

NEW PAPERS

War-induced stress and arterial hypertension: a prospective study among Ukrainian refugee women

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Growing evidence supports the impact of psychological factors such as traumatic lifetime experiences that may result in Post-Traumatic Stress Disorder (PTSD) on the incidence of arterial hypertension (AH) and cardiovascular diseases (CVD). The war in Ukraine is exposing a million inhabitants to traumatic stressors. Millions of Ukrainians (mostly women and children) left the country to escape war. The prevalence of PTSD in refugees is extremely high, usually in the range of 20-40%¹ compared to an estimate lifetime prevalence of PTSD ~6% in the US population.²

As stated by the World Health Organization (WHO), “one in five (22%) people, who have experienced war or other conflict in the previous 10 years, will have depression, anxiety, post-traumatic stress disorder.” In applying these estimates to Ukraine, WHO expects that approximately 9.6 million people in Ukraine will develop a mental health condition. If unaddressed, this latter will contribute to a high burden of chronic diseases in the next decades, particularly cardiovascular diseases and hypertension.³

However, to our knowledge, the association between hypertension and PTSD has not been investigated in refugees, particularly among women.

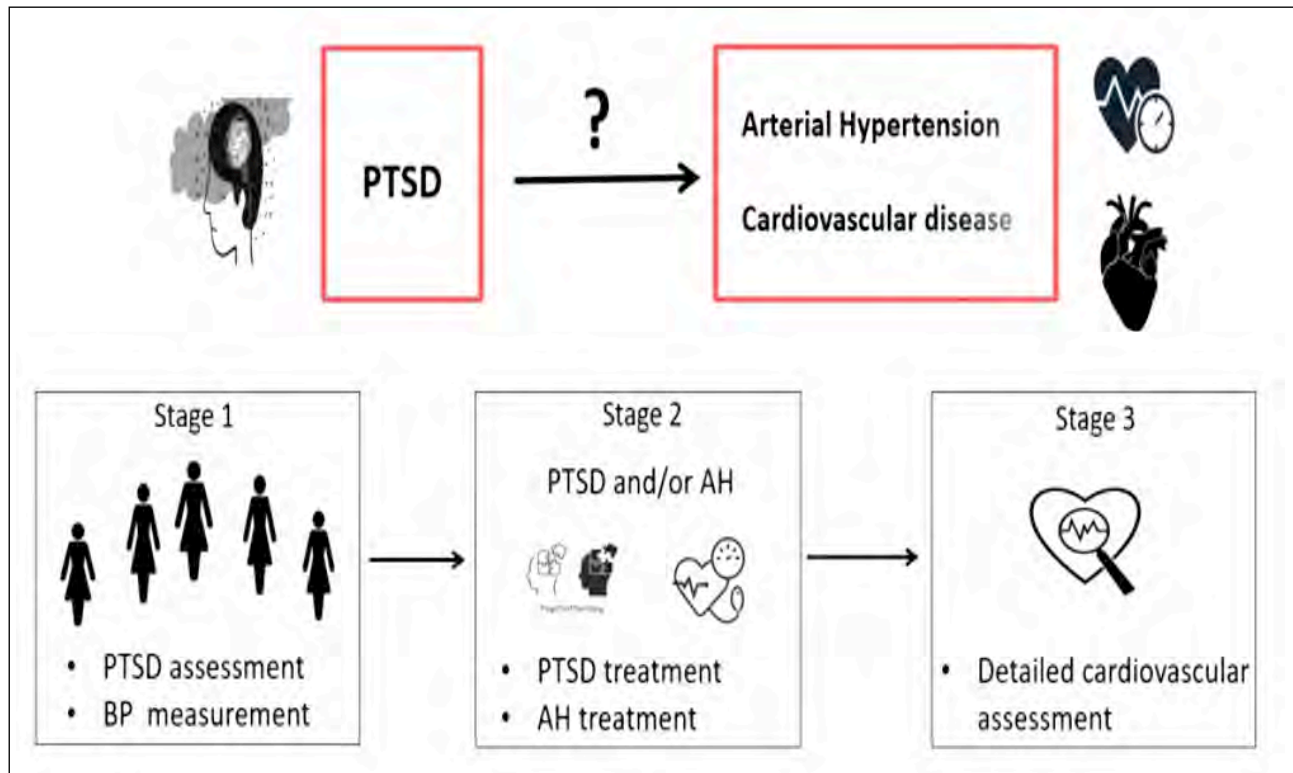
We are conducting a scientific project named: “The impact of war-induced stress on the development and progression of arterial hypertension and



cardiovascular disease in Ukrainian female refugees” in the Clinic of Hypertension and Diabetology of the Medical University of Gdansk (Poland). The project (No 2022/45/P/NZ5/02812) is co-funded by the National Science Centre and the European Union’s Horizon 2020 research and innovation programme under the Marie Skłodowska-Curie grant agreement (No 945339).⁴

In this study we test the hypothesis that trauma and psychological stress exposure contribute to BP elevation and progression of CVD in female refugees and that cardiovascular complications could be prevented by the early management of these women. Results will provide new evidence on the effect of integrated management, including psychological therapy, on BP and cardiovascular risk. Such an approach may be further tested and

Figure 1. Hypothesis and stages of the study



extrapolated to other populations exposed to war and chronic violence, migrants and refugees around the world. Overall, about 500 Ukrainian women will be enrolled in the study in Poland and compared to women who stayed in Ukraine.

Our study consists of 3 stages:

- At Stage 1, we assess the prevalence of AH and PTSD among Ukrainian refugees and estimate the impact of war-related trauma exposure on these parameters. Data on BP will be compared to data already collected in STEPS data 2019 and May Measurement Month 2021 in Ukraine, matched for age and sex.
- Stage 2 will involve subjects diagnosed with HTN and/or PTSD referred for management and follow-up of these conditions. Psychologic targeted therapies will be offered to subjects with confirmed PTSD, with a periodical reassessment of the severity of PTSD-associated symptoms and of its impact on HTN and cardiovascular health. Clinical history and characteristics will be compared among three groups: subjects with HTN and PTSD, with HTN without PTSD, with PTSD but without HTN.

- Stage 3 will involve a subgroup among those screened in Stage 1, with the objective of investigating the biological mechanisms underlying the relation between HTN and trauma exposure, identifying early signs of subclinical target organ damage in subjects with HTN with/without PTSD.

Detailed information about our study “The impact of war on the development and progression of arterial hypertension and cardiovascular disease: protocol of a prospective study among Ukrainian female refugees” was published in *Frontiers in Cardiovascular Medicine*.⁵

The first results of our project were published in the October issue of *Hypertension*. In our research letter entitled “Association of high blood pressure with post-traumatic stress disorder in Ukrainian female refugees”, we have presented the data of the first-year-war refugees enrolled in our project.⁶ Among 55 refugees, 30 women were hypertensive and 25 women were normotensive. Hypertensive and normotensive patients did not differ in terms of level of education, socio-economic conditions, social support, area of origin, or direct exposure to war. However, a significant difference was noted in the prevalence and severity of PTSD, as well as in the emotional safety in the study groups.

The multivariate logistic regression performed to ascertain the effects of PTSD, age, and obesity on the likelihood of hypertension was statistically significant ($p < 0.0001$).⁶

In this analysis of 55 Ukrainian female refugees in Poland, the main findings were the following:

- the prevalence of PTSD in refugees (22%) was 7-fold higher than in Ukrainian women before the war (3%)⁷ but in the expected range compared to that documented in exiles and refugees from other countries⁸
- PTSD composite scores were much higher and PTSD diagnosis was 9-fold more frequent in hypertensive than in normotensive women, in parallel with a persistent lower sense of safety.

We assume that the higher feeling of persistent unsafety and increased prevalence of PTSD despite similar exposure to war-related trauma may result from differences in emotion coping mechanisms.

Our assumptions will be clarified after analysing the results of a detailed cardiovascular assessment, re-evaluation of stress questionnaires and psychiatric consultation. By collaborating with research centers from three regions of Ukraine with different levels of military actions (Kharkiv, Kyiv and Ivano-Frankivsk), we plan to organize a prospective assessment of the state of the cardiovascular system and the severity of PTSD in women who remained on the territory of Poland since the beginning of the war compared with Ukrainian women who remained on the territory of Ukraine.

By implementing our project, we have a mission to draw the attention of the wider scientific community, stakeholders and patients to the human, psychological and social aspects of the war-induced stress problem that requires a complex solution. This will ensure that significant progress is made and that data and tools from this initiative will be made available to other disease areas.

This study also provokes hypothesis on the combined impact of bio-psycho-social factors on the long-term general health with modifiable mental health factors impacting cardiovascular morbidity.

References

1. Blackmore R, Boyle JA, Fazel M, Ranasinha S, Gray KM, Fitzgerald G, Misso M, Gibson-Helm M. The prevalence of mental illness in refugees and asylum seekers: A systematic review and meta-analysis. <https://doi.org/10.1371/journal.pmed.1003337>.
2. Stewart IJ, Sosnov JA, Howard JT, Orman JA, Fang R, Morrow BD, Zonies DH, Bollinger M, Tuman C, Freedman BA, Chung KK. Retrospective analysis of long-term outcomes after combat injury: a hidden cost of war. *Circulation*. 2015;132:2126–2133. doi: 10.1161/CIRCULATIONAHA.115.016950.
3. WHO: Scaling-up mental health and psychosocial services in war-affected regions: best practices from Ukraine: World Health Organization; 2022 [updated 16.12.2022. Available from: <https://www.who.int/news-room/feature-stories/detail/scaling-up-mental-health-and-psychosocial-services-in-war-affected-regions--best-practices-from-ukraine>.
4. <https://warscar.mug.edu.pl/>
5. Shalimova A, Stoenoiu MS, Cubała WJ, Burnier M, Persu A, Narkiewicz K. The impact of war on the development and progression of arterial hypertension and cardiovascular disease: protocol of a prospective study among Ukrainian female refugees. *Frontiers in Cardiovascular Medicine*. 2024;10.
6. Shalimova A, Stoenoiu MS, Manolache N-G, Cubała WJ, Burnier M, Narkiewicz K., Persu A. Association of High Blood Pressure With Post-Traumatic Stress Disorder in Ukrainian Women Refugees. *Hypertension*. Vol. 81, N 10, October 2024; P. e128-e131.
7. WHO: Ukraine Hypertension Fact Sheet, 2019 [Available from: https://cdn.who.int/media/docs/default-source/country-profiles/hypertension/ukr_en.pdf?
8. Blackmore R, Gray KM, Boyle JA, Fazel M, Ranasinha S, Fitzgerald G, et al. Systematic Review and Meta-analysis: The Prevalence of Mental Illness in Child and Adolescent Refugees and Asylum Seekers. *J Am Acad Child Adolesc Psychiatry*. 2020;59(6):705-14.

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