Ditiuk Pavlo,
Senior Researcher of the Laboratory of Cyberpsychology,
G.S. Kostiuk Institute of Psychology of the NAES of Ukraine
nitelabor@gmail.com
http://orcid.org/0000-0002-1142-1201
Meshcheriakov Dmytro,
PhD in Psychological Sciences,
Deputy Director for Scientific and Experimental Work,
G.S. Kostiuk Institute of Psychology of the NAES of Ukraine
meoldom@gmail.com
https://orcid.org/0000-0001-6831-8654
Nazar Maksym,
PhD in Psychological Sciences, Senior Researcher,
Acting Head of the Laboratory of Cyberpsychology,
G.S. Kostiuk Institute of Psychology of the NAES of Ukraine
apartment@bigmir.net
https://orcid.org/0000-0002-9104-2585
Redka Iryna,
PhD in Biological Sciences, Associate Professor,
V.N. Karazin Kharkiv National University
iredka@karazin.ua
https://orcid.org/0000-0002-9620-9452
Smulson Maryna,
Full Member of the NAES of Ukraine,
Doctor of Psychological Sciences, Professor,
Chief Scientific Researcher of the Laboratory of Cyberpsychology,
G.S. Kostiuk Institute of Psychology of the NAES of Ukraine
smulson@ukr.net
http://orcid.org/0000-0002-9563-3390
Starkov Denys,
PhD, Researcher in Laboratory of Cyberpsychology,
G.S. Kostyuk Institute of Psychology, NAES of Ukraine
https://orcid.org/0000-0001-9220-8703
votr@ukr.net

The role of digital screening in determining the psycho-emotional state of the population of Ukraine in conditions of war and post-war recovery

Abstract. *The full-scale war in Ukraine has led to a sharp rise in the prevalence of mental health disorders: anxiety symptoms have been identified in 54.1% of respondents, depression in 46.8%, and PTSD in at least 20% of the adult population within 18 months of the invasion. Given the bidirectional relationship between psychoemotional disorders and somatic pathology — in particular, a 53–61% increased risk of cardiovascular disease associated with PTSD — the need for an integrated digital psychoemotional screening system is substantiated. The*

proposed system combines psychodiagnostics tools, biological indicators, and machine learning methods for automated risk stratification and patient routing.

Keywords: *psychoemotional screening, mental health, PTSD, anxiety, depression, cardiovascular disease, digital health, war, Ukraine, artificial intelligence, psychological support.*

Дітюк Павло Павлович,
старший науковий співробітник
лабораторії кіберпсихології Інституту психології
імені Г.С. Костюка НАПН України

Мещеряков Дмитро Сергійович,
кандидат психологічних наук,
заступник директора з науково-експериментальної роботи,
Інститут психології імені Г.С. Костюка НАПН України
Назар Максим Миколайович,
кандидат психологічних наук, старший дослідник,
в.о. завідувача лабораторії кіберпсихології,
Інститут психології імені Г.С. Костюка НАПН України
Редька Ірина Василівна,
кандидат біологічних наук, доцент,
Харківський національний університет імені В.Н. Каразіна
Смульсон МЛ.
Дійсний член НАПН України,
доктор психологічних наук, професор,
головний науковий співробітник лабораторії кіберпсихології,
Інститут психології імені Г.С. Костюка НАПН України
Старков Денис Юрійович,
кандидат психологічних наук,
науковий співробітник в лабораторії кіберпсихології,
Інститут психології імені Г.С. Костюка НАПН України

Роль цифрового скринінгу у визначенні психоемоційного стану населення України в умовах війни та повоєнного відновлення

Анотація. *В умовах повномасштабної війни в Україні спостерігається стрімке зростання поширеності психічних розладів: симптоми тривоги виявлено у 54,1% опитаних, депресії — у 46,8%, а ПТСР — у щонайменше 20% дорослого населення через 18 місяців після початку вторгнення. Враховуючи двосторонній зв'язок між психоемоційними розладами та соматичною патологією, зокрема підвищення ризику серцево-судинних захворювань на 53–61% при ПТСР, обґрунтовується необхідність створення інтегрованої цифрової системи психоемоційного скринінгу. Запропонована система поєднує психодіагностичні методики, біологічні показники та*

методи машинного навчання для автоматизованої стратифікації ризиків і маршрутизації пацієнтів.

Ключові слова: *психоемоційний скринінг, ментальне здоров'я, ПТСР, тривога, депресія, серцево-судинні захворювання, цифрова охорона здоров'я, війна, Україна, штучний інтелект, психологічна допомога.*

There is no doubt that the war has had a negative impact on the mental health of Ukrainians, particularly regarding the rates of PTSD, anxiety, and depression. For instance, several surveys conducted at the beginning of the war, as well as during its first year, showed that 52.7% of respondents experienced symptoms of psychological distress, 54.1% had symptoms of anxiety, 46.8% showed symptoms of depression, and 12.1% suffered from insomnia (see, e.g., Xu et al., 2023). Studies comparing mental health status among non-displaced individuals, internally displaced persons (IDPs), and refugees also indicated that PTSD symptoms were present and increased slightly from the non-displaced group (11.02) to internally displaced persons (12.55) and refugees (12.90). Kurapov et al. (2023) also found a significant rise in stress levels, which were even higher among internally displaced persons and refugees who had left the country. Similar results were obtained in a survey by Lushchak et al. (2023).

A year after the invasion (September 2023), an online study (Martsenkovskyi et al., 2024) of 2,050 adults living in Ukraine showed that approximately one-third of the participants (36%) met the diagnostic criteria for at least one of seven stress-associated mental disorders 18 months after russia's full-scale invasion (PTSD - 11% + CPTSD - 9% [20%], generalized anxiety disorder - 15%, prolonged grief disorder - 11.5%, depressive disorder - 8%, alcohol use disorder – 8%, cannabis use disorder - 1.5%). The cited studies, like many others, demonstrate the emergence of significant mental health challenges, primarily tied to stress-associated mental disorders, and a corresponding sharp increase in the prevalence rates of PTSD/CPTSD, anxiety, and depression.

However, it is clear that the disorders identified at the beginning of the war represent only the "tip of the iceberg" and reflect the ongoing impact of chronic (prolonged) stress on the mental health of Ukrainians. Furthermore, the subsequent impact of mental health disorders on somatic health is quite evident. This relationship is bidirectional: a decline in physical health following psychotrauma increases the likelihood of developing PTSD. On the other hand, research indicates that PTSD increases the probability of cardiovascular diseases (myocardial infarction, stroke) by 53–61%, as well as the risk of developing chronic heart failure by 44% (see, e.g., Hargrave et al., 2022).

Consequently, there is an urgent need for screening, ideally continuous, or at least periodic. Given the vast amount of information that needs to be collected and processed, this screening must be digital (Panok et al; 2025). The importance of such an approach, as well as respondents' potential trust in data collection and processing within the digital environment, is convincingly demonstrated by the results of our survey of adult Ukrainian citizens conducted at the beginning of the war. This study, in particular, aimed to determine the role and place of virtual

space technologies in their lives, as well as to identify the connection between recovery from traumatic impact and the supportive aspects of the virtual space (Smulson et al., 2024).

Respondents were asked to answer a series of questions regarding the impact of the Internet and social networks (virtual space technologies) on their lives during wartime. According to the obtained data, the Internet and social networks exert a significant impact on people's lives, particularly during the war, as they serve as a means of communication while simultaneously providing access to information, as well as opportunities for education and professional development. For instance, nearly half of the respondents (44.3%) agree with the statement: "Everything I know and understand about life right now is due to information from the Internet."

The survey data indicate that the virtual space can also influence social interactions and community building. Individuals use digital platforms not only for entertainment but also to maintain connections, especially under conditions where physical meetings are limited. Social networks are becoming a tool for self-expression and self-identification, allowing users to present their interests and values. They also play a role in shaping public opinion and mobilizing civic engagement. However, it is crucial to consider that this influence can have both positive and negative consequences, depending on how people use these tools and interact with online information. Furthermore, 49.2% of those surveyed confirm that all their friends are also on social networks.

At the same time, the respondents' answers clearly indicate that the Internet is essential for learning, self-improvement, and self-development, particularly under challenging life conditions such as war (and previously, COVID-19). A vast majority of individuals (80.6%) use information from the Internet to enhance their professional performance. This confirms that adults find ways to utilize digital technologies for positive change despite external circumstances. Additionally, a significant portion of the sample (40.1%) noted that their self-development is also connected to social networks.

As can be seen from the data presented above, it can be argued that there is a baseline, initial trust among the majority of adult Ukrainian citizens in the content and form of virtual space technologies. We believe, that digital screening, including mental health screening, should be perceived by them as a reliable tool and a serious, productive aid. In other words, screening should serve as one of the stages of support that fosters trust and motivation for further engagement.

The psychoemotional screening system must be based on a multidisciplinary approach that combines clinical psychology, evidence-based medicine, and modern data processing methods, particularly through specialized neural networks (LLMs, AI). The foundation of such a model could be a system of diverse biological indicators, psychodiagnostic techniques, scales, and questionnaires designed to assess depression levels, signs of PTSD and acute stress, anxiety, propensity for maladaptive behavior, and risk factors for psychoemotional disorders, among others.

For the software implementation of such a system, we propose the application of automated response processing from a pre-trained machine learning model (LLM, AI) using natural language processing, supplemented by local language models to reduce the rate of misinterpretation. The quality of the collected data is to be controlled by algorithms for detecting careless responses, while the analytical module utilizes appropriate analysis methods (frequency, correlation, and multivariate) for automated risk stratification.

The expected accuracy of classifying (assessing) patients by their level of psychoemotional and cardiovascular risk must be at least 85% to ensure a clinically meaningful level of sensitivity sufficient for system implementation.

If implemented, the result will be a unified digital risk assessment model (system) across all levels of medical and psychological care for the primary assessment of patients' psychoemotional state, cardiovascular system, and autonomic manifestations.

Furthermore, unlike currently available digital solutions, this system model will not be limited to isolated tests or questionnaires. It will comprehensively analyze screening results and automatically determine whether a specific individual requires additional psychological or medical assistance. Thanks to subsequent integration with medical information systems, this digital system will automatically reroute patients to the appropriate specialists or designated services when a need is identified or specific risks/predetermined indicators are detected.

We propose that this system may improve access to psychological support at the primary care level, facilitate earlier identification of individuals at elevated risk, and contribute to reducing barriers and stigma related to seeking mental health care.

AI Involvement: Gemini 3 was used for reference formatting, search, and translation. Grammarly AI was used for grammar and punctuation correction.

References

1. Ben-Ezra, M., Goodwin, R., Leshem, E., & Hamama-Raz, Y. (2023). PTSD symptoms among civilians being displaced inside and outside Ukraine during the 2022 Russian invasion. Psychiatry Research, 320, 115011. https://doi.org/10.1016/j.psychres.2022.115011.
2. Hargrave A.S., Sumner J.A., Ebrahimi R., Cohen B.E. (2022). Posttraumatic Stress Disorder (PTSD) as a Risk Factor for Cardiovascular Disease: Implications for Future Research and Clinical Care. In: Curr Cardiol Rep. 2022 Dec;24 (12):2067-2079. doi: 10.1007/s11886-022-01809-y
3. 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, 1190465. https://doi.org/10.3389/fpsyt.2023.1190465.
4. Lushchak, O., Velykodna, M., Bolman, S., Strilbytska, O., Berezovskyi, V., & Storey, K. B. (2023). 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. Lancet Regional Health – Europe, 36, 100773. https://doi.org/10.1016/j.lanepe.2023.100773

5. Martsenkovskyi 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, 1–8 https://doi.org/10.1192/j.eurpsy.2024.12
6. Panok, B., Shevchenko, A., Nazar, M., Starkov, D., Meshcheriakov, D., & Shevtsov, A. (2025). Methodological principles of educational and psychological chatbot development. *Information Technologies and Learning Tools*, 106, 2, https://doi.org/10.33407/itlt.v106i2.5872
7. Smulson, M. L., Ditiuk, P. P., Nazar, M. M., Meshcheriakov, D. S., Zinchenko, O. V., & Starkov, D. Yu. (2024). Proiektuvannia virtualnoho osvitnyoho prostoru rozvytku sуbiektnosti doroslykh v umovakh pisliavoiennoho vidnovlennia Ukrainy [Designing a virtual educational space for the development of adult agency in the context of Ukraine's post-war recovery]. Kyiv.
8. Xu, W., Pavlova, I., Chen, X., Petrytsa, P., Graf-Vlachy, L., & Zhang, S. X. (2023). Mental health symptoms and coping strategies among Ukrainians during the Russia-Ukraine war in March 2022. International Journal of Social Psychiatry, 69(4), 957–966. https://doi.org/10.1177/00207640221143919