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**RESULTS OF THE STUDY ON THE IMPACT OF AIR RAID SIREN
SOUNDS ON THE PSYCHO-EMOTIONAL STATE OF UKRAINIANS
DURING THE WAR**

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Abstract: The impact of the sound of an air alarm on the human psyche is an inevitable phenomenon. Exposure to the sound of an air alarm can potentially be destructive to psycho-emotional state of person's; hence the irrevocable relevance of the study of the main psycho-emotional symptoms/manifestations of this influence as an objective basis for formulating recommendations for the prevention of environmental damage to the population of Ukraine.

Key words: impact, sounds of air raid siren; psycho-emotional state; Ukrainians; war.

Ukrainians have faced a heavy ordeal – living in the cruel realities of war. Frustration, anxiety, stress, apathy, and even depression are symptoms of every other Ukrainian today. If you ask an ordinary Ukrainian what associations the word "war", you can hear many different responses, for example: aggressor country, suffering, pain, total chaos, and signal of air alarm. Clearly, the sound of the signal of an air alarm has become one of the most original acoustic irritants of our daily lives. That is why the question of studying the impact of the sound of the signal of air alarm on the psycho-emotional state of Ukrainians during the war seems very relevant.

The aim of the study: to theoretically substantiate and empirically investigate the features of the impact of the signal of air alarm sound on the psycho-emotional

state of Ukrainians in wartime conditions.

The research objective is specified in the following research tasks:

1. Analyze scientific approaches to studying the stated problem.
2. Analyze the sound of the signal of air alarm (SAA) using spectral analysis methods, based on a recording of the SAA in Ternopil; especially analyze the frequency of the SAA sound as one of the main physical quantities and its potential impact on humans.
3. Empirically identify the characteristic of the impact of the signal of air alarm signal on the psycho-emotional state of respondents in wartime conditions; conduct quantitative and qualitative analysis of the obtained information.
4. Empirically analyze the relationship between the reactive anxiety with other components of the psycho-emotional and psychophysiological spheres of the respondents.
5. Substantiate the relevance of the getting results for developing recommendations on protecting the mental health of Ukrainians in wartime conditions, their psycho-emotional sphere.

The topic of the impact of sound on the human psyche has interested and continues to attract the attention of scientists from various professional parts, such as psychology, neurobiology, acoustic engineering, and others. Also well, there are scientific studies on the specific impact of signal of air alarm on emotional state and mental health. For example, this problem has been studied by foreign scientists: M. Kirk (who proves that signals from air alarms have a negative impact on the psycho-emotional state of a person); S. Janssen, F. Van Den Berg, and H. Vos (the impact of signal of air alarm on the quality of life). In domestic psychology, the impact of signals from air alarms on the mental state of a person has been studied by L. Kozak (the effectiveness of psychotherapy in treating post-traumatic stress disorder caused by signals of air alarms) and O. Ponomarenko (the relationship between the level of anxiety and the sense of security in people who have experienced signals of air alarms).

In the scientific world, sound is waves with frequencies that correspond to the

limits of human hearing perception, with the intensity of the stimulus needing to be no less than the minimum sensitivity threshold. At the same time, it should be noted that the sensitivity threshold correlates with the sound frequency. Sound waves that exceed the ecological norms of safe frequency, according to the standards established by Ukrainian legislation, are considered noise and are bad to the human psyche and the body. A person is able to perceive sound by the duration of the stimulus, loudness, pitch, and timbre (frequency of oscillations). These characteristics will be studied in the practical aspect of our work.

The empirical research program included the application of the following research methods:

1. Method of spectral analysis to study the sound of the air raid siren.
2. An author-developed mixed-type questionnaire containing both closed and open-ended questions.
3. The method of scaled self-assessment of the psychophysiological state by Kokun.
4. The Spielberger-Hanin scale the level of reactive (situational) anxiety.
5. The results of the empirical research were processed using methods of mathematical statistics in the statistical program "SPSS".

The research sample consisted of 200 respondents - residents of the city of Ternopil and Ternopil region.

The spectral analysis allowed us to specifically analyze the intensity and related frequency of the air raid siren sound. The sound was more intense at low frequencies, particularly in the range from 440 Hz to 4.9 kHz. It is worth mentioning that low-frequency fluctuation causes a range of psycho-emotional and psychophysiological symptoms in individuals: irritation, sleep disturbances, a feeling of internal vibration, vision impairment, ringing in the ears, asthenic syndrome, fatigue, and etc.

Using the developed questionnaire, we were able to gather material regarding respondents' perception of the air raid siren sound, their subjective marks of its duration, intensity, and loudness. Detected that the perception of the duration of the

air raid siren's stimulus reflects rather subjective tendencies in the respondents' assessments, the duration of the stimulus is much reduced, which typically happens when the loudness of the sound stimulus is quite strong, thereby suppressing the sensitivity of the analyzer. For most participants (69%), the sound subjectively became louder. 66% mentioned that they went to shelters at the beginning of the war when the air raid siren sounded, but today, only 25% of them continue to go to shelters, while 75% of respondents stay at home. In response to the question "How does the sound of the air raid siren affect you? What emotional states arise first when you hear the air raid siren signal?" only 1% of respondents did not provide any answer. However, 54% of respondents indicated anxiety, 39% indicated anger, and 35% indicated exhaustion.

The most prominent psycho-emotional state reported by respondents was anxiety. We tried to examine this aspect in more detail using the "State-Trait Anxiety Inventory" by Spielberger. To more specifically investigate the state of our respondents during the air raid siren, we modified the application conditions of the state anxiety scale, proposing the respondents with the following instruction: "Please assess your state during the air raid siren signal." The results were striking with extreme indicators: 90% of respondents showed a high level of situational anxiety, and only 10% had a medium level of reactive anxiety, with no results for a low level. Very high anxiety levels (> 46) directly correlate with the presence of neurotic conflict, emotional and neurotic breakdowns, and potentially with psychosomatic manifestations. We conclude that reactive (situational) anxiety, as a state during the air raid siren, is subjectively experienced by respondents with high tension, worry, preoccupation, and nervousness. The situation itself is perceived as distressing and extreme in intensity.

It seemed relevant for us to investigate how situational anxiety correlates with other components of the psycho-emotional and psychophysiological spheres of a person. To this end, we used the rapid assessment method of the psychophysiological state by Kokun. The obtained results allow us to make assumptions about the most vulnerable components of the psycho-emotional and psychophysiological spheres of

the respondents. It turned out that during the air raid siren, respondents experienced deterioration in the following areas: "Well-being": low level – 90%, below average - 7%; "Mood": low level – 84%, below average – 8%; "Work capacity": low level – 80%, below average – 7%; "Activity": low level – 76%, below average – 9%; "Interest in the process": low level – 70%, below average – 15%; "Self-confidence": low level – 63%, below average – 12%; "Willingness to perform tasks (going to shelter)": low level – 50%, below average – 11%.

So, the impact of the air raid siren sound on the human psyche is inevitable. The influence of the air raid siren sound can potentially be destructive to a person's psycho-emotional state; hence, the unambiguous relevance of researching the main psycho-emotional symptoms and manifestations of this impact as an objective basis for formulating recommendations to prevent ecological harm to the population of Ukraine.

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