responses, including those associated with dependence risk⁴¹. The same age-related tendency is visible in military samples. Younger service members may be more likely to rely on maladaptive coping strategies, including behaviors associated with addiction. Although students and military personnel differ in their social roles, both groups include young people exposed to war-related stress at a stage when coping skills and self-regulation may still be unstable. Here, vulnerability seems to depend not only on profession but also on age, chronic stress, and limited adaptive reserve.

Gender is relevant here, but the pattern is more complex than a simple contrast between men and women. In Ukraine, many men have experienced more direct wartime exposure, including combat participation, injury, prolonged threat to life, and the loss of relatives or close others⁴². Such experiences are associated with PTSD and other mental health problems that may complicate post-war adaptation and affect family and social functioning⁴³. Women, however, may be more vulnerable to prolonged emotional strain, especially when it is linked to uncertainty, exhaustion, isolation, and chronic fear. Gender-related vulnerability is better understood through differences in stress exposure than through a simple hierarchy of risk⁴⁴.

This interpretation is supported by broader population studies. Recent findings indicate markedly elevated psycho-emotional distress among Ukrainians during the war, including high levels of stress, anxiety, depressive symptoms, and post-traumatic stress, with especially unfavorable outcomes among displaced populations and those affected by war-related

⁴⁰ Polyvianaia, A., Vyshnya, K., Kovalchuk, O., Klymenko, V., & Klymenko, T. (2025). Mental health of university students twenty months after the beginning of the full-scale Russian-Ukrainian war. *BMC Psychiatry*, 25(1), Article 236. <https://doi.org/10.1186/s12888-025-06654-1>; Wagner, F. A., & Anthony, J. C. (2002). From first drug use to drug dependence: Developmental periods of risk for dependence upon marijuana, cocaine, and alcohol. *Neuropsychopharmacology*, 26(4), 479–488.

⁴¹ Polyvianaia, A., Vyshnya, K., Kovalchuk, O., Klymenko, V., & Klymenko, T. (2025). Mental health of university students twenty months after the beginning of the full-scale Russian-Ukrainian war. *BMC Psychiatry*, 25(1), Article 236. <https://doi.org/10.1186/s12888-025-06654-1>; Wagner, F. A., & Anthony, J. C. (2002). From first drug use to drug dependence: Developmental periods of risk for dependence upon marijuana, cocaine, and alcohol. *Neuropsychopharmacology*, 26(4), 479–488.

⁴² Chaban, O. S., Bezsheyko, V. H., Khaustova, O. O., Burlaka, O. V., Ryvak, T. B., & Kyrylyuk, S. S. (2018). Gender-related differences of stress reactions in Ukrainian combatants. *Pharmacia*, 65(2), 3–10. <https://bsphs.org/wp-content/uploads/magazine/2018/2/Ryvak.pdf>; Schroeder, A. (2022, March 9). Gender, health, and the war in Ukraine. *ReliefWeb*. <https://reliefweb.int/report/ukraine/gender-health-and-war-ukraine>.

⁴³ Kurapov, A., Danyliuk, I., Loboda, A., Kalaitzaki, A., Kowatsch, T., Klimash, T., & Predko, V. (2023). Six months into the war: A first-wave study of stress, anxiety, and depression among in Ukraine. *Frontiers in Psychiatry*, 14, Article 1190465. <https://doi.org/10.3389/fpsy.2023.1190465>; Chaban, O. S., Bezsheyko, V. H., Khaustova, O. O., Burlaka, O. V., Ryvak, T. B., & Kyrylyuk, S. S. (2018). Gender-related differences of stress reactions in Ukrainian combatants. *Pharmacia*, 65(2), 3–10. <https://bsphs.org/wp-content/uploads/magazine/2018/2/Ryvak.pdf>.

⁴⁴ Kurapov, A., Danyliuk, I., Loboda, A., Kalaitzaki, A., Kowatsch, T., Klimash, T., & Predko, V. (2023). Six months into the war: A first-wave study of stress, anxiety, and depression among in Ukraine. *Frontiers in Psychiatry*, 14, Article 1190465. <https://doi.org/10.3389/fpsy.2023.1190465>; Chaban, O. S., Bezsheyko, V. H., Khaustova, O. O., Burlaka, O. V., Ryvak, T. B., & Kyrylyuk, S. S. (2018). Gender-related differences of stress reactions in Ukrainian combatants. *Pharmacia*, 65(2), 3–10. <https://bsphs.org/wp-content/uploads/magazine/2018/2/Ryvak.pdf>.

disruption⁴⁵. In a 2023 survey of adults living in Ukraine (n=2,050), 11.1% met criteria for PTSD, 15.2% for generalized anxiety disorder, and 8.1% for depressive disorder⁴⁶. Comorbidity was common, with about half of affected respondents meeting criteria for more than one disorder⁴⁷. A similar pattern is evident among young women. A study of 3,467 Ukrainian female university students surveyed in 2022, 2023, and 2024 found that fear of war, depression, burnout, and loneliness varied across the three years, with lower levels in 2023 and higher levels again in 2024⁴⁸. Fear of war, depression, and loneliness were significantly associated with burnout, suggesting that prolonged psychological strain may contribute to age- and gender-related vulnerability under wartime conditions and may also increase susceptibility to maladaptive coping, including potentially addictive behaviors⁴⁹.

5. Military personnel as a separate socio-professional group

Military personnel form a specific socio-professional group whose alcohol-related risk and coping patterns may differ from those seen in civilians. In those undergoing psychological recovery, age may be one of the factors associated with alcohol-related risk and coping style⁵⁰. The present analysis draws on data from a study of 162 male members of the Ukrainian Defense Forces aged 20-60 years. Most participants were privates and non-commissioned officers with 6-10 months of combat experience who had been referred from combat positions to a rehabilitation center for the 14-day “Invincibility Program”. The study used the WHO AUDIT and the COPE Inventory, and the data were analyzed by hierarchical cluster analysis and multiple regression in SPSS 20.0.⁵¹

⁴⁵ Kurapov, A., Danyliuk, I., Loboda, A., Kalaitzaki, A., Kowatsch, T., Klimash, T., & Predko, V. (2023). Six months into the war: A first-wave study of stress, anxiety, and depression among in Ukraine. *Frontiers in Psychiatry*, 14, Article 1190465. <https://doi.org/10.3389/fpsy.2023.1190465>.

⁴⁶ Martsenkovskiy, D., Shevlin, M., Ben-Ezra, M., Bondjers, K., Fox, R., Karatzias, T., Martsenkovska, I., Martsenkovsky, I., Pfeiffer, E., Sachser, C., Vallières, F., & Hyland, P. (2024). Mental health in Ukraine in 2023. *European Psychiatry*, 67(1), e27. <https://doi.org/10.1192/j.eurpsy.2024.12>.

⁴⁷ Martsenkovskiy, D., Shevlin, M., Ben-Ezra, M., Bondjers, K., Fox, R., Karatzias, T., Martsenkovska, I., Martsenkovsky, I., Pfeiffer, E., Sachser, C., Vallières, F., & Hyland, P. (2024). Mental health in Ukraine in 2023. *European Psychiatry*, 67(1), e27. <https://doi.org/10.1192/j.eurpsy.2024.12>

⁴⁸ Reznik, A., Pavlova, I., Pavlenko, V., Kurapov, A., Drozdov, A., Korchakova, N., Romem Porat, S.-I., & Isralowitz, R. (2025). Mental health and well-being among Ukrainian female university students: The impact of war over 3 years. *Cambridge Prisms: Global Mental Health*, 12, e149. <https://doi.org/10.1017/gmh.2025.10112>

⁴⁹ Reznik, A., Pavlova, I., Pavlenko, V., Kurapov, A., Drozdov, A., Korchakova, N., Romem Porat, S.-I., & Isralowitz, R. (2025). Mental health and well-being among Ukrainian female university students: The impact of war over 3 years. *Cambridge Prisms: Global Mental Health*, 12, e149. <https://doi.org/10.1017/gmh.2025.10112>; Stellern, J., Xiao, K. B., Grennell, E., Sanches, M., Gowin, J. L., & Sloan, M. E. (2023). Emotion regulation in substance use disorders: A systematic review and meta-analysis. *Addiction*, 118(1), 30–47. <https://doi.org/10.1111/add.16001>.

⁵⁰ Prykhodko, O., Hordiienko, I., Hordiienko, O., Klymenko, T., & Klymenko, O. (2024). The risk of developing alcohol addiction – what coping strategies do Ukrainian military personnel use after participating in intense hostilities? *European Journal of Clinical and Experimental Medicine*, 22(3), 482–490. <https://doi.org/10.15584/ejcem.2024.3.1>.

⁵¹ Prykhodko, O., Hordiienko, I., Hordiienko, O., Klymenko, T., & Klymenko, O. (2024). The risk of developing alcohol addiction – what coping strategies do Ukrainian military personnel use after

In the total sample, the mean age was 41.84 years; 69.14% of participants had a low alcohol-related risk, and 29.01% had a moderate risk. Regression analysis showed a positive association between substance-use coping and alcohol-related risk, whereas planning and mental disengagement were associated with lower risk. These data point to greater vulnerability in younger service members under combat stress⁵².

The cluster analysis makes this pattern more distinct. The oldest group, with a mean age of 43.6 years, showed more productive coping and lower alcohol-related risk, whereas the youngest group, with a mean age of 30.2 years, had the highest risk. This difference indicates that age-related variation in coping resources and stress regulation may influence vulnerability to maladaptive alcohol-related behavior in military personnel⁵³.

The literature reviewed here suggests that addiction in wartime Ukraine reflects the interaction of neurobiological mechanisms and severe social stress rather than a single causal pathway. Dopamine remains central to this process because it increases the motivational salience of substance-related and behavioral cues, strengthens craving, and supports repeated reward-seeking over time⁵⁴. At the same time, these mechanisms do not operate independently of context. Under wartime conditions, they are shaped by trauma exposure, displacement, chronic uncertainty, and the disruption of ordinary routines, all of which may weaken adaptive coping and increase vulnerability to maladaptive forms of self-regulation⁵⁵.

The reviewed evidence also indicates that vulnerability is not distributed evenly across the population. Population-level studies point to a high burden of stress, anxiety, and trauma-related symptoms across war-affected Ukrainians, with especially unfavorable patterns among internally displaced persons and refugees⁵⁶. In such conditions, material deprivation,

participating in intense hostilities? *European Journal of Clinical and Experimental Medicine*, 22(3), 482–490. <https://doi.org/10.15584/ejcem.2024.3.1>

⁵² Prykhodko, O., Hordiienko, I., Hordiienko, O., Klymenko, T., & Klymenko, O. (2024). The risk of developing alcohol addiction – what coping strategies do Ukrainian military personnel use after participating in intense hostilities? *European Journal of Clinical and Experimental Medicine*, 22(3), 482–490. <https://doi.org/10.15584/ejcem.2024.3.1>

⁵³ Prykhodko, O., Hordiienko, I., Hordiienko, O., Klymenko, T., & Klymenko, O. (2024). The risk of developing alcohol addiction – what coping strategies do Ukrainian military personnel use after participating in intense hostilities? *European Journal of Clinical and Experimental Medicine*, 22(3), 482–490. <https://doi.org/10.15584/ejcem.2024.3.1>

⁵⁴ Wanat, M. J., Willuhn, I., Clark, J. J., & Phillips, P. E. M. (2009). Phasic dopamine release in appetitive behaviors and drug abuse. *Current Drug Abuse Reviews*, 2(2), 195–213. <https://doi.org/10.2174/1874473710902020195>; Koob, G. F., & Volkow, N. D. (2016). Neurobiology of addiction: A neurocircuitry analysis. *The Lancet Psychiatry*, 3(8), 760–773. [https://doi.org/10.1016/S2215-0366\(16\)00104-8](https://doi.org/10.1016/S2215-0366(16)00104-8); Speranza, L., di Porzio, U., Viggiano, D., de Donato, A., & Volpicelli, F. (2021). Dopamine: The neuromodulator of long-term synaptic plasticity, reward and movement control. *Cells*, 10(4), Article 735. <https://doi.org/10.3390/cells10040735>; Jiménez-González, A., Gómez-Acevedo, C., Ochoa-Aguilar, A., & Chavarria, A. (2022). The role of glia in addiction: Dopamine as a modulator of glial responses in addiction. *Cellular and Molecular Neurobiology*, 42(7), 2109–2120. <https://doi.org/10.1007/s10571-021-01105-3>.

⁵⁵ Kurapov, A., Kalaitzaki, A., Keller, V., Danyliuk, I., & Kowatsch, T. (2023). The mental health impact of the ongoing Russian-Ukrainian war 6 months after the Russian invasion of Ukraine. *Frontiers in Psychiatry*, 14, Article 1134780. <https://doi.org/10.3389/fpsy.2023.1134780>

⁵⁶ Kurapov, A., Kalaitzaki, A., Keller, V., Danyliuk, I., & Kowatsch, T. (2023). The mental health impact of the ongoing Russian-Ukrainian war 6 months after the Russian invasion of Ukraine. *Frontiers in Psychiatry*, 14, Article 1134780. <https://doi.org/10.3389/fpsy.2023.1134780>;

social instability, loss of support, and prolonged psychological overload may increase the likelihood of both substance-related and behavioral addictions⁵⁷. This interpretation is consistent with the broader view that addiction risk in wartime settings reflects not only reward-related neurobiology but also accumulated psychosocial strain and reduced coping capacity.

A particularly important distinction in the Ukrainian wartime context is that between substance-related and behavioral addictions. These forms are not identical, but they share core features such as impaired control, persistence despite harm, and reinforcement through reward-related learning⁵⁸. In young people, this connection is especially relevant because addiction-related behavior may involve psychoactive substances as well as digital or online activities, including gaming, problematic internet use, and excessive online communication. The Ukrainian youth data reviewed here support this heterogeneity: behavioral addiction did not follow a single stable pattern, and some forms appeared to vary by gender and age group. This suggests that addiction risk in youth should be approached as a differentiated phenomenon rather than as a single uniform category.

Age emerged as one of the clearest modifiers of vulnerability across the reviewed literature. Adolescence and emerging adulthood are developmental periods in which reward sensitivity remains comparatively high while executive control is still maturing, a combination that may increase susceptibility to both behavioral and substance-related problems⁵⁹. War appears to intensify this vulnerability. Among Ukrainian adolescents, 20.5% screened at medium risk or higher for substance use disorder, alongside a substantial burden of depression, anxiety, and trauma-related symptoms. A similar pattern was reported among university students, among whom PTSD symptoms, moderate or severe anxiety, moderate or severe depression, and war-related traumatic exposure were all common. Taken together, these findings suggest that younger age groups are vulnerable not only because they are

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⁵⁷ Kurapov, A., Kalaitzaki, A., Keller, V., Danyliuk, I., & Kowatsch, T. (2023). The mental health impact of the ongoing Russian-Ukrainian war 6 months after the Russian invasion of Ukraine. *Frontiers in Psychiatry*, 14, Article 1134780. <https://doi.org/10.3389/fpsyt.2023.1134780>; Riad, A., Drobov, A., Krobot, M., Antalová, N., Alkasaby, M. A., Peřina, A., & Kořčík, M. (2022). Mental health burden of the Russian-Ukrainian War 2022 (RUW-22): Anxiety and depression levels among young adults in Central Europe. *International Journal of Environmental Research and Public Health*, 19(14), Article 8418. <https://doi.org/10.3390/ijerph19148418>.

⁵⁸ World Health Organization. (2024). *Clinical descriptions and diagnostic requirements for ICD-11 mental, behavioural and neurodevelopmental disorders*. World Health Organization. <https://iris.who.int/server/api/core/bitstreams/dcf73611-9e0f-4d5c-85f6-85a58b0da6de/content>; Kalivas, P. W., & Volkow, N. D. (2005). The neural basis of addiction: A pathology of motivation and choice. *American Journal of Psychiatry*, 162(8), 1403–1413. <https://doi.org/10.1176/appi.ajp.162.8.1403>; Koob, G. F., & Volkow, N. D. (2016). Neurobiology of addiction: A neurocircuitry analysis. *The Lancet Psychiatry*, 3(8), 760–773. [https://doi.org/10.1016/S2215-0366\(16\)00104-8](https://doi.org/10.1016/S2215-0366(16)00104-8).

⁵⁹ Wanat, M. J., Willuhn, I., Clark, J. J., & Phillips, P. E. M. (2009). Phasic dopamine release in appetitive behaviors and drug abuse. *Current Drug Abuse Reviews*, 2(2), 195–213. <https://doi.org/10.2174/1874473710902020195>; Arain, M., Haque, M., Johal, L., Mathur, P., Nel, W., Rais, A., Sandhu, R., & Sharma, S. (2013). Maturation of the adolescent brain. *Neuropsychiatric Disease and Treatment*, 9, 449–461. <https://doi.org/10.2147/NDT.S39776>.

exposed to war stress, but because such stress interacts with a biological developmental stage marked by less stable self-regulation and coping resources.

The same logic is visible in occupation-specific groups, especially military personnel. The evidence reviewed here indicates that military populations represent a distinct socio-professional group in which addiction-related risk is shaped by combat stress, exposure to intense hostilities, and the demands of psychological recovery. In the military sample discussed in this review, most participants had low alcohol-related risk, but nearly one third had moderate risk, and younger service members showed less adaptive coping and greater alcohol-related vulnerability than older ones. This pattern suggests that addiction-related risk in military settings is influenced not only by combat exposure itself, but also by age-related differences in coping resources and stress regulation.

Gender-related vulnerability appears more complex than a simple contrast between men and women. Men are more often exposed to direct combat, injury, and life-threatening events, whereas women may experience a heavier burden of prolonged emotional strain, uncertainty, loneliness, and burnout⁶⁰. The evidence on young Ukrainian women is particularly important here, as rising levels of fear of war, depression, loneliness, and burnout suggest that prolonged war fatigue may become a meaningful pathway of psychological vulnerability even in the absence of direct combat exposure. Rather than treating gender as a fixed hierarchy of risk, it may be more accurate to interpret gender differences through patterns of stress exposure and the social forms through which distress is experienced.

Across the reviewed literature, coping emerges as a key link between war-related stress and addiction-related risk. In several groups, addictive behavior appears less as a stand-alone disorder than as a maladaptive attempt to regulate distress, uncertainty, and emotional overload. This helps explain why both substance use and behavioral overinvolvement may increase under prolonged stress. It also aligns with findings that Ukrainian adolescents use digital communication and social media to maintain connections, regulate emotions, and distract themselves from anxiety, even though heavier reliance on these platforms may gradually increase the risk of problematic use.

At the same time, these findings should be interpreted cautiously. The reviewed studies differ in sample type, age structure, and outcome measures, and they do not assess clinically confirmed addiction in the same way⁶¹. Some focus on behavioral addiction, some on substance-use risk, and others on PTSD, anxiety, or depression as related vulnerability

⁶⁰ Riad, A., Drobov, A., Krobot, M., Antalová, N., Alkasaby, M. A., Peřina, A., & Kořčík, M. (2022). Mental health burden of the Russian-Ukrainian War 2022 (RUW-22): Anxiety and depression levels among young adults in Central Europe. *International Journal of Environmental Research and Public Health*, 19(14), Article 8418. <https://doi.org/10.3390/ijerph19148418>; Kurapov, A., Kalaitzaki, A., Keller, V., Danyliuk, I., & Kowatsch, T. (2023). The mental health impact of the ongoing Russian-Ukrainian war 6 months after the Russian invasion of Ukraine. *Frontiers in Psychiatry*, 14, Article 1134780. <https://doi.org/10.3389/fpsyt.2023.1134780>.

⁶¹ Polyvianaia, A., Vyshnya, K., Kovalchuk, O., Klymenko, V., & Klymenko, T. (2025). Mental health of university students twenty months after the beginning of the full-scale Russian-Ukrainian war. *BMC Psychiatry*, 25(1), Article 236. <https://doi.org/10.1186/s12888-025-06654-1>; Prykhodko, O., Hordiienko, I., Hordiienko, O., Klymenko, T., & Klymenko, O. (2024). The risk of developing alcohol addiction – what coping strategies do Ukrainian military personnel use after participating in intense hostilities? *European Journal of Clinical and Experimental Medicine*, 22(3), 482–490. <https://doi.org/10.15584/ejcem.2024.3.1>

factors⁶². Even so, the overall pattern remains consistent: across different social groups, prolonged war stress is associated with weaker adaptive coping and a greater likelihood of maladaptive reward-seeking behavior⁶³.

From a practical perspective, the literature points to several priorities for prevention and support. First, attention should be directed toward groups with cumulative stress exposure, especially adolescents and young adults, displaced populations, and military personnel. Second, addiction screening should not be separated from screening for trauma, anxiety, and depression, because these problems repeatedly co-occur in the reviewed material⁶⁴. For this reason, trauma-informed and age-sensitive interventions are likely to be more effective than narrowly addiction-focused approaches alone⁶⁵. In the Ukrainian wartime context, continuity of care, psychosocial support, and early identification of maladaptive coping may be central to preventing both substance-related and behavioral forms of dependence⁶⁶.

⁶² Polyvianaia, A., Vyshnya, K., Kovalchuk, O., Klymenko, V., & Klymenko, T. (2025). Mental health of university students twenty months after the beginning of the full-scale Russian-Ukrainian war. *BMC Psychiatry*, 25(1), Article 236. <https://doi.org/10.1186/s12888-025-06654-1>; Prykhodko, O., Hordiienko, I., Hordiienko, O., Klymenko, T., & Klymenko, O. (2024). The risk of developing alcohol addiction – what coping strategies do Ukrainian military personnel use after participating in intense hostilities? *European Journal of Clinical and Experimental Medicine*, 22(3), 482–490. <https://doi.org/10.15584/ejcem.2024.3.1>; Hanhan, Y., Yang, Y., Porpult, O., Melnichuk, I., & Synitska, T. (2024). A study of cyber-addictions in Ukrainian youth. *Amazonia Investiga*, 13(78), 124–133. <https://doi.org/10.34069/AI/2024.78.06.11>.

⁶³ Polyvianaia, A., Vyshnya, K., Kovalchuk, O., Klymenko, V., & Klymenko, T. (2025). Mental health of university students twenty months after the beginning of the full-scale Russian-Ukrainian war. *BMC Psychiatry*, 25(1), Article 236. <https://doi.org/10.1186/s12888-025-06654-1>; Prykhodko, O., Hordiienko, I., Hordiienko, O., Klymenko, T., & Klymenko, O. (2024). The risk of developing alcohol addiction – what coping strategies do Ukrainian military personnel use after participating in intense hostilities? *European Journal of Clinical and Experimental Medicine*, 22(3), 482–490. <https://doi.org/10.15584/ejcem.2024.3.1>

⁶⁴ Polyvianaia, A., Vyshnya, K., Kovalchuk, O., Klymenko, V., & Klymenko, T. (2025). Mental health of university students twenty months after the beginning of the full-scale Russian-Ukrainian war. *BMC Psychiatry*, 25(1), Article 236. <https://doi.org/10.1186/s12888-025-06654-1>; Prykhodko, O., Hordiienko, I., Hordiienko, O., Klymenko, T., & Klymenko, O. (2024). The risk of developing alcohol addiction – what coping strategies do Ukrainian military personnel use after participating in intense hostilities? *European Journal of Clinical and Experimental Medicine*, 22(3), 482–490. <https://doi.org/10.15584/ejcem.2024.3.1>

⁶⁵ Goto, R., Pinchuk, I., Kolodezhny, O., Pimenova, N., Kano, Y., & Skokauskas, N. (2024). Mental health of adolescents exposed to the war in Ukraine. *JAMA Pediatrics*, 178(5), 480–488. <https://doi.org/10.1001/jamapediatrics.2024.0295>; International Organization for Migration. (2024). *Mental health in Ukraine: Displacement, vulnerabilities and support – Thematic brief (November 2024)*. <https://reliefweb.int/report/ukraine/mental-health-ukraine-displacement-vulnerabilities-and-support-thematic-brief-november-2024>; Polyvianaia, A., Vyshnya, K., Kovalchuk, O., Klymenko, V., & Klymenko, T. (2025). Mental health of university students twenty months after the beginning of the full-scale Russian-Ukrainian war. *BMC Psychiatry*, 25(1), Article 236. <https://doi.org/10.1186/s12888-025-06654-1>.

⁶⁶ International Organization for Migration. (2024). *Mental health in Ukraine: Displacement, vulnerabilities and support – Thematic brief (November 2024)*. <https://reliefweb.int/report/ukraine/mental-health-ukraine-displacement-vulnerabilities-and-support-thematic-brief-november-2024>; Hanhan, Y., Yang, Y., Porpult, O., Melnichuk, I., & Synitska, T. (2024). A study of cyber-addictions in Ukrainian youth. *Amazonia Investiga*, 13(78),

CONCLUSION

Addiction in wartime Ukraine is better viewed as the result of interacting neurobiological and social pressures rather than any single factor⁶⁷. Dopamine-related reinforcement remains central to addictive processes, but under wartime conditions, these mechanisms are shaped by trauma, displacement, chronic uncertainty, and reduced coping resources across different social groups⁶⁸. The reviewed evidence also indicates that vulnerability is modified by age: adolescents, young adults, and younger military personnel appear to be especially susceptible under sustained war-related stress⁶⁹. At the same time, substance-related and behavioral addictions should be considered within a common framework of maladaptive reward-seeking while preserving their clinical distinctions⁷⁰. These findings support the need for trauma-

124–133. <https://doi.org/10.34069/AI/2024.78.06.11>; Prykhodko, O., Hordiienko, I., Hordiienko, O., Klymenko, T., & Klymenko, O. (2024). The risk of developing alcohol addiction – what coping strategies do Ukrainian military personnel use after participating in intense hostilities? *European Journal of Clinical and Experimental Medicine*, 22(3), 482–490. <https://doi.org/10.15584/ejcem.2024.3.1>

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⁶⁹ Goto, R., Pinchuk, I., Kolodezhny, O., Pimenova, N., Kano, Y., & Skokauskas, N. (2024). Mental health of adolescents exposed to the war in Ukraine. *JAMA Pediatrics*, 178(5), 480–488. <https://doi.org/10.1001/jamapediatrics.2024.0295>; Polyvianai, A., Vyshnya, K., Kovalchuk, O., Klymenko, V., & Klymenko, T. (2025). Mental health of university students twenty months after the beginning of the full-scale Russian-Ukrainian war. *BMC Psychiatry*, 25(1), Article 236. <https://doi.org/10.1186/s12888-025-06654-1>; Prykhodko, O., Hordiienko, I., Hordiienko, O., Klymenko, T., & Klymenko, O. (2024). The risk of developing alcohol addiction – what coping strategies do Ukrainian military personnel use after participating in intense hostilities? *European Journal of Clinical and Experimental Medicine*, 22(3), 482–490. <https://doi.org/10.15584/ejcem.2024.3.1>.

⁷⁰ World Health Organization. (2024). *Clinical descriptions and diagnostic requirements for ICD-11 mental, behavioural and neurodevelopmental disorders*. World Health Organization. <https://iris.who.int/server/api/core/bitstreams/dcf73611-9e0f-4d5c-85f6-85a58b0da6de/content>; Kalivas, P. W., & Volkow, N. D. (2005). The neural basis of addiction: A pathology of motivation and choice. *American Journal of Psychiatry*, 162(8), 1403–1413. <https://doi.org/10.1176/appi.ajp.162.8.1403>; Hanhan, Y., Yang, Y., Porpult, O., Melnichuk, I., & Synitska, T. (2024). A study of cyber-addictions in Ukrainian youth. *Amazona Investiga*, 13(78), 124–133. <https://doi.org/10.34069/AI/2024.78.06.11>.

informed, age-sensitive, and integrated approaches to prevention and support in wartime Ukraine, especially for youth, displaced populations, and military personnel⁷¹.

SUMMARY

This narrative review examines how dopaminergic processes, age-related susceptibility, and war-related social stress contribute to substance-related and behavioral addictions in Ukraine during the full-scale Russian invasion. It focuses on three related dimensions of risk: neurobiological reinforcement, developmental factors, and wartime adversity across civilians, displaced populations, and military personnel.

The review draws on peer-reviewed articles, international reports, and official health materials identified through PubMed, PubMed Central, Google Scholar, and other academic databases. The review primarily includes publications from 2020 to May 2026, while earlier foundational studies were included to clarify dopamine function, addiction neurobiology, and developmental risk.

This is a narrative rather than a systematic review, so no formal PRISMA protocol was applied. The literature was selected for its relevance to the research question and grouped into four thematic domains: dopaminergic mechanisms of addiction formation, behavioral and substance-related addictions in youth; war-related social vulnerability and addiction risk in Ukraine; and age- and occupation-related differences, including military personnel.

The literature suggests that addiction risk in wartime Ukraine is shaped by the interaction of neurobiological reward processes and prolonged social stress rather than by any single factor. Dopamine-related reinforcement remains central to craving, reward salience, and repeated seeking behavior, while wartime trauma, displacement, economic hardship, bereavement, and reduced social support may heighten risk by weakening adaptive coping. The reviewed evidence indicates greater risk under sustained war-related stress among adolescents, young adults, internally displaced persons, refugees, bereaved individuals, and some military subgroups. The literature also suggests that wartime addictive behavior may involve both psychoactive substances and behavioral forms, including problematic digital use among young people.

The evidence base is heterogeneous with respect to study design, sample composition, age structure, and outcome definitions, and many studies assess distress, coping, or addiction risk rather than clinically confirmed addiction. As this is a narrative review, the conclusions should be read as an analytical synthesis rather than a pooled effect estimate or a formal assessment of evidence quality.

In wartime Ukraine, addiction risk may increase when dopaminergic reinforcement interacts with developmental sensitivity and chronic social stress. These findings support trauma-informed, age-sensitive, and socially targeted prevention and intervention

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approaches, especially for adolescents and young adults, displaced populations, bereaved individuals, and military personnel living under sustained war-related stress.

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